
# QuantaMesh Ethernet Switch CLI User Guide

QNOS Software Platform

# REVISIONS

| Version | Date | Description | Authors |
|---|---|---|---|
| 1.0 | 13-Dec-2016 | First publish | Mark Yang, Garfield Hsieh, Kelin Zhong, William Chen, Thomas Lin |
| 1.1 | 20-Jan-2017 | Correct wording and wrong information | Thomas Lin, Garfield Hsieh |
| 1.2 | 31-Oct-2017 | New commands:<br>■ Security: 5.5.7.2, 5.13.11, 5.19.4~5.19.6<br>■ BGP: 6.10.1.20, 6.10.1.27, 6.10.2.15~18<br>■ CLI Scheduler: 5.5.14<br>■ RBAC: 5.34<br>■ BFD for Static Route: 6.2.2.10<br>Revised commands:<br>■ Security: 5.5.6, 5.10.2, 5.11.2, 5.13.1, 5.13.3, 5.19.2<br>■ BGP: 6.2.1.6, 6.10.1.1, 6.10.1.15, 8.3.1.5<br>■ System Utility: 5.19.2.2<br>■ DHCPv6 Snooping: 8.6<br>Removed commands:<br>■ Dot1x (802.1X) Supplicant commands | Garfield Hsieh, Rynn Yeh, Eddie Chang |
| 1.3 | 17-Nov-2017 | ■ Remove unsupported features in 1.1.5, 1.2, and 1.5.<br>■ Add new sections for 802.1x auto authentication command in section 5.11.26 and time zone commands in section 5.35. | Garfield Hsieh |
| 1.4 | 19-Dec-2017 | ■ Modify supported AAA authentication method in 5.11.6<br>■ Delete 5.12.6 and 5.12.7 | Garfield Hsieh |
| 1.5 | 29-Dec-2017 | ■ Revise SNMP commands: 5.5.4.2, 5.5.4.5, 5.5.4.6, 5.5.4.10, 5.5.4.12, 5.5.4.14, 5.5.4.16, 5.5.5.1, 5.5.5.2<br>■ Add New commands: SNMP: 5.5.6 | Janice Chou, Garfield Hsieh |
| 1.5.1 | 08-Jan-2017 | Following features and CLI commands are not yet supported in T7032-IX1<br>■ MLAG with RSTP | Thomas Lin |

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| | | ■ MLAG with IGMP snooping<br>■ BGP Graceful restart<br>■ OpenFlow v1.3<br>■ IPv6 DHCP snooping<br>■ CLI schedule<br>■ SSL for RESTful<br>■ OpenAPI/RESTful – VTEP configuration | |
| 1.6 | 02-Feb-2018 | New commands:<br>■ Add LACP section in 5.2.11.5 ~ 5.2.11.7<br>■ Add SDM section in 5.5.15<br>■ Add CLIBanner section in 5.19.21<br>■ Add FluentD section in 10<br>■ Add BFD VRF Static route in 6.2.2.11.<br>■ Add OSPF section in 6.3.2.30, 6.3.2.59~60.<br>Revised commands:<br>■ Change the Telnet port from 23 to 122.<br>■ Modify features in 1.2<br>■ Modify the description in 2.5.6<br>■ Fix incorrect wording in 5.5.3.10, 5.34.5, 9.1.8 ~ 9.1.11<br>■ Add limitation in 5.24.2.5 and 5.24.2.11<br>■ Add some parameters in 5.19.2.2<br>■ Modify 5.19.1.5 to support retaining IP address on service port<br>■ Modify 6.9.2.<br>■ Modify 5.19.4 ~ 5.19.6.<br>■ Modify 6.3.1.1 ~ 5, 6.3.1.8, 6.3.1.10 ~ 15, 6.3.1.17, 6.3.2.1, and 6.3.2.24 ~ 29 to support OSPF VRF<br>Removed commands:<br>■ Remove redundant chapter 5.5.11<br>■ Remove 5.2.11.5 and 5.2.11.11 about adminmode commands for port channel | Janice Chou, Garfield Hsieh |
| 1.7 | 26-Mar-2018 | New commands:<br>■ BGP + VRF, dynamic neighbors, and extended communities: 6.10.1.20, 6.10.1.21, 6.10.1.30, 6.10.2.19, 6.10.2.43, 6.10.2.45, 6.10.2.66, | Cathy Sun, Terry Liu, Garfield Hsieh |

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| | | and 6.10.2.67.<br>■ Port-channel resilient-hashing: 5.2.11.14<br>■ VXLAN+Multicast: 5.32.5<br>■ SPT: 5.5.32 and 5.5.33<br>Revised commands:<br>■ Support BGP + VRF: 6.10.1.22 and 6.10.2.42.<br>■ SPT: 5.5.30 and 5.5.31<br>■ VLAN: 5.2.1.9<br>■ MLAG: 5.30.12<br>■ VXLAN: 5.32.6<br>■ Protected Ports: 5.2.1.9 and 5.2.5.5<br>Remove commands:<br>■ Protected Ports: 5.4 and 5.18<br>■ MLAG: 5.30.8 | |
| 1.8 | 28-Sept-2018 | New commands:<br>■ Support CLI command log: 5.6.22 ~ 24<br>■ Support RADIUS host with link-local address: 5.12.14<br>■ Support TACACS server with link-local address: 5.13.4<br>■ Support Link-Flap: 5.17.22<br>■ Support Loop Detection: 5.17.23<br>■ Support License Key: 5.17.24<br>■ Support MLAG configuration consistency display: 5.28.18 and 5.28.19<br>■ Support VRRPv3: 6.11<br>Revised commands:<br>■ Remove the display message “LACP Min. Links”: 5.2.1.5<br>■ Add the display message “Admin Key”: 5.2.1.5<br>■ Remove the display message “Sys Priority”: 5.2.11.5<br>■ Modify the command name: 5.2.11.20<br>■ Remove the none option: 5.5.32<br>■ Revise RADIUS host to suppor IPv6: 5.12.2, | Cathy Sun, Rynn Yeh, Garfield Hsieh |

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| | | 5.12.3, and 5.12.13<br>■ Revise some wording in LLDP: 5.16<br>■ Change default from Disabled to Enabled: 5.16.18 and 5.16.19<br>■ Change the behavior of erasing factory-defaults: 5.17.5<br>■ Change ACL command format: 5.22.2.4 and 5.23.2.4<br>■ Revise display content: 5.28.15<br>■ Add two causes in Auto Recovery: 5.31.1, 5.31.3, and 5.31.4<br>Remove commands:<br>■ Port Channel: 5.2.11.6 (show lacp partner) and 5.2.11.21 (lacp actor system priority)<br>■ Linktrap: 5.2.1.13.6<br>■ ACL: 5.23.4 | |
| 1.9 | 03-Dec-2018 | New commands:<br>■ Add missed commands in sFlow: 5.4.11.15 ~ 16<br>■ Add missed commands for FEC: 5.2.1.14.13 and 5.2.1.13<br>Revised commands:<br>■ Revise some wording in Port-Channel: 5.2.11.4 and 5.2.11.13<br>■ Correct the default value of LACP admin key and LACP actor admin key: 5.2.11.16 and 5.2.11.17<br>■ Revise commands to support 100/50/25G: 5.2.1.6, 5.2.1.14.9, 5.1.17.1, and 5.2.17.2<br>Remove commands:<br>■ 802.1x: 5.10.26 (dot1x port-auto-auth all) | Garfield Hsieh, Han Lin |
| 2.0 | 11-Dec-2018 | New commands:<br>■ Support OpenFlow 1.3: 9.4<br>Revised commands:<br>■ Revise command to support IPv6 address of SNMP server: 5.4.4.5<br>■ Revise some wording: 5.2.11.16, 5.2.11.17, 5.17.23.1 | Garfield Hsieh, Cathy Sun, Goerge Hu, Rynn Yeh |

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| | | ■ Correct the default value of Loop-detection action: 5.17.23.4<br>■ Revise commands to support more options in clear counters: 5.17.1.7<br>■ Revise commands to support more options in dcbx: 5.16.8, 5.16.9, and 5.16.19~5.16.21<br>■ Revise command of IPv6 OSPF area: 8.4.2.2<br>Remove commands:<br>■ 802.1x: 5.10.26 (dot1x port-auto-auth all)<br>■ LLDP MED related commands<br>■ PIM-DM related commands and wording | |
| 2.1 | 03-Jan-2019 | New commands:<br>■ Support VRF configuration under BGP: 6.10.2.68 ~ 6.10.2.70<br>Revised commands:<br>■ Revise command to support VRF in BGP: 6.10.1.2 ~ 6.10.1.4, 6.10.1.7, 6.10.1.9 ~ 6.10.1.11, 6.10.1.13 ~ 6.10.1.14, 6.10.2.3 ~ 6.10.2.12, 6.10.2.14, 6.10.2.21 ~ 6.10.2.32, 6.10.2.35, 6.10.2.37 ~ 6.10.2.42, 6.10.2.44, 6.10.2.47 ~ 6.10.2.53, and 6.10.2.55 | Garfield Hsieh |
| 2.2 | 07-Jan-2019 | Revised commands:<br>■ Revise command to support static route with VRF: 6.2.2.7 ~ 6.2.2.9 | Garfield Hsieh |
| 2.3 | 26-Feb-2019 | New commands:<br>■ Support VRF configuration: 6.12<br>Revised commands:<br>■ Remove unsupported display messages: 5.5.2 and 5.5.8<br>■ Remove address type option: 5.15.10<br>■ Refine wording and add missed options: 5.22.2.9 and 5.23.2.3<br>■ Correct the command format: 6.2.2.14 | Garfield Hsieh |
| 2.4 | 22-May-2019 | New commands:<br>■ Support ISSU commands: 5.17.25<br>■ Support BHD commands: 6.13<br>■ Support RIOT commands: 5.30.12 and | Garfield Hsieh |

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| | | 5.30.13<br>■ Add missed commands for BGP: 6.10.2.71<br>Revised commands:<br>■ Modify display messages to support RIOT: 5.30.9 | |
| 2.5 | 15-July-2019 | Refine the wording in 2.4.<br>Add the port number information in 2.5.4 and 3.3.1.<br>Revised commands:<br>■ 5.2.1.14.12: speed-duplex<br>■ 5.2.1.14.13: Change default value of FEC<br>■ 5.4.12.5: Modify the comments of the command<br>■ 8.3.2.27: Move this command to the right category<br>New commands:<br>■ 8.7: New commands for DHCPv6 | Garfield Hsieh |
| 2.6 | 14-Aug-2019 | Revised commands:<br>■ 5.1.13: Modify the comments of the section<br>■ 5.2.8.11: Add the comments for the output<br>■ 5.2.7.18: Add missed output of the command<br>■ 5.2.7.19, and 5.2.7.20: Modify the comments of the command<br>New commands:<br>■ Add missed command in 5.2.7.26 | Garfield Hsieh |
| 2.7 | 29-Aug-2019 | Revised commands:<br>■ 5.2.7.18: Modify the output of show command to support Last Member Query Count/Interval<br>■ 5.22.1.3: Update the comments of the Displayed Message<br>■ 5.22.2.4, 5.22.2.9, and 5.23.2.3: Modify the comments of the command options<br>New commands:<br>■ Add commands in 5.2.7.27 ~ 5.2.7.30 and 5.2.9.23 ~ 5.2.9.26: Support Last Member Query Count/Interval | |

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| 2.8 | 25-Dec-2019 | New commands:<br>■ Support ECN commands: 5.24.1.6, 5.24.2.7, 5.24.2.8.<br>■ Support Auto-Nego commands: 5.2.1.14 and 5.2.1.22<br>■ Support IP SLA commands: 6.14<br>■ Support PBR with VRF commands: 6.9.2.17 and 6.9.2.18<br>■ Support BGP-EVPN commands: 6.10.1.7, 6.10.1.31 ~ 36, 6.10.2.68, 6.10.2.70 ~ 77<br>■ Support Link Debounce commands: 5.34<br>■ Support 1-Pass RIOT commands: 5.30.10, 5.30.15, and 5.30.16<br>■ Support DCBX Application Priority commands: 5.16.11, 5.16.22, 5.16.23, 5.16.27, and 5.16.28.<br>Revised commands:<br>■ Modify for FEC: 5.2.1.27<br>■ Modify display messages to support RIOT: 5.30.9<br>■ Modify to support VRRPv3 with BFD commands: 6.11.1.1. and 6.11.2.9<br>■ Remove 6.10.2.15 and 6.10.2.16: BGP GR is enabled by default.<br>■ Correct the ASN number to support BGP 4-Byte ASN: 6.10.2.1, 6.10.2.32, and 6.10.2.55.<br>■ Refine section titles: 5.30<br>■ Remove duplicated commands: 5.2.17, 6.10.2.43 | Garfield |

# CONTENTS

# 1. Introduction

## 1.1. Product Overview

The Quanta top-of-rack (ToR) Ethernet Switch provides high performance, high availability and simplicity management. They are designed for adaptability and scalability for campus and data center.

### 1.1.1. Simplicity

The Quanta Switch can be managed through industry standard command-line interface (CLI) which reduces the training and operating costs. It also supports Simple Network Management Protocol (SNMP) both rom standard MIB and private MIB for network administrator to easily configure, monitor, and manage remotely. The Auto-installation feature implemented helps centralized management to simplify deployment of a truly plug-and-play experience. With the evolution from IPv4 to IPv6, the switch is an IPv6 integrated management device.

### 1.1.2. High Availability

The Quanta Switch is designed for high availability from both hardware and software perspective. The key features include:

- 1+1 hot-swappable power supplies

- Out-of-band management supported

- 802.1D, 802.1w and 802.1s supported

- Up to 8 ports per link aggregation group (LACP) and up to 64 groups

- Multi-chassis LAG for preventing the risks of single point failure

- Up to 32 paths ECMP routing for load balancing and redundancy

- Virtual Router Redundancy Protocol (VRRP) supported

### 1.1.3. High-Performance L2/L3 Access Deployments

With the compact 1U form factor, high density ports in the front panel, front to back or back to front airflow design, the Quanta switch is idea for top-of-rack deployments in high-performance, highly demanding data centers. The high switching capacity to be a powerful solution to aggregate high-performance servers in the data center.

### 1.1.4. Advance IPv4 and IPv6 Routing

The Quanta Switch is a full layer 2 and layer 3 routing switch that supports advanced IPv4 and IPv6 routing features such as OSPFv2, BGP4, and OSPFv3. The multicast routing features for IGMP v1/v2/v3, PIM-SM, MLD v1/v2 and PIM- SM6 are all supported.

### 1.1.5. Data Center Applicaion

The Quanta Switch is an IEEE DCB-based switch delivering a high-performance solution to integrate server edge access. The key features include:

- Enhanced Transmission Selection (ETS, 802.1Qaz)

- Priority-based Flow Control (PFC, 802.1Qbb)

- Data Center Bridging Extension (DCBX, 802.1Qaz)

- FCoE Initiation Protocol (FIP) snooping

## 1.2. Features

- IEEE 802.3z and IEEE 802.3x compliant Flow Control for all ethernet ports
- Supports 802.1S MSTP, and 802.1w Rapid Spanning Tree for redundant back up bridge paths
- Supports 802.1Q VLAN, Double VLAN, IGMP snooping, 802.1p Priority Queues, Port Channel, port mirroring
- Link Aggregation (802.1ad LACP)
- Multi-chassis Link Aggregation (MLAG)
- Supports LLDP with potential communication problems detection
- Supports Port Security
- Multi-layer Access Control (based on MAC address, IP address, VLAN, Protocol, 802.1p, DSCP)
- Quality of Service (QoS) customized control
- 802.1x access control and RADIUS client support
- TACACS+ support
- UDLD support
- Administrator-definable port security
- Supports DHCP Snooping, Dynamic ARP Inspection and IP Source Guard (IPSG)
- ARP support
- IP Routing support
- OSPF v2 and v3 support
- BGP4 Support
- Router Discovery Protocol support
- Virtual Router Redundancy Protocol (VRRP) v2 support
- VLAN Routing support
- 32-way ECMP support
- 31 subnets support
- Source IP configuration support
- Policy Based Routing (PBR)
- IP Multicast support
- IGMP v1, v2, and v3 support

- Protocol Independent Multicast - Sparse Mode (PIM-SM) support for IPv4 and IPv6
- IPv6 function
    - Supports DHCPv6 protocol, OSPFv3 protocol, Tunneling, loopback
    - Provides to configure IPv6 routing interface, routing preference
- DHCP Client and Relay support
- IP Helper (BOOTP/DHCP Relay)
- DNS Client and Relay support
- DDNS client support
- Per-port bandwidth control
- SNMP v1, v2, v3 network management, RMON support
- CLI management support
- Fully configurable either in-band or out-of-band control via RS-232 console serial connection
- Telnet remote control console
- TraceRoute support
- Traffic Segmentation
- TFTP/FTP upgrade
- SysLog support
- Email Alerting support
- CLI Scheduler support
- Simple Network Time Protocol support
- SSH Secure Shell v2.0 support; not support SSH v1.5.
- SSL Secure HTTP TLS Version 1 and SSL version 3 support
- Auto Install Support
- Fiber Channel Over Ethernet(FCoE)
    - FIP Snooping
- Data Center Bridge (DCB)
    - Enhanced Transmission Selection (ETS, IEEE 802.1Qaz)
    - Priority Flow Control (PFC, IEEE 802.1Qbb)

Application Priority (IEEE 802.1Qaz)

- Data Center Bridge Exchange (DCBX, IEEE802.1Qaz)

  CEE 1.01 support

  IEEE version support

## 1.3. Management Options

The system may be managed by using one Service Ports through a Telnet, SNMP function, and using the console port on the front panel through CLI command.

## 1.4. Command Line Console Interface Through The Serial Port or Telnet

You can also connect a computer or terminal to the serial console port or use Telnet to access the Switch. The command-line-driven interface provides complete access to all switch management features.

## 1.5. SNMP-Based Management

You can manage the Switch with an SNMP-compatible console program. The Switch supports SNMP version 1.0, version 2.0, and version 3.0. The SNMP agent decodes the incoming SNMP messages and responds to requests with MIB objects stored in the database. The SNMP agent updates the MIB objects to generate statistics The Switch supports a comprehensive set of MIB extensions:

- RFC1493 Bridge
- RFC 2819 RMON-MIB
- RFC 2233 Interface MIB
- RFC 2618 (Radius-Auth-Client-MIB)
- RFC 2620 (Radius-Acc-Client-MIB)
- RFC 1850 (OSPF-MIB)
- RFC 1850 (OSPF-TRAP-MIB)
- RFC 2787 (VRRP-MIB)
- RFC 3289 - DIFFSERV-DSCP-TC
- RFC 3289 - DIFFSERV-MIB
- QOS-DIFFSERV-EXTENSIONS-MIB
- QOS-DIFFSERV-PRIVATE-MIB
- RFC 2674 802.1p
- RFC 2932 (IPMROUTE-MIB)
- Quanta Enterprise MIB
- ROUTING-MIB
- MGMD-MIB
- RFC 2934 PIM-MIB
- IANA-RTPROTO-MIB
- MULTICAST-MIB
- ROUTING6-MIB
- IEEE8021-PAE-MIB
- INVENTORY-MIB
- MGMT-SECURITY-MIB
- QOS-MIB

- QOS-ACL-MIB
- QOS-COS-MIB
- QOS-AUTOVOIP-MIB
- QOS-DIFFSERV-PRIVATE-MIB
- QOS-ISCSI-MIB
- RFC 1907 - SNMPv2-MIB
- RFC 2465 - IPV6-MIB
- RFC 2466 - IPV6-ICMP-MIB
- TACACS-MIB
- IGMP/MLD Snooping
- IGMP/MLD Layer2 Multicast
- QoS – IPv6 ACL
- Guest VLAN
- LLDP-MIB
- LLDP MED
- RFC 2925 (DISMAN-TRACEROUTE-MIB)
- OSPFV3-MIB
- RFC 2571 - SNMP-FRAMEWORK-MIB
- RFC 2572 - SNMP-MPD-MIB
- RFC 2573 - SNMP-NOTIFICATION-MIB
- RFC 2573 - SNMP-TARGET-MIB
- RFC 2574 - SNMP-USER-BASED-SM-MIB
- RFC 2576 - SNMP-COMMUNITY-MIB
- RFC 2263 - USM-TARGET-TAG-MIB
- RFC 3176 - SFLOW-MIB
- IEEE8023-LAG-MIB (IEEE Std 802.3ad)
- RFC 2674 - P-BRIDGE-MIB
- RFC 2674 - Q-BRIDGE-MIB
- RFC 2737 - ENTITY-MIB

- RFC 2863 - IF-MIB
- RFC 3635 - Etherlike-MIB
- PORTSECURITY-PRIVATE-MIB
- RADIUS-CLIENT-PRIVATE-MIB
- RFC 5060 - PIM-STD-MIB
- RFC 5240 - PIM-BSR-MIB
- RFC 3419 - TRANSPORT-ADDRESS-MIB
- IANA-MAU-MIB

# 2. Installation and Quick Startup

## 2.1. Package contents

Before you begin installing the Switch, confirm that your package contains the following items:

- One Layer 2/3/4 Managed ToR Switch
- Mounting kit: 2 mounting brackets and screws
- Four rubber feet with adhesive backing
- Redundant AC power cord

## 2.2. Switch Installation

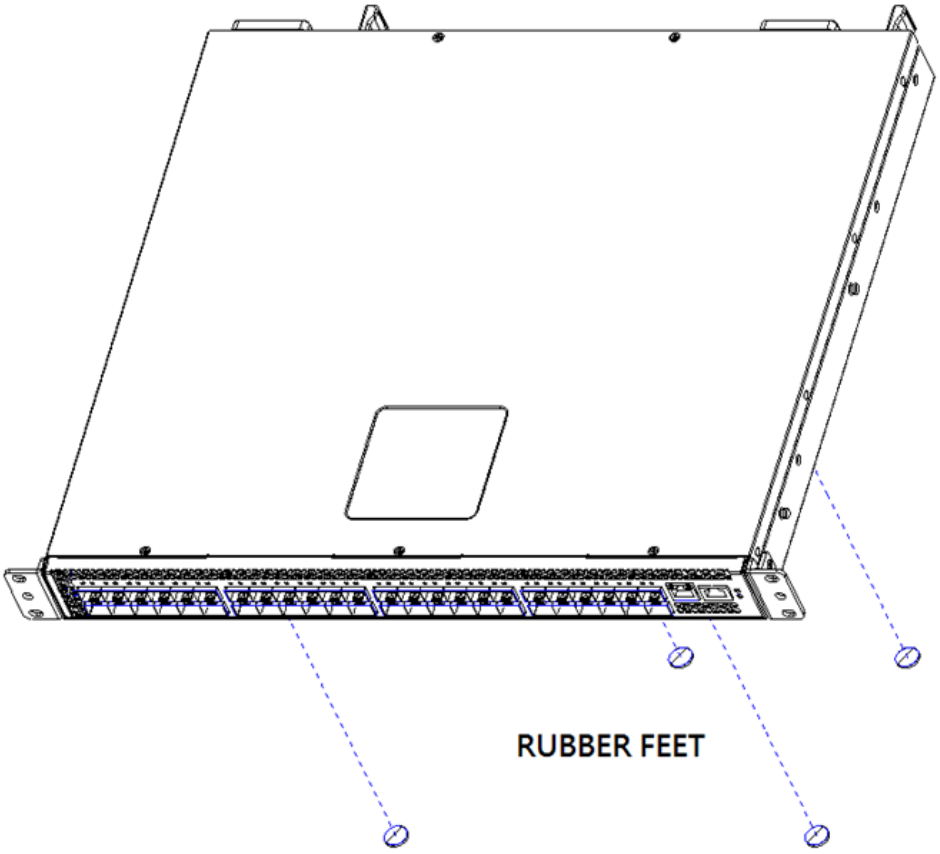
**Installing the Switch Without the Rack**

1. Install the Switch on a level surface that can safely support the weight of the Switch and its attached cables. The Switch must have adequate space for ventilation and for accessing cable connectors.

2. Set the Switch on a flat surface and check for proper ventilation. Allow at least 5 cm (2 inches) on each side of the Switch and 15 cm (6 inches) at the back for the power cable.

3. Attach the rubber feet on the marked locations on the bottom of the chassis.

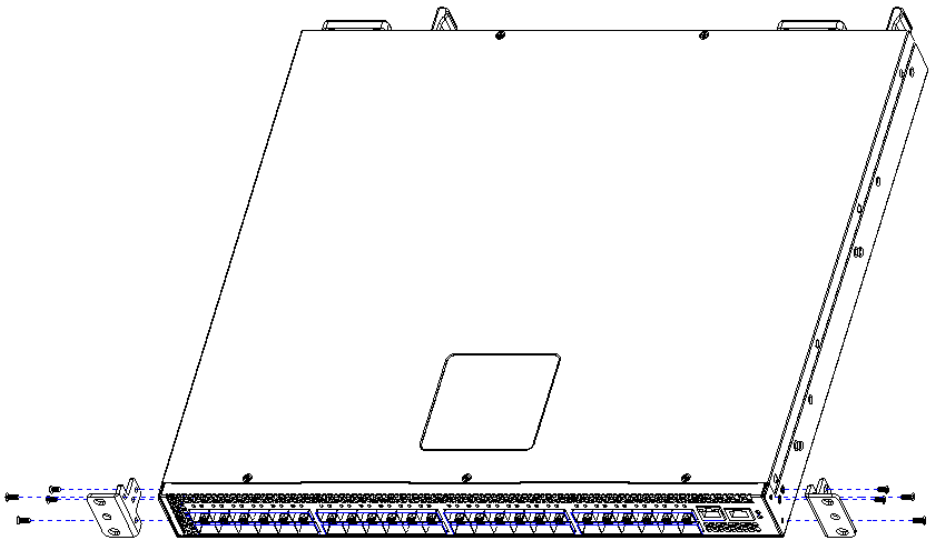
The rubber feet are recommended to keep the unit from slipping.



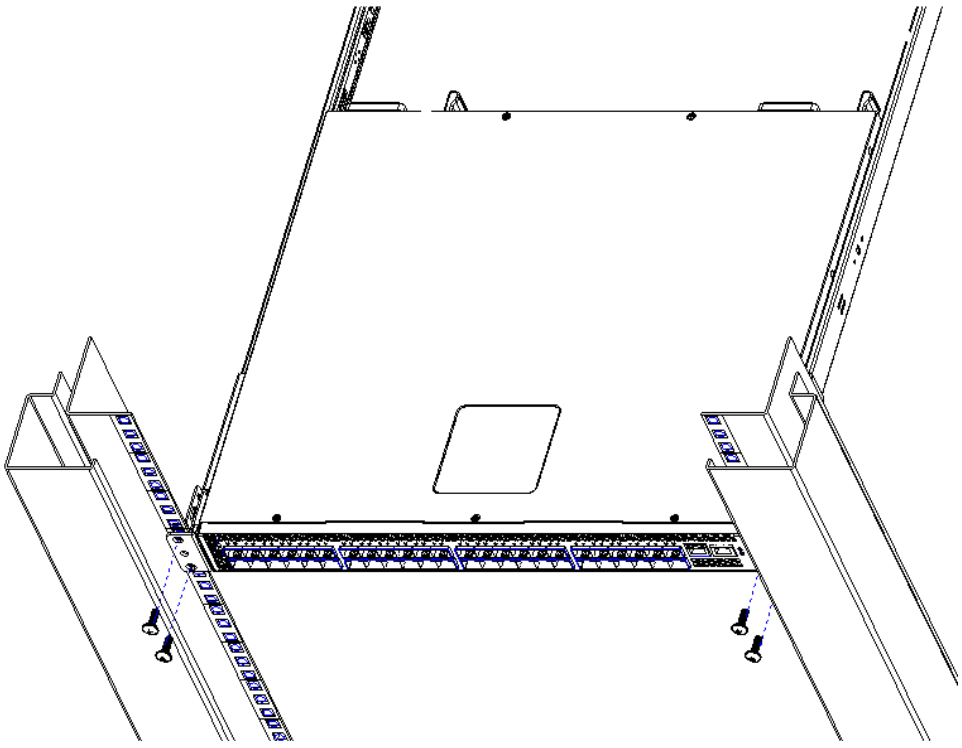
## 2.3. Installing the Switch in a Rack

You can install the Switch in most standard 19-inch (48.3-cm) racks. Refer to the illustrations below.

1. Use the supplied screws to attach a mounting bracket to each side of the Switch.
2. Align the holes in the mounting bracket with the holes in the rack.
3. Insert and tighten two screws through each of the mounting brackets.



MOUNTING EAR & SCREWS



## 2.4. Quick Starting the Switch

1. Read the device Installation Guide for the connectivity procedure. In-band connectivity allows access to the Switch locally. From a remote workstation, the device must be configured with IP information (IP address, subnet mask, and default gateway).

2. Turn the Power ON.

3. Allow the device to load the software until the login prompt appears. The device initial state is called the default mode.

4. If the device is based on X86 system, please login to the Linux system first with the following login and password information in the default mode:

   Login: **admin**
   Password: **qct**

   After logging to the Linux system, use the qnos-console command to access the QNOS OS command line interface. Please enter QNOS-console to access switch console session and remember must have "sudo" privileges:

   admin@Switch:~$ **sudo qnos-console**
   [sudo] password for admin: **qct**

   When seeing User prompt of QNOS, enter **admin** as username and WITHOUT password.

   User:admin
   Password:
   (Switch) #

   If the device is NOT based on X86 system, please proceed to step 5.

5. When the prompt asks for operator login, do the following:

   - Type the word **admin** in the login area. Since a number of the Quick Setup commands require administrator account rights, suggesting logging into an administrator account.
   - Do not enter a password because there is no password in the default mode.
   - Press the <Enter> key
   - The CLI Privileged EXEC mode prompt will be displayed.
   - Use "configure" to switch to the Global Config mode from Privileged EXEC.
   - Use "exit" to return to the previous mode.

## 2.5. System Information Setup

### 2.5.1. Quick Startup Softwre Version Information

Table 2-1. Quick Start up Software Version Information

| Command | Details |
|---|---|
| **show hardware** | Allows the user to see the HW & SW version the device contains<br>System Description - switch's model name |
| **show version** | Allows the user to see Serial Number, Part Number, and Model name<br>See SW loader, bootrom and operation version<br>See HW version |

### 2.5.2. Quick Startup Physical Port Data

Table 2-2. Quick Start up Physical Port

| Command | Details |
|---|---|
| **show interfaces status [<slot/port>]** | Displays the Ports slot/port<br>Type - Indicates if the port is a special type of port<br>Admin Mode - Selects the Port Control Administration State<br>Physical Mode - Selects the desired port speed and duplex mode<br>Physical Status - Indicates the port speed and duplex mode<br>Link Status - Indicates whether the link is up or down<br>Link Trap - Determines whether or not to send a trap when link status changes<br>LACP Mode - Displays whether LACP is enabled or disabled on this port<br>Flow Mode - Indicates the status of flow control on this port<br>Cap. Status - Indicates the port capabilities during auto-negotiation |

### 2.5.3. Quick Startup User Account Management

Table 2-3. Quick Start up User Account Management

| Command | Details |
|---|---|
| **show users** | Displays all users that are allowed to access the switch<br>User Access Mode - Shows whether the user is able to change parameters on the switch (Read/Write) or is only able to view (Read Only). |

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| | As a factory default, admin has Read/Write access and guest has Read Only access. There can only be one Read/Write user and up to 5 Read Only users. |
| **show loginsession** | Displays all login session information |
| **username <username> {passwd \| nopasswd}** | Allows the user to set passwords or change passwords needed to login<br>A prompt will appear after the command is entered requesting the old password. In the absence of an old password leave the area blank. The operator must press enter to execute the command.<br>The system then prompts the user for a new password then a prompt to confirm the new password. If the new password and the confirmed password match a message will be displayed.<br>The user password should not be more than eight characters in length. |
| **copy running-config startup-config** | This will save passwords and all other changes to the device. If you do not save config, all configurations will be lost when a power cycle is performed on the switch or when the switch is reset. |

## 2.5.4. Quick Startup IP Address

To view the network parameters the operator can access the device by the following three methods.

- Simple Network Management Protocol - SNMP
- Telnet via port **1223** for X86 system and via port **23** for other systems
- SSH via port **1234** for X86 system and via port **22** for other systems

Table 2-4. Quick Start up IP Address

| Command | Details |
|---|---|
| **show ip interface** | Displays the Network Configurations<br>Interface Status – Indicates whether the interface is up or down.<br>IP Address - IP Address of the interface<br>Subnet Mask - IP Subnet Mask for the interface.<br>MAC Address - The MAC Address used for this in-band connectivity<br>Network Configurations Protocol Current - Indicates which network protocol is being used. Default is None. |
| **ip address** | (Config)#*interface vlan 1*<br>(if-vlan 1)#*ip address <ipaddr> <subnet-mask>*<br>(if-vlan 1)#*exit*<br>(Config)#*ip default-gateway <gateway-addr>*<br>IP Address range from 0.0.0.0 to 255.255.255.255<br>Subnet Mask range from 0.0.0.0 to 255.255.255.255 |

| | |
|---|---|
| | Gateway Address range from 0.0.0.0 to 255.255.255.255<br>Displays all of the login session information |
| **show serviceport** | Display the serviceport's network configurations<br>Interface Status – Indicates whether the interface is up or down.<br>IP Address - IP Address of the interface. Default IP is 0.0.0.0<br>Subnet Mask - IP Subnet Mask for the interface. Default is 0.0.0.0<br>Default Gateway - The default Gateway for this interface. Default value is 0.0.0.0<br>Burned in MAC Address - The Burned in MAC Address used for out-of-band connectivity<br>Configured IPv4 Protocol - Indicates which network protocol is being used. Default is DHCP. |
| **serviceport ip** | (Config)#*serviceport protocol none*<br>(Config)#serviceport *ip <ipaddr> <netmask> <gateway>*<br>(Config)# |

## 2.5.5. Quick Startup Downloading from TFTP Server

Before starting a TFTP server download, the operator must complete the Quick Start up for the IPAddress.

Table 2-5. Quick Start up Downloading from TFTP Server

| Command | Details |
|---|---|
| **copy <url> startup-config <destfilename>** | Sets the download datatype to be an image or config file.<br>The URL must be specified as: tftp://ipAddr/filepath/fileName.<br>The startup-config option downloads the config file using tftp and image option downloads the code file. |

## 2.5.6. Quick Startup Factory Defaults

Table 2-6. Quick Start up Factory Defaults

| Command | Details |
|---|---|
| **clear config** | Enter yes when the prompt pops up to clear all the configurations made to the switch.<br>You can also decide if the IP settings of service port be kept or not in this command. |
| **copy running-config startup-config** | Enter yes when the prompt pops up that asks if you want to save the configurations made to the switch. |
| **reload [warm]** | Enter yes when the prompt pops up that asks if you want to reset the system.<br>You can reset the switch or cold boot the switch; both work effectively.<br>warm – indicates only switch application is restarted. |

# 3. Console and Telnet Administration Interface

This chapter discusses many of the features used to manage the Switch, and explains many concepts and important points regarding these features. Configuring the Switch to implement these concepts is discussed in detail in chapter 5.

The command-line interface (CLI) provides a text-based way to manage and monitor the switch features. You can access the CLI by using a direct connection to the console port or by using a Telnet or SSH client. To access the switch by using Telnet or Secure Shell (SSH), the switch must have an IP address configured on either the service port or the network interface, and the management station you use to access the device must be able to ping the switch IP address. DHCP is enabled by default on the service port. It is disabled on the network interface.

## 3.1. Local Console Management

Local console management involves the administration of the Switch via a direct connection to the RS-232 DCE console port. This is an Out-of-band connection, meaning that it is on a different circuit than normal network communications, and thus works even when the network is down.

The local console management connection involves a terminal or PC running terminal emulation software to operate the Switch's built-in console program (see Chapter 5). Using the console program, a network administrator can manage, control, and monitor many functions of the Switch. Hardware components in the Switch allow it to be an active part of a manageable network. These components include a CPU, memory for data storage, other related hardware, and SNMP agent firmware. Activities on the Switch can be monitored with these components, while the Switch can be manipulated to carry out specific tasks.

## 3.2. Setup Your Switch Using Console Access

Out-of-band management requires connecting a terminal, such as a VT-100 or a PC running a terminal-emulation program (such as HyperTerminal, which is automatically installed with Microsoft Windows) to the RS-232 DCE console port of the Switch. Switch management using the RS-232 DCE console port is called *Local Console Management* to differentiate it from management done via management platforms, such as DView or HP OpenView.

Make sure the terminal or PC you are using to make this connection is configured to match these settings. If you are having problems making this connection on a PC, make sure the emulation is set to VT-100 or ANSI. If you still don't see anything, try pressing <Ctrl> + r to refresh the screen.

First-time configuration must be carried out through a console, that is, either (a) a VT100-type serial data terminal, or (b) a computer running communications software set to emulate a VT100. The console must be connected to the Diagnostics port. This is an RS-232 port with a 9-socket D-shell connector and DCE-type wiring. Make the connection as follows:

1. Obtain suitable cabling for the connection. You can use a null-modem RS-232 cable or an ordinary RS-232 cable and a null-modem adapter. One end of the cable (or cable/adapter combination) must have a 9-pin D-shell connector suitable for the Diagnostics port; the other end must have a connector suitable for the console's serial communications port.

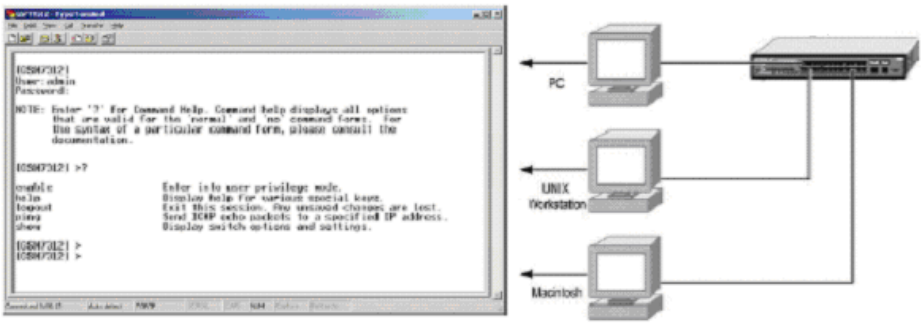
2. Power down the devices, attach the cable (or cable/adapter combination) to the correct ports, and restore power.

3. Set the console to use the following communication parameters for your terminal:

    - The console port is set for the following configuration:
    - Baud rate: 115,200
    - Data width: 8 bits
    - Parity: none
    - Stop bits: 1
    - Flow Control: none

A typical console connection is illustrated below:

Figure 3-1: Console Setting Environment


PC
UNIX
Workstation
Macintosh

## 3.3. Setup Your Switch Using Telnet Access

Once you have set an IP address for your Switch, you can use a Telnet program (in a VT-100 compatible terminal mode) to access and control the Switch. The port number for Telnet is 1223 for X86 systems and 23 for other systems. Most of the screens are identical, whether accessed from the console port or from a Telnet interface.

### 3.3.1. Accessing the Switch CLI through the Network

Remote management of the switch is available through the service port or through the network interface. To use telnet , SSH , or SNMP for switch management, the switch must be connected to the network, and you must know the IP or IPv6 address of the management interface. The switch has no IP address by default. The DHCP client on the service port is enabled, and the DHCP client on the network interface is disabled. The port number used to access the switch CLI is as follows:

- Telnet via port **1223** for X86 system and via port **23** for other systems
- SSH via port **1234** for X86 system and via port **22** for other systems

### 3.3.2. Using the Service Port or Network Interface for Remote Management

The service port is a dedicated Ethernet port for out-of-band management. We recommend that you use the service port to manage the switch. Traffic on this port is segregated from operational network traffic on the switch ports and cannot be switched or routed to the operational network. Additionally, if the production network is experiencing problems, the service port still allows you to access the switch management interface and troubleshoot issues. Configuration options on the service port are limited, which makes it difficult to accidentally cut off management access to the switch.

Alternatively, you can choose to manage the switch through the production network, which is known as in-band management, because in-band management traffic is mixed in with production network traffic, it is subject to all of the filtering rules usually applied on a switched/routed port such as ACLs and VLAN tagging. You can access the in-band network management interface through a connection to any front-panel port.

#### 3.3.2.1. *Configuing Service Port Information*

To disable DHCP/BootP and manually assign an IPv4 address, enter commands under Global Configuration mode:

serviceport protocol none

serviceport ip ipaddress netmask

For example, serviceport ip 192.168.2.22 255.255.255.0

To disable DHCP/BootP and manually assign an IPv6 address, enter commands under Global Configuration mode:

serviceport protocol none dhcp6

serviceport ipv6 enable

serviceport ipv6 address *prefix /prefix-length*

serviceport ipv6 gateway *ipv6-address*

To view the assigned or configured network address, use:

show serviceport

To enable the DHCP/DHCPv6 client on the service port, use:

serviceport protocol dhcp

serviceport protocol dhcp6

To enable the BootP client on service port, use:

serviceport protocol bootp

### 3.3.2.2. *Configuing the In-Band Network Interface*

To use a DHCP server to obtain the IP address, subnet mask, and default gateway information, use:

interface vlan 1

ip address dhcp

ipv6 address dhcp

To manually configure the IPv4 address, subnet mask, use:

interface vlan 1

ip address ipaddr subnet-mask

To manually configure the IPv6 address, subnet mask, use:

interface vlan 1

ipv6 address prefix /prefix-length

# 4. Command Line Interface Structure and Mode-based CLI

The Command Line Interface (CLI) syntax, conventions, and terminology are described in this section. Each CLI command is illustrated using the structure outlined below.

## 4.1. CLI Command Format

Commands are followed by values, parameters, or both.

Example 1

**ip address <ipaddr> <netmask> [<gateway>]**

- **ip address** is the command name.
- **<ipaddr> <netmask>** are the required values for the command.
- **[<gateway>]** is the optional value for the command.

Example 2

**snmp-server location <loc>**

- **snmp-server location** is the command name.
- **<loc>** is the required parameter for the command.

Example 3

**clear vlan**

- **clear vlan** is the command name.

Command

The text in bold, non-italic font must be typed exactly as shown.

## 4.2. CLI Mode-based Topology

### 4.2.1. Parameters

Parameters are order dependent.

The text in bold italics should be replaced with a name or number. To use spaces as part of a name parameter, enclose it in double quotes like this: "System Name with Spaces".

Parameters may be mandatory values, optional values, choices, or a combination.

- **<parameter>.**

  The <> angle brackets indicate that a mandatory parameter must be entered in place of the brackets and text inside them.

- **[parameter].**

  The [] square brackets indicate that an optional parameter may be entered in place of the brackets and text inside them.

- **{choice1 | choice2}.**

  The | indicates that only one of the parameters should be entered.

  The {} curly braces indicate that a parameter must be chosen from the list of choices.

### 4.2.2. Values

- **ipaddr**

  This parameter is a valid IP address, made up of four decimal bytes ranging from 0 to 255. The default for all IP parameters consists of zeros (that is, 0.0.0.0). The interface IP address of 0.0.0.0 is invalid.

- **macaddr**

  The MAC address format is six hexadecimal numbers separated by colons, for example 00:06:29:32:81:40.

- **areaid**

  Area IDs may be entered in dotted-decimal notation (for example, 0.0.0.1). An area ID of 0.0.0.0 is reserved for the backbone. Area IDs have the same form as IP addresses, but are distinct from IP addresses. The IP network number of the sub-netted network may be used for the area ID.

- **routerid**

  The value of <router id> must be entered in 4-digit dotted-decimal notation (for example, 0.0.0.1). A router ID of 0.0.0.0 is invalid.

- **slot/port**

  This parameter denotes a valid slot number, and a valid port number. For example, 0/1 represents unit number 1, slot number 0 and port number 1. The <slot/port> field is composed of a valid slot number and a valid port number separated by a forward slash (/).

- **logical slot/port**

  This parameter denotes a logical slot number, and logical port number assigned. This is applicable in the case of a port-channel (LAG). The operator can use the logical slot number, and the logical port number to configure the port-channel.

### 4.2.3. Conventions

Network addresses are used to define a link to a remote host, workstation, or network. Network addresses are shown using the following syntax:

Table 4-1. Network Address Syntax

| Address Type | Format | Range |
|---|---|---|
| **IPAddr** | A.B.C.D | 0.0.0.0 to 255.255.255.255 |
| **MacAddr** | YY:YY:YY:YY:YY:YY | hexadecimal digit pairs |

Double quotation marks such as "System Name with Spaces" set off user defined strings. If the operator wishes to use spaces as part of a name parameter then it must be enclosed in double quotation marks.

Empty strings (““) are not valid user defined strings. Command completion finishes spelling the command when enough letters of a command are typed to uniquely identify the command word. The command may be executed by typing <enter> (command abbreviation) or the command word may be completed by typing the <tab> (command completion).

The value 'Err' designates that the requested value was not internally accessible. This should never happen and indicates that there is a case in the software that is not handled correctly.

The value of '-----' designates that the value is unknown.

### 4.2.4. Annotations

The CLI allows the user to type single-line annotations at the command prompt for use when writing test or configuration scripts and for better readability. The exclamation point (‘!’) character flags the beginning of a comment. The comment flag character can begin a word anywhere on the command line and all input following this character is ignored. Any command line that begins with the character ‘!’ is recognized as a comment line and ignored by the parser.

Some examples are provided below:

**! Script file for displaying the ip interface**

**! Display information about interfaces**

**show ip interface 0/1 !Displays the information about the first interface**

**! Display information about the next interface**

**show ip interface 0/2**

**! End of the script file**

# 5. Switching Commands

## 5.1. System Information and Statistics Commands

This section describes the commands that use to display system information or statistics.

### 5.1.1. Show arp

This command displays connectivity between the switch and other devices from service port or management port. The Address Resolution Protocol (ARP) cache identifies the MAC addresses of the IP stations communicating with the switch.

**Format** show arp

**Default** None

**Mode** Privileged Exec

Example:

```
(Switch) #show arp

   MAC Address       IP Address     Interface
------------------- --------------- ------------
00:00:5E:00:01:03   172.16.3.254     Management
C4:54:44:F6:4F:8A   172.16.3.98      Management

(Switch) #
```

### 5.1.2. Show calendar

This command displays the system time.

**Format** show calendar

**Default** None

**Mode** Privileged Exec

Example:

```
(Switch) #show calendar
```

Timezone:Etc/UTC(UTC,+0000)
Oct  5 01:25:35 2019

(Switch) #

### 5.1.3. Show process cpu

This command provides the percentage utilization of the CPU by different tasks.

**Format** show process cpu

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show process cpu

Memory and Process CPU Utilization Info of Unit:1

Memory Utilization Report
status  KBytes
------ ----------
free  1277836
alloc  792756
CPU Utilization:

| PID | Name | 5 Secs | 60 Secs | 300 Secs |
|---|---|---|---|---|
| 10 | (rcu_sched) | 0.00% | 0.06% | 0.07% |
| 15 | (kworker/1:0) | 0.00% | 0.01% | 0.00% |
| 52 | (kworker/0:1) | 0.00% | 0.01% | 0.02% |
| 232 | (hwmon0) | 0.00% | 0.01% | 0.02% |
| 613 | (procmgr) | 0.00% | 0.08% | 0.09% |
| 720 | osapiTimer | 0.10% | 0.11% | 0.12% |
| 729 | bcmINTR | 0.10% | 0.07% | 0.06% |
| 730 | socdmadesc.0 | 0.20% | 0.14% | 0.13% |
| 733 | bcmMEM_SCAN.0 | 0.00% | 0.04% | 0.07% |
| 735 | bcmL2X.0 | 3.11% | 3.47% | 3.49% |

```
737        bcmCNTR.0            1.24%    1.50%    1.50%
740        bcmLINK.0            2.80%    2.65%    2.64%
741        bcmRX                0.00%    0.07%    0.07%
742        cpuUtilMonitorTask   0.20%    0.24%    0.25%
744        tL7Timer0            0.00%    0.03%    0.03%
750        simPts_task          0.00%    0.04%    0.04%
753        BootP                0.10%    0.01%    0.00%
760        emWeb                0.10%    0.01%    0.01%
774        hapiBroadBfdCtrlTas  0.31%    0.29%    0.29%
796        dot1s_timer_task     0.00%    0.06%    0.06%
800        radius_task          0.00%    0.02%    0.01%
806        snoopTask            0.00%    0.06%    0.07%
812        SNTP                 0.10%    0.01%    0.00%
827        pbrProcessingTask    0.00%    0.01%    0.00%
851        (ospf_app)           0.00%    0.01%    0.02%
888        RMONTask             0.00%    0.21%    0.28%
900        mlagTxTask           0.10%    0.01%    0.00%
924        openrTask            1.66%    1.86%    1.93%
---------------------------- -------- -------- --------
Total CPU Utilization           10.16%   11.30%   11.53%

(Switch) #
```

## 5.1.4. Show process cpu threshold

This command displays the configurations of CPU utilization threshold.

**Format** show process cpu threshold

**Default** None

**Mode** Privileged Exec

Example:

```
(Switch) #show process cpu threshold

CPU Utilization Monitoring Parameters
Rising Threshold..... 90 %
Rising Interval..... 3600 secs
Falling Threshold..... 50 %
```

Falling Interval..... 300 secs

CPU Free Memory Monitoring Threshold..... 0 KB

(Switch) #

## 5.1.5. Show eventlog

This command displays the event log, which contains error messages from the system.

**Format** show eventlog

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show eventlog

| File | Line | TaskID | Code | Time yyyy/mm/dd hh:mm:ss |
|---|---|---|---|---|
| EVENT> Boot! | 0 | 48474A24 | AAAAAAAA | 2016/06/07 21:22:57 |
| EVENT> Boot! | 0 | 48407104 | AAAAAAAA | 2016/06/07 17:38:56 |
| EVENT> Manual Reload! | 0 | 48407104 | 00000000 | 2016/06/07 17:36:12 |
| EVENT> Boot! | 0 | 48407104 | AAAAAAAA | 2016/06/07 17:12:40 |
| EVENT> Manual Reload! | 0 | 48407104 | 00000000 | 2016/06/07 17:09:45 |
| EVENT> Boot! | 0 | 48407104 | AAAAAAAA | 2016/06/05 00:04:36 |
| EVENT> Manual Reload Warm! | 0 | 48407104 | 00000000 | 2016/06/05 00:01:42 |
| EVENT> Boot! | 0 | 48407104 | AAAAAAAA | 2016/06/04 23:38:07 |
| EVENT> Manual Reload Warm! | 0 | 48474A24 | 00000000 | 2016/06/04 23:35:09 |
| EVENT> Boot! | 0 | 48474A24 | AAAAAAAA | 2016/06/04 22:01:35 |
| EVENT> Boot! | 0 | 48474A24 | AAAAAAAA | 2016/06/02 18:09:26 |
| EVENT> Boot! | 0 | 48474A24 | AAAAAAAA | 2016/06/02 03:26:04 |
| EVENT> Boot! | 0 | 48465024 | AAAAAAAA | 2016/06/01 21:29:27 |
| EVENT> Clear Event Log! | 0 | 48465024 | AAAAAAAA | 2016/05/31 23:07:58 |

(Switch) #

## 5.1.6. Show running-config

This command is used to display/capture the current setting of different protocol packages supported on switch. This command displays/captures only commands with settings/configurations with values that differ from the default value. The output is displayed in script format, which can be used to configure another switch with the same configuration.

The parameter “<scriptname>” means to redirect the current settings to a script file with an assigned name <scriptname>, which needs a fixed file name extension “.scr”.

The parameter “all” means to display/capture of all commands with settings/configurations that include values that are same as the default values.

The parameter “control-plane” means to display the running config of control-plane interface.

The parameter “mlag” means to display the running config of Multi-Chassis Link Aggregation (MLAG).

**Format** show running-config [<scriptname> | all | interface {<slot/port> | control-plane | loopback <loopback-id> | port-channel <portchannel-id> | tunnel <tunnel-id> | vlan <vlan-id>} | mlag]

**Default** None

**Mode** Privileged Exec

Example:

```
(Switch) #show running-config

!Current Configuration:
!
!System Description "Quanta IX8D - 48x25G SFP 8x100G QSFP, Runtime Code 19.12.00.14, Linux 4.14.4, 0"
!System Software Version "19.12.00.14"
!System Up Time          "0 days 0 hrs 5 mins 47 secs"
!Additional Packages     BGP-4,QOS,Multicast,IPv6,Routing,Data Center
!Current System Time: Dec 24 01:14:03 2019
!
configure
vlan database
exit

time-range
username "admin" passwd 7
928336800ccca32a4c218d5e93108e70239a6a11664300a29598ec3b4771b69fd1711bcccd59d465b2309c18879c5
0347d786118e6d332a4b21b337c620dcc5c level 15
username "admin" role "network-admin"
username "guest" role "network-operator"
line console
```

exit

line ssh
exit

interface vlan 1
exit
!
interface control-plane
exit
application install orig_restful_api
application install psme-network auto-restart
application install psme-rest-server auto-restart

interface vlan 1
ip address dhcp
exit

router ospf
exit
ipv6 router ospf
exit
exit

(Switch) #

### 5.1.7. Show sysinfo

This command displays switch brief information and MIBs supported.

**Format** show sysinfo

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show sysinfo

System Description..... LY9, Runtime Code 5.4.01.11, Linux 3.8.13-rt9, U-Boot 2010.12 (Oct 03 2014 - 14:38:07) - ONIE 2014.05.03-7
System Name..... QCT
System Location.....
System Contact.....
System Object ID..... 1.3.6.1.4.1.7244.100.2
System Up Time..... 0 days 0 hrs 33 mins 40 secs
Current SNTP Synchronized Time..... SNTP Client Mode Is Disabled

MIBs Supported:

RFC 1907 - SNMPv2-MIB The MIB module for SNMPv2 entities
HC-RMON-MIB The original version of this MIB, published as RFC3273.
HCNUM-TC A MIB module containing textual conventions for high capacity data types.
SNMP-COMMUNITY-MIB This MIB module defines objects to help support coexistence between SNMPv1, SNMPv2, and SNMPv3.
SNMP-MPD-MIB The MIB for Message Processing and Dispatching
SNMP-TARGET-MIB The Target MIB Module
SNMP-VIEW-BASED-ACM-MIB The management information definitions for the View-based Access Control Model for SNMP.
SFLOW-MIB sFlow MIB
QNOS-UDLD-MIB UDLD MIB
DIFFSERV-DSCP-TC The Textual Conventions defined in this module should be used whenever a Differentiated Services Code Point is used in a MIB.
QNOS-DENIALOFSERVICE-PRIVATE-MIB The QCI Private MIB for QNOS Denial of Service.
LLDP-MIB Management Information Base module for LLDP configuration, statistics, local system data and remote systems data components.
LLDP-EXT-MED-MIB The LLDP Management Information Base extension module for TIA-TR41.4 Media Endpoint Discovery information.

| | |
|---|---|
| DISMAN-PING-MIB | The Ping MIB (DISMAN-PING-MIB) provides the capability of controlling the use of the ping function at a remote host. |
| QNOS-OUTBOUNDTELNET-PRIVATE-MIB | The QCI Private MIB for QNOS Outbound Telnet |
| QNOS-TIMEZONE-PRIVATE-MIB | The QCI Private MIB for QNOS for system time, timezone and summer-time settings |
| LAG-MIB | The Link Aggregation module for managing IEEE 802.3ad |
| RFC 1493 - BRIDGE-MIB | Definitions of Managed Objects for Bridges (dot1d) |
| RFC 2674 - Q-BRIDGE-MIB | The VLAN Bridge MIB module for managing Virtual Bridged Local Area Networks |
| RFC 2863 - IF-MIB | The Interfaces Group MIB using SMIv2 |
| QNOS-SWITCHING-MIB | QNOS Switching - Layer 2 |
| QNOS-INVENTORY-MIB | Unit and Slot configuration. |
| INET-ADDRESS-MIB | This MIB module defines textual conventions for representing Internet addresses. |
| QNOS-LOGGING-MIB | This MIB provides objects to configure and display events logged on this system. |
| IANA-MAU-MIB | This MIB module defines dot3MauType OBJECT-IDENTITIES and IANAifMauListBits, IANAifMauMediaAvailable, IANAifMauAutoNegCapBits, |
| IEEE8021-PFC-MIB | Priority-based Flow Control module for managing IEEE 802.1Qbb |
| IEEE8021-PAE-MIB | Port Access Entity module for managing IEEE 802.1X. |
| QNOS-DOT1X-AUTHENTICATION-SERVER-MIB | The QCI Private MIB for QNOS Dot1x Authentication Server |
| RADIUS-ACC-CLIENT-MIB | RADIUS Accounting Client MIB |
| TACACS-CLIENT-MIB | Defines a portion of the SNMP MIB under the QCI Corporation enterprise OID pertaining to TACACS+ client configuration. |
| RFC 1850 - OSPF-MIB | OSPF Version 2 Management Information Base |
| RFC 2787 - VRRP-MIB | Definitions of Managed Objects for the Virtual Router Redundancy Protocol |
| IP-FORWARD-MIB | The MIB module for the management of CIDR multipath IP Routes. |
| QNOS-LOOPBACK-MIB | The QCI Private MIB for QNOS Loopback |

QNOS-BGP-MIB The MIB definitions for Border Gateway Protocol Flex package.
QNOS-QOS-ACL-MIB QNOS Flex QOS ACL
QNOS-QOS-DIFFSERV-PRIVATE-MIB QNOS Flex QOS DiffServ Private MIBs' definitions
draft-ietf-magma-mgmd-mib-03 MGMD MIB, includes IGMPv3 and MLDv2.
RFC 5240 - PIM-BSR-MIB Bootstrap Router mechanism for PIM routers
IANA-RTPROTO-MIB IANA IP Route Protocol and IP MRoute Protocol Textual Conventions
IPMROUTE-STD-MIB The MIB module for management of IP Multicast routing, but independent of the specific multicast routing protocol in use.
RFC 2465 - IPV6-MIB Management Information Base for IP Version 6: Textual Conventions and General Group
RFC 3419 - TRANSPORT-ADDRESS-MIB Textual Conventions for Transport Addresses
QNOS-IPV6-LOOPBACK-MIB The QCI Private MIB for QNOS Loopback IPV6 address configuration.
QNOS-DCBX-MIB The MIB module defines objects to configure DCBX
LLDP-V2-TC-MIB Textual conventions used throughout the IEEE Std 802.1AB version 2 and later MIB modules.

(Switch) #

## 5.1.8. Show system

This command displays switch system information.

**Format** show system

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show system

System description: LY9, Runtime Code 18.09, Linux 3.8.13-rt9, U-Boot 2010.12 (Oct 03 2014 - 14:38:07) - ONIE 2014.05.03-7
System object ID : 1.3.6.1.4.1.7244.100.2

System information

System Up time: 0 days, 0 hours, 37 minutes, and 39 seconds

System Name : QCT

System Location :

System Contact :

MAC address : 54-AB-3A-65-06-5D

Protocol Current : None

(Switch) #

## 5.1.9. Show tech-support

Use this command displays switch system information and configurations when you contact technical support. The output of the show tech-support command combines the output of the following commands: show version, show sysinfo, show interface status, show logging, show event log, show logging buffered, show trap log, show running config, … etc

The parameter “file” means to write the output into a file with file name “TechSupport”.

Other parameters are used to display the information of assigned component.

**Format** show tech-support [{bfd | bgp | datacenter | dcvpn | dot1q | dot1s | dot3ad | igmp | ipv6 | layer3 | link_dependency | lldp | log | mcast | multicast | ospfv2 | ospfv3 | pimsm | routing | sim | snooping | switching | system] [file]} | file]

**Default** None

**Mode** Privileged Exec

Example:

(Switch) # show tech-support

********** show version **********

Switch: 1

System Description..... LY9, Runtime Code 5.4.01.11, Linux 3.8.13-rt9, U-Boot 2010.12 (Oct 03 2014 - 14:38:07) - ONIE 2014.05.03-7

Machine Type..... LY9

Machine Model..... QUANTA LY9

Serial Number..... QTFCNB6100014

Part Number..... 1LY9BZZ0001
Burned In MAC Address..... 54:AB:3A:65:06:5D
Software Version..... 5.4.01.11
License Key Status..... Advance Key
Operating System..... Linux 3.8.13-rt9
Network Processing Device..... BCM56854_A2
Additional Packages..... BGP-4
QOS
Multicast
IPv6
Routing
Data Center
OpEN API
Prototype Open API

********** show sysinfo **********

System Description..... LY9, Runtime Code 5.4.01.11, Linux 3.8.13-rt9, U-Boot 2010.12 (Oct 03 2014 - 14:38:07) - ONIE 2014.05.03-7
System Name..... QCT
System Location.....
System Contact.....
System Object ID..... 1.3.6.1.4.1.7244.100.2
System Up Time..... 0 days 2 hrs 2 mins 0 secs
Current SNTP Synchronized Time..... SNTP Client Mode Is Disabled (QCT)

(* note: this command displays information more than 3000 lines, so here we omit remained messages.)
:
:
(Switch) #

## 5.1.10. Show hardware

This command displays inventory and hardware information for the switch.

**Format** show hardware

**Default** None

**Mode** Privileged Exec

**Example:**

(Switch) #show hardware

Switch: 1

System Description..... LY9, Runtime Code 18.09, Linux 3.8.13-rt9, U-Boot 2010.12 (Oct 03 2014 - 14:38:07) - ONIE 2014.05.03-7
Machine Type..... LY9
Machine Model..... QUANTA LY9
Serial Number..... QTFCNB6100014
Part Number..... 1LY9BZZ0001
Burned In MAC Address..... 54:AB:3A:65:06:5D
Software Version..... 18.09
Operating System..... Linux 3.8.13-rt9
Network Processing Device..... BCM56854_A2

FAN 1 Status..... Inactive
FAN 1 Airflow Direction..... -
FAN 2 Status..... Inactive
FAN 2 Airflow Direction..... -
FAN 3 Status..... Inactive
FAN 3 Airflow Direction..... -

Switch Power+ 1..... Exist
Type..... Removable
Model..... AET
Serial Number..... QW005F
Revision Number..... AN
FW Version..... -
Airflow Direction..... -

Switch Power+ 2..... Exist
Type..... Removable
Model..... AET
Serial Number..... QW0001
Revision Number..... AN
FW Version..... -

Airflow Direction..... -

Additional Packages..... BGP-4
QOS
Multicast
IPv6
Routing
Data Center
OpEN API
Prototype Open API

(Switch) #

## 5.1.11. Show version

This command displays inventory, software packages and license key information for the switch.

**Format** show version

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show version

Switch: 1

System Description..... LY9, Runtime Code 18.09, Linux 3.8.13-rt9, U-Boot 2010.12 (Oct 03 2014 - 14:38:07) - ONIE 2014.05.03-7
Machine Type..... LY9
Machine Model..... QUANTA LY9
Serial Number..... QTFCNB6100014
Part Number..... 1LY9BZZ0001
Burned In MAC Address..... 54:AB:3A:65:06:5D
Software Version..... 18.09
License Key Status..... Advance Key
Operating System..... Linux 3.8.13-rt9
Network Processing Device..... BCM56854_A2
Additional Packages..... BGP-4

QOS
Multicast
IPv6
Routing
Data Center
OpEN API
Prototype Open API

(Switch) #

## 5.1.12. Show logingsessin

This command displays serial port or remote login  connections to the switch.

The parameter “long” means to display full user names of login sessions.

**Format** show loginsession [long]

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show loginsession

| ID | User Name | Connection From | Idle Time | Session Time | Session Type |
|---|---|---|---|---|---|
| 00 | admin | EIA-232 | 00:00:00 | 02:08:12 | Serial |
| 01 | guest | 172.16.3.68 | 00:00:05 | 00:00:05 | SSH |

(Switch) #

## 5.1.13. Show command filter

All commands starting with keyword “show” can use below parameters to refine output or redirect output to a file. Following any show command to use symbol “|” to set filter and it uses regular expression to math assigned keyword.

The parameter “commands” means any show command of CLI.

The parameter “**|**” means to use filter option.

The parameter “begin” sets output to begin with the line that contains the assigned keyword.

The parameter “exclude” sets output to exclude lines that contains the assigned keyword.

The parameter “include” sets output to include lines that contains the assigned keyword only.

The parameter “section” sets output to only include a specified section of the content (e.g., “interface 0/1”) with a configurable end-of-section delimiter. If multiple sections matching the specified string match criteria are part of the output, then all instances are displayed. Each section begins with the line containing the starting keyword and ends with the line containing the ending keyword. If there is a line, said **L**, containing the starting keyword and there is no line containing the ending keyword in the original output, the parameter “section” will extract a section from the line **L** to the final line of the original output. (Default ending keyword is “exit”.)

The parameter “redirect” means to write output to a remote file which locates the assigned “url”, and “url” could be TFTP or SFTP.

**Format** show command **|** {[begin <keyword>] [exclude <keyword>] [include <keyword>][section <starting keyword> [ending keyword]] [redirect url]}

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show interface counters detailed 0/1 | begin "Total Packets" exclude "0"

Total Packets Received (Octets)..... 438677
Packets Received 64 Octets..... 115
Packets Received 65-127 Octets..... 376
Packets Received 128-255 Octets..... 2136
Packets RX and TX 64 Octets..... 117
Packets RX and TX 65-127 Octets..... 36293
Packets RX and TX 128-255 Octets..... 2136

Total Packets Received Without Errors..... 2729
Multicast Packets Received..... 2258
Broadcast Packets Received..... 471

Packets Discarded by Chip Debug Counter..... 225

Total Received Packets Discarded..... 225

Packets Transmitted 64 Octets..... 2

Packets Transmitted 65-127 Octets..... 35917
Max Frame Size..... 1518

Total Packets Transmitted Successfully..... 35919
Multicast Packets Transmitted..... 35919

MSTP BPDUs Transmitted..... 33675

(Switch) #

## 5.1.14. Show transceiver device

This command displays summary of digital optical monitor information for the switch.

**Format** show transceiver device

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show transceiver device

| Interface | Gigabit Ethernet Compliance Code | Vendor Name | Vendor Part Number |
|---|---|---|---|
| 0/7 | 10GBase-SR | FINISAR CORP. | FTLX8571D3BCL |
| 0/9 | 10GBase-SR | FINISAR CORP. | FTLX8571D3BCL |

(++) : high alarm, (+) : high warning, (-) : low warning, (--) : low alarm.
mA: milliamperes, dBm: decibels (milliwatts), NA: not available, -: null/unknown.

| Interface | Temperature (Celsius) | Voltage (Volts) | Tx bias current (mA) | Tx Power (dBm) | Rx Power (dBm) |
|---|---|---|---|---|---|
| 0/7 | 23.15 | 3.31 | 7.92 | -2.17 | -2.28 |
| 0/9 | 30.14 | 3.29 | 7.95 | -1.91 | -2.02 |

(Switch) #

## 5.1.15. Show transceiver interface

This command displays detail of digital optical monitor information for the switch.

**Format** show transceiver interface detail [<intf-range>]

**Default** None

**Mode** Privileged Exec

Example:

(Switch) #show transceiver interface detail 0/7

(++) : high alarm, (+) : high warning, (-) : low warning, (--) : low alarm.
mA: milliamperes, dBm: decibels (milliwatts), NA: not available, -: null/unknown.

Interface..... 0/7
Gigabit Ethernet Compliance Codes..... 10GBase-SR
Vendor Name..... FINISAR CORP.
Vendor Part Number..... FTLX8571D3BCL
Vendor Serial Number..... AP50L3K
Vendor Revision Number..... A
Vendor Manufacturing Date..... 2013/02/02
Wavelength..... 850 nm
Link length supported for 50um OM2 fiber..... 82 m
Link length supported for 62.5um OM1 fiber..... 33 m
Link length supported for 50um OM3 fiber..... 300 m
Temperature..... 34.66 Celsius
Voltage..... 3.31 Volts
Tx bias current..... 8.17 mA
Tx Power..... -2.15 dBm
Rx Power..... -2.26 dBm
Temperature high alarm threshold..... 80.00 Celsius
Temperature high warning threshold..... 70.00 Celsius
Temperature low warning threshold..... 0.00 Celsius
Temperature low alarm threshold..... -5.00 Celsius
Voltage high alarm threshold..... 3.46 Volts
Voltage high warning threshold..... 3.40 Volts

Voltage low warning threshold..... 3.20 Volts
Voltage low alarm threshold..... 3.14 Volts
Tx bias current high alarm threshold..... 12.00 mA
Tx bias current high warning threshold..... 10.00 mA
Tx bias current low warning threshold..... 2.00 mA
Tx bias current low alarm threshold..... 0.00 mA
Tx power high alarm threshold..... 3.97 dBm
Tx power high warning threshold..... 3.49 dBm
Tx power low warning threshold..... -2.50 dBm
Tx power low alarm threshold..... -3.00 dBm
Rx power high alarm threshold..... 3.97 dBm
Rx power high warning threshold..... 3.49 dBm
Rx power low warning threshold..... -9.50 dBm
Rx power low alarm threshold..... -10.00 dBm

(Switch) #

# 5.2. Device Configuration Commands

## 5.2.1. Interface commands

### 5.2.1.1. *Show interface status*

The command displays a summary of information for a specific interface or all interfaces.

**Format** show interface status [{<slot/port> | err-disabled | loopback <loopback-id> | port-channel <port-channel-id> | tunnel <tunnel-id> | vlan <vlan-id>}]

| Parameter | Definition |
|---|---|
| **no parameter** | To display information for all interfaces. |
| **<slot/port>** | Specifies Interface number . |
| **err-disabled** | Specifies to display the interfaces which are err disabled. |
| **loopback <0-63>** | Specifies to display information for the loopback interfaces. The range of the loopback ID is 0 to 63 |
| **port-channel <1-64>** | Specifies to display information for the port-channel interfaces. The range of the port-channel ID is 1 to 64. |
| **tunnel <0-7>** | Specifies to display information for the tunnel interfaces. The range of the tunnel ID is 0 to 7. |
| **vlan <vlan-id>** | Specifies to display information for the vlan interfaces. The range of the VLAN ID is 1 to 4093. |

**Mode** Privileged EXEC

The following will show the information of each command with a different parameter.

#### *5.2.1.1.1. Show interface status*

Displays information for all interfaces.

| Fields | Definition |
|---|---|
| **Intf** | The physical slot and physical port. |
| **Type** | If not blank, this field indicates that this port is a special type of port. The possible values are: |

| | |
|---|---|
| | **Source:** This port is a monitoring port.<br><br>**PC Mbr:** This port is a member of a port-channel (LAG).<br><br>**Dest:** This port is a probe port. |
| **Admi Mode (Admin Mode)** | Selects the Port control administration state. The port must be enabled in order for it to be allowed into the network. It may be enabled or disabled. The factory default is enabled. |
| **Phy Mode (Physical Mode)** | Selects the desired port speed and duplex mode. If auto-negotiation support is selected, then the duplex mode and speed will be set from the auto-negotiation process. Note that the port's maximum capability (full duplex 100M) will be advertised. Otherwise, this object will determine the port's duplex mode and transmission rate. The factory default is Auto. |
| **Phy Stat** | Indicates the port speed and duplex mode. |
| **Link Stat** | Indicates whether the Link is up or down. |
| **Link Trap** | This object determines whether to send a trap when link status changes. The factory default is enabled. |
| **LACP Mode** | Displays whether LACP is enabled or disabled on this port. |
| **Flow Mode** | Displays flow control mode. |
| **Cap. Status (Capabilities Status)** | Displays interface capabilities the port supports. |

#### *5.2.1.1.2. Show interface status <slot/port>*

Displays information for a specific interface.

| Fields | Definition |
|---|---|
| **Interface** | The physical slot and physical port. |
| **ifIndex** | Displays the interface index associated with the port. |
| **Description** | Description string attached to a port. It can be of up to 64 characters in length. |
| **Admin Mode** | Selects the Port control administration state. The port must be enabled in order for it to be allowed into the network. It may be enabled or disabled. The factory default is enabled. |
| **Physical Mode** | Selects the desired port speed and duplex mode. If auto-negotiation support is selected, then the duplex mode and speed will be set from the auto-negotiation process. Note that the port's maximum capability (full duplex 100M) will be advertised. Otherwise, this object will determine the port's |

| | |
|---|---|
| | duplex mode and transmission rate. The factory default is Auto. |
| **Physical Status** | Indicates the port speed and duplex mode. |
| **Cable Type** | Displays interface cable type. |
| **Link Status** | Indicates whether the Link is up or down. |
| **Link Trap** | This object determines whether to send a trap when link status changes. The factory default is enabled. |
| **LACP Mode** | Displays whether LACP is enabled or disabled on this port. |
| **Flow Control Mode** | Displays flow control mode. |
| **Capability Information** | Displays interface capabilities. |
| **MAC Address** | Displays interface mac address. |
| **Bit Offset Val** | Displays the bit offset value which corresponds to the port when the MIB object type PortList is used to manage in SNMP. |

#### *5.2.1.1.3. Show interface status err-disabled*

Displays interfaces which are error disabled. [refer to errdisabled command]

| **Fields** | **Definition** |
|---|---|
| **interface** | An interface that is error disabled. |
| **Errdisabled Reason** | The cause of the interface being error disabled. |
| **Auto-Recovery Time Left** | The amount of time left before auto recovery begins. |

#### *5.2.1.1.4. Show interface status loopback <0-63>*

Displays information for the loopback interfaces. [refer to loopback command]

| **Interface** | **The interface name.** |
|---|---|
| **Interface** | The interface name. |
| **ifIndex** | Displays the interface index associated with the port. |
| **Description** | Description string attached to the port-channel. It can be of up to 64 characters in length. |

| | |
|---|---|
| **Admin Mode** | Displays the port-channel control administration state. |
| **Physical Mode** | The speed and duplex mode setting on the interface. |
| **Physical Status** | Indicates the speed and duplex mode for the physical interface. |
| **Cable Type** | Displays interface cable type. |
| **Link Status** | Indicates whether the Link is up or down. |
| **Link Trap** | Indicates whether to send a trap when link status changes. The factory default is enabled. |
| **LACP Mode** | Displays whether LACP is enabled or disabled on this port. |
| **Flow Control Mode** | Displays flow control mode. |
| **Capability Information** | Displays interface capabilities. |
| **Bit Offset Val** | Displays the bit offset value which corresponds to the port when the MIB object type PortList is used to manage in SNMP. |

#### *5.2.1.1.5. Show interface status port-channel <1-64>*

Displays information for the port-channel interface.[refer to port-channel command]

| Fields | Definition |
|---|---|
| **Interface** | The interface name. |
| **ifIndex** | Displays the interface index associated with the port. |
| **Description** | Description string attached to the port-channel. It can be of up to 64 characters in length. |
| **Admin Mode** | Displays the port-channel control administration state. |
| **Physical Mode** | The speed and duplex mode setting on the interface. |
| **Physical Status** | Indicates the speed and duplex mode for the physical interface. |
| **Cable Type** | Displays interface cable type. |
| **Link Status** | Indicates whether the Link is up or down. |
| **Link Trap** | Indicates whether to send a trap when link status changes. The factory default is enabled. |
| **LACP Mode** | Displays whether LACP is enabled or disabled on this port. |

| | |
|---|---|
| **Flow Control Mode** | Displays flow control mode. |
| **Capability Information** | Displays interface capabilities. |
| **Bit Offset Val** | Displays the bit offset value which corresponds to the port when the MIB object type PortList is used to manage in SNMP. |

#### *5.2.1.1.6. Show interface status tunnel <0-7>*

Displays information for the tunnel interface. [refer to tunnel command]

| Fields | Definition |
|---|---|
| **Interface** | The interface name. |
| **ifIndex** | Displays the interface index associated with the interface. |
| **Description** | Description string attached to an interface . |
| **Admin Mode** | Displays the administration state. |
| **Physical Mode** | The speed and duplex mode setting on the interface. |
| **Physical Status** | Indicates the speed and duplex mode for the physical interface. |
| **Cable Type** | Displays interface cable type. |
| **Link Status** | Indicates whether the Link is up or down. |
| **Link Trap** | This object determines whether to send a trap when link status changes. The factory default is enabled. |
| **LACP Mode** | Displays whether LACP is enabled or disabled on this port. |
| **Flow Control Mode** | Displays flow control mode. |
| **Capability Information** | Displays interface capabilities. |
| **MAC Address** | Displays interface mac address. |
| **Bit Offset Val** | Displays the bit offset value which corresponds to the interface when the MIB object type PortList is used to manage in SNMP. |

#### *5.2.1.1.7. Show interface status vlan <1-4093>*

Displays information for the vlan interface. [refer to vlan command]

| Fields | Definition |
|---|---|
| **Interface** | The interface name. |
| **ifIndex** | Displays the interface index associated with the interface. |
| **Description** | Description string attached to an interface . |
| **Admin Mode** | Displays the administration state. |
| **Physical Mode** | The speed and duplex mode setting on the interface. |
| **Physical Status** | Indicates the speed and duplex mode for the physical interface. |
| **Cable Type** | Displays interface cable type. |
| **Link Status** | Indicates whether the Link is up or down. |
| **Link Trap** | This object determines whether to send a trap when link status changes. The factory default is enabled. |
| **LACP Mode** | Displays whether LACP is enabled or disabled on this port. |
| **Flow Control Mode** | Displays flow control mode. |
| **Capability Information** | Displays interface capabilities. |
| **MAC Address** | Displays interface mac address. |
| **Bit Offset Val** | Displays the bit offset value which corresponds to the interface when the MIB object type PortList is used to manage in SNMP. |

### 5.2.1.2. *Show interface counters*

The command displays a summary of statistics for a specific interface or all interfaces.

**Format** show interface counters [{<slot/port> | [port-channel <port-channel-id>] | [detailed [<slot/port> | [port-channel <port-channel-id> | switchport ]]]}]

| Parameter | Definition |
|---|---|
| **no parameter** | Displays summary statistics for all interfaces. |
| **<slot/port>** | Displays summary statistics for a specific interface. |
| **port-channel <port-channel-id>** | Displays summary statistics for the port-channel interfaces. The range of the port-channel ID is 1 to 64. |

| | |
|---|---|
| **Detailed <slot/port>** | Display detailed statistics for a specific interface. |
| **Detailed port-channel <port-channel-id>** | Display detailed statistics for the port-channel interfaces. |
| **Detailed switchport** | Display detailed statistics for the entire switch. |

**Mode** Privileged EXEC

The following will show the counter information for the command with a different parameter.

#### *5.2.1.2.1. Show interface counters*

Displays summary statistics for all interfaces.

| Fields | Definition |
|---|---|
| **Packets Received Without Error** | The total number of packets (including broadcast packets and multicast packets) received by the processor. |
| **Packets Received With Error** | The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. |
| **Broadcast Packets Received** | The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets. |
| **Packets Transmitted Without Errors** | The total number of packets transmitted out of the interface. |
| **Transmit Packet Errors** | The number of outbound packets that could not be transmitted because of errors. |
| **Collision Frames** | The best estimate of the total number of collisions on this Ethernet segment. |
| **Time Since Counters Last Cleared** | The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared. |

#### *5.2.1.2.2. Show interface counters detailed*

Displays detailed statistics for a specific interface.

| Fields | Definition |
|---|---|
| **Total Packets Received (Octets)** | The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets). This object can be used as a reasonable estimate of Ethernet utilization. If greater precision is desired, |

| | |
|---|---|
| | the etherStatsPkts and etherStatsOctets objects should be sampled before and after a common interval. The result of this equation is the value Utilization which is the percent utilization of the Ethernet segment on a scale of 0 to 100 percent. |
| **Packets Received 64 Octets** | The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets). |
| **Packets Received 65-127 Octets** | The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Received 128-255 Octets** | The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Received 256-511 Octets** | The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Received 512-1023 Octets** | The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Received 1024-1518 Octets** | The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Received > 1518 Octets** | The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed. |
| **Packets RX and TX 64 Octets** | The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets). |
| **Packets RX and TX 65-127 Octets** | The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets RX and TX 128-255 Octets** | The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets RX and TX 256-511 Octets** | The total number of packets (including bad packets) received that were between 256 and 512 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets RX and TX 512-1023 Octets** | The total number of packets (including bad packets) received that were between 512 and 1024 octets in length inclusive |

| | |
|---|---|
| | (excluding framing bits but including FCS octets). |
| **Packets RX and TX 1024-1518 Octets** | The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets RX and TX > 1518 Octets** | The total number of packets (including bad packets) received that were longer than 1518 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Total Packets Received Without Errors** | The total number of packets received that were without errors. |
| **Unicast Packets Received** | The number of subnetwork-unicast packets delivered to a higher-layer protocol. |
| **Multicast Packets Received** | The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address. |
| **Broadcast Packets Received** | The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets. |
| **Total Packets Received with MAC Errors** | The total number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. |
| **Jabbers Received** | The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error). Note that this definition of jabber is different than the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition where any packet exceeds 20 ms. The allowed range to detect jabber is between 20 ms and 150 ms. |
| **Undersize Received** | The total number of packets received that were less than 64 octets in length with GOOD CRC(excluding framing bits but including FCS octets). |
| **Fragments Received** | The total number of packets received that were less than 64 octets in length with ERROR CRC(excluding framing bits but including FCS octets). |
| **Alignment Errors** | The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad FCS with a non- |

| | |
|---|---|
| | integral number of octets. |
| **FCS Errors** | The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad FCS with an integral number of octets |
| **Overruns** | The total number of frames discarded as this port was overloaded with incoming packets, and could not keep up with the inflow. |
| **MTU Errors** | The number of packets whose size exceeded the MTU of the interface. |
| **Packets Discarded by Chip Debug Counter** | The number of inbound packets which were chosen to be discarded by chip debug. |
| **Total Received Packets Discarded** | The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space. |
| **Total Packets Transmitted (Octets)** | The total number of octets of data (including those in bad packets) transmitted on the network (excluding framing bits but including FCS octets). This object can be used as a reasonable estimate of ethernet utilization. If greater precision is desired, the etherStatsPkts and etherStatsOctets objects should be sampled before and after a common interval. |
| **Packets Transmitted 64 Octets** | The total number of packets (including bad packets) transmitted that were 64 octets in length (excluding framing bits but including FCS octets). |
| **Packets Transmitted 65-127 Octets** | The total number of packets (including bad packets) transmitted that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Transmitted 128-255 Octets** | The total number of packets (including bad packets) transmitted that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Transmitted 256-511 Octets** | The total number of packets (including bad packets) transmitted that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Transmitted 512-1023 Octets** | The total number of packets (including bad packets) transmitted that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Packets Transmitted 1024-1518 Octets** | The total number of packets (including bad packets) |

| | |
|---|---|
| | transmitted that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets). |
| **Max Frame Size** | The maximum size of the Info (non-MAC) filed that this port will receive or transmit. |
| **Total Packets Transmitted Successfully** | The number of frames that have been transmitted by this port to its segment. |
| **Unicast Packets Transmitted** | The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent. |
| **Multicast Packets Transmitted** | The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent. |
| **Broadcast Packets Transmitted** | The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent. |
| **Tx Oversized** | The total number of frames that exceeded the max permitted frame size. This counter has a max increment rate of 815 counts per sec. at 10 Mb/s. |
| **Total Transmit Errors** | The sum of Single, Multiple, and Excessive Collisions. |
| **Total Transmit Packets Discarded** | The sum of single collision frames discarded, multiple collision frames discarded, and excessive frames discarded. |
| **Single Collision Frames** | A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision. |
| **Multiple Collision Frames** | A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision. |
| **Excessive Collision Frames** | A count of frames for which transmission on a particular interface fails due to excessive collisions. |
| **Packets Dropped by MMU** | A count for the packets dropped by the MMU. There are reasons for MMU to drop packets, such as CBP full, HOL blocking, etc. |
| **STP BPDUs Transmitted** | Spanning Tree Protocol Bridge Protocol Data Units sent. |
| **STP BPDUs Received** | Spanning Tree Protocol Bridge Protocol Data Units received. |
| **RSTP BPDUs Transmitted** | Rapid Spanning Tree Protocol Bridge Protocol Data Units sent. |

| | |
|---|---|
| **RSTP BPDUs Received** | Rapid Spanning Tree Protocol Bridge Protocol Data Units received. |
| **MSTP BPDUs Transmitted** | Multiple Spanning Tree Protocol Bridge Protocol Data Units sent. |
| **MSTP BPDUs Received** | Multiple Spanning Tree Protocol Bridge Protocol Data Units received. |
| **Time Since Counters Last Cleared** | The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared. |

#### *5.2.1.2.3. Show interface counters detailed switchport*

Display statistics for the entire switch.

| Fields | Definition |
|---|---|
| **Total Packets Received (Octets)** | The total number of octets of data received by the processor (excluding framing bits but including FCS octets). |
| **Packets Received Without Error** | **Packets Received Without Error:** The total number of packets (including broadcast packets and multicast packets) received by the processor. |
| **Unicast Packets Received** | The number of subnetwork-unicast packets delivered to a higher-layer protocol. |
| **Multicast Packets Received** | The total number of packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address. |
| **Broadcast Packets Received** | The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets. |
| **Receive Packets Discarded** | The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space. |
| **Octets Transmitted** | The total number of octets transmitted out of the interface, including framing characters. |
| **Packets Transmitted Without Errors** | The total number of packets transmitted out of the interface. |
| **Unicast Packets Transmitted** | The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent. |

| | |
|---|---|
| **Multicast Packets Transmitted** | The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent. |
| **Broadcast Packets Transmitted** | The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent. |
| **Transmit Packets Discarded** | The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space. |
| **Most Address Entries Ever Used** | The highest number of Forwarding Database Address Table entries that have been learned by this switch since the most recent reboot. |
| **Address Entries Currently in Use** | The number of Learned and static entries in the Forwarding Database Address Table for this switch. |
| **Maximum VLAN Entries** | The maximum number of Virtual LANs (VLANs) allowed on this switch. |
| **Most VLAN Entries Ever Used** | The largest number of VLANs that have been active on this switch since the last reboot. |
| **Static VLAN Entries** | The number of presently active VLAN entries on this switch that have been created statically. |
| **Dynamic VLAN Entries** | The number of presently active VLAN entries on this switch that have been created by GVRP registration. |
| **VLAN Deletes** | The number of VLANs on this switch that have been created and then deleted since the last reboot. |
| **Time Since Counters Last Cleared** | The elapsed time, in days, hours, minutes, and seconds, since the statistics for this switch were last cleared. |

### 5.2.1.3. *Show interface dampening*

This command displays the status and configured parameters of the interfaces configured with dampening.

The CLI command “clear counters” resets the flap counter to zero.

The interface CLI command “no shutdown” reset the suppressed state to False.

Any change in the dampening configuration resets the current penalty, reuse time and suppressed state to their default value, meaning 0, 0, and False respectively.

**Format** show interface dampening

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The interface name. |
| **Flaps** | The number times the link state of an interface changed from UP to DOWN. |
| **Penalty** | Accumulated Penalty. |
| **Supp** | Indicates if the interface is suppressed or not. |
| **ReuseTm** | Number of seconds until the interface is allowed to come up again. |
| **HalfL** | Configured half-life period. |
| **ReuseV** | Configured reuse-threshold. |
| **SuppV** | Configured suppress threshold. |
| **MaxSTm** | Configured maximum suppress time in second. |
| **MaxP** | Maximum possible penalty. |
| **Restart** | Configured restart penalty . |

### 5.2.1.4. *Show interface loopback*

The command displays the configured loopback interface information.

**Format** show interface loopback <0-63> [vrf <vrf-name>]

| Parameter | Definition |
|---|---|
| **<0-63>** | The loopback ID |
| **vrf-name** | Specify the name of the VRF |

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Loopback Id** | The loopback ID associated with the rest of the information in the row. This item is shown only when a loopback Id is not specified. |
| **interface** | The interface name. This item is shown only when a loopback Id is not specified. |
| **IP Address** | The address of the interface. |
| **Interface Link Status** | Shows whether the link is up or down. |
| **IPv6 Prefix is** | The IPv6 address of the interface |
| **MTU size** | The maximum transmission size for packets on the interface in bytes |

### 5.2.1.5. *Show interface port-channel*

This command displays the capabilities of all port-channels (LAGs) on the device as well as a summary of individual port-channel. [refer to LAG command]

**Format** show interface port-channel [{ <ID> | brief | system priority } ]

| **Parameters** | **Definition** |
|---|---|
| **< ID >** | The port-channel interface number. The range of the port-channel ID is 1 to 64. |
| **brief** | Display port-channel static capability and summary information for the device. |
| **system priority** | Display port-channel system priority. |

**Mode** Privileged EXEC

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **Port Channel ID** | The port-channel‘s ID. |
| **Port Channel Name** | The name of the port-channel. |
| **Link State** | Indicates whether the link is up or down. |
| **Admin Mode** | Indicates if the port-channel is enabled or not . |
| **Link Trap Mode** | Indicates whether or not to send a trap when link status changes. The factory default is enabled. |

| | |
|---|---|
| **STP Mode** | Indicates if the STP mode for the interface is enabled or not . |
| **Type** | Indicates whether the port-channel is statically or dynamically maintained. |
| **Port-channel Min-links** | Indicates the minimum links for the port-channel. |
| **Load Balance Option (Src/Dest MAC, VLAN, EType, incoming port)** | The load balance option associated with this LAG.. |
| **Admin Key** | Indicates the administrative value of the LACP actor admin key |
| **Mbr Ports** | Lists the ports that are members of this port-channel, in slot/port notation |
| **Active Ports (Port Active)** | Lists the ports that are actively participating in this port-channel. |
| **Port Speed** | Speed of the port-channel port |
| **Device/Timeout** | Displays the device timeout value of actor and partner. The value of device timeout should be short (1 second) or long(30 seconds). |

### 5.2.1.6. *Show interface port-mode*

The command displays the hardware profile information for the 100G ports.

**Format** show interface port-mode [<slot/port>]

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **100G Interface** | Indicates the interface number of 100G port. |
| **40G Interface** | Indicates the interface number of 40G port. |
| **50G Interface** | Indicates the interface number of 50G port. |
| **25G Interface** | Indicates the interface number of 25G port. |
| **10G Interfaces** | Indicates the interface number of 10G ports. |
| **Configured Mode** | Indicates the configured mode of the 100G port. The mode should be 1x100G, 1x40G, 2x50G, 4x25G, or 4x10G. |
| **Operating Mode** | Indicates the current operational mode of the 100G port. The mode should be 1x100G, 1x40G, 2x50G, 4x25G, or 4x10G. |

| | |
|---|---|
| **Expandable Option(s)** | Indicates the expanded mode this interface can support |
| **Expanded Interfaces** | Indicates the corresponding port numbers after this interface is expanded |

### 5.2.1.7. *Show interface priority flow control*

The command displays the priority flow control (PFC) information of a given interface or all interfaces.

**Format** show interface [<slot/port>] priority-flow-control

| Parameter | Definition |
|---|---|
| **slot/port** | Specifies the interface number as the slot/port format. |

**Mode** Privileged EXEC

When an interface number is not provided, it will display all the interfaces.

**Display Message**

| Fields | Definition |
|---|---|
| **Interface Detail** | The port for which data is displayed. |
| **Operational State** | The operational status of the interface. |
| **Configured State** | The administrative mode of PFC on the interface. |
| **Configured Drop Priorities** | The 802.1p priority values that are configured with a drop priority on the interface. Drop priorities do not participate in pause. |
| **Configured No-Drop Priorities** | The 802.1p priority values that are configured with a no-drop priority on the interface. If an 802.1p priority that is designated as no-drop is congested, the priority is paused. |
| **Operational Drop Priorities** | The 802.1p priority values that the switch is using with a drop priority. The operational drop priorities might not be the same as the configured priorities if the interface has accepted different priorities from a peer device. |
| **Operational No-Drop Priorities** | The 802.1p priority values that the switch is using with a no-drop priority. The operational drop priorities might not be the same as the configured priorities if the interface has accepted different priorities from a peer device. |
| **Delay Allowance** | The operational status of the interface. |
| **Peer Configuration** | Indicates whether the local switch has accepted a compatible configuration |

| | |
|---|---|
| **Compatible** | from a peer switch. |
| **Compatible Configuration Count** | The number of received configurations accepted and processed as valid. The number does not include duplicate configurations. |
| **Incompatible Configuration Count** | The number of received configurations that are not accepted from a peer device because they were incompatible. |
| **Priority** | The 802.1p priority value. |
| **Received PFC frames** | The number of PFC frames received by the interface with the associated 802.1p priority. |
| **Transmitted PFC Frames** | The number of PFC frames transmitted by the interface with the associated 802.1p priority. |
| **Port** | The port list for which data is displayed. |
| **Drop Priorities** | The 802.1p priority values that are configured with a drop priority on the interface. |
| **Non-Drop Priorities** | The 802.1p priority values that are configured with a no-drop priority on the interface. |
| **Operational Status** | The operational status of the interface. |

### 5.2.1.8. *Show interface switch*

This command displays a summary of statistics for all CPU traffic.

**Format** show interfaces switch

**Mode** Privileged EXEC

| Parameter | Definition |
|---|---|
| **Packets Received Without Error** | The total number of packets received from the interface. |
| **Broadcast Packets Received** | The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets. |
| **Packets Received With Error** | The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. |
| **Packets Transmitted Without Errors** | The total number of packets transmitted out of the interface. |

| | |
|---|---|
| **Broadcast Packets Transmitted** | The total number of packets that higher-level protocols requested to be transmitted to the Broadcast address, including those that were discarded or not sent. |
| **Transmit Packet Errors** | The number of outbound packets that could not be transmitted because of errors. |
| **Address Entries Currently in Use** | The total number of Forwarding Database Address Table entries now active on the switch, including learned and static entries. |
| **VLAN Entries Currently in Use** | The number of VLAN entries presently occupying the VLAN table. |
| **Time Since Counters Last Cleared** | The elapsed time, in days, hours, minutes, and seconds since the statistics for this switch were last cleared. |

### 5.2.1.9. *Show interface switchport*

This command displays VLAN port information.

**Format** show interface switchport [{<slot/port> | port-channel <1-64>}]

| Parameter | Definition |
|---|---|
| **no parameter** | To display information for all ports. |
| **<slot/port>** | Specifies Interface number |
| **port-channel <1-64>** | Specifies to display information for the port-channel. The range of the port-channel ID is 1 to 64. |

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | Indicates by slot id and port number which is the port controlled by the fields on this line. |
| **Port VLAN ID** | The VLAN ID that this port will assign to untagged frames or priority tagged frames received on this port. The value must be for an existing VLAN. |
| **Default Priority** | The 802.1p priority assigned to untagged packets arriving on the port. |
| **Admin. Native VLAN** | The administrative VLAN ID that this port will assign to untagged frames or priority tagged frames received on this port. The value must be for an |

| | |
|---|---|
| | existing VLAN. |
| **Oper. Native VLAN** | The operational VLAN ID that this port will assign to untagged frames or priority tagged frames received on this port. The value must be for an existing VLAN. |
| **Mode** | Indicates this interface is operating on Access mode, General mode, Trunk mode, Private Vlan Host mode and Private Vlan Promiscuous mode. |
| **Ingress Filtering** | May be enabled or disabled. When enabled, the frame is discarded if this port is not a member of the VLAN with which this frame is associated. In a tagged frame, the VLAN is identified by the VLAN ID in the tag. In an untagged frame, the VLAN is the Port VLAN ID specified for the port that received this frame. When disabled, all frames are forwarded in accordance with the 802.1Q VLAN bridge specification. The factory default is disabled. |
| **Acceptable Frame Types** | Specifies the types of frames that may be received on this port. The options are 'VLAN only' and 'Admit All'. When set to 'VLAN only', untagged frames or priority tagged frames received on this port are discarded. When set to 'Admit All', untagged frames or priority tagged frames received on this port are accepted and assigned the value of the Port VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance to the 802.1Q VLAN specification. |
| **VLAN ID** | Displays the VLAN of which the interface is a member. (Display in administration and operation two statuses) |
| **VLAN Name** | Displays the name of the VLAN of which the interface is a member. (Display in administration and operation twstatuses) |
| **VLAN Type** | Displays the type of the VLAN of which the interface is a member. (Display in administration and operation statuses) |
| **Egress rule** | Indicate the port will untag or tag frame when sending frames in that specific VLAN. (Display in administration and operation statuses) |

### 5.2.1.10. *Show interface tunnel*

This command displays the parameters related to tunnel such as tunnel mode, tunnel source address and tunnel destination address.

**Format** show interface tunnel [<0-7>]

| Parameter | Definition |
|---|---|
| **<0-7>** | Specifies the tunnel ID |

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **TunnelId** | Shows the tunnel identification number. |
| **Interface** | Shows the name of the tunnel interface.. |
| **Tunnel Mode** | Shows the tunnel mode . |
| **Source Address** | Shows the source transport address of the tunnel |
| **Destination Address** | Shows the destination transport address of the tunnel |
| **Routing Mode** | Shows whether the routing is enabled or disabled. |
| **Administrative Mode** | Shows whether the interface administrative mode is enabled or disabled. |
| **IPv6 Implicit Mode** | Shows whether the Implicit mode is enabled, which enables the interface being capable of ipv6 operation without a global address. |
| **IPv6 Operational Mode** | Shows whether the operational state of an interface is enabled or disabled. |
| **Interface Maximum Transmit Unit** | Shows the maximum transmission unit for packets on the interface, in bytes. |
| **Router Duplicate Address Detection Transmits** | Shows the number of consecutive duplicate address detection probes to transmit. |
| **Router Advertisement NS Interval** | Shows the interval, in milliseconds, between router advertisements for advertised neighbor solicitations. |
| **Router Advertisement Lifetime** | Shows the router lifetime value of the interface in router advertisements. |
| **Router Advertisement Reachable Time** | Shows the amount of time, in milliseconds, to consider a neighbor reachable after neighbor discovery confirmation. |
| **Router Advertisement Interval (max)** | Shows maximum time allowed between sending router advertisements from the interface. Range of maximum advertisement interval is (4 to 1800).Default value is 600. |
| **Router Advertisement Interval (min)** | Shows minimum time allowed between sending router advertisements from the interface. Range of minimum advertisement interval is (3 to 1350).Default value is 200. |
| **Router Advertisement Managed Config Flag.** | Shows whether the managed configuration flag is set (enabled) for router advertisements on this interface. |

| | |
|---|---|
| **Router Advertisement Other Config Flag.** | Shows whether the other configuration flag is set (enabled) for router advertisements on this interface. |
| **Router Advertisement Suppress Flag** | Shows whether router advertisements are suppressed (enabled) or sent (disabled). |
| **IPv6 Destination Unreachables** | Shows whether ICMPv6 Destination Unreachable messages may be sent (enabled) or not (disabled) |

### 5.2.1.11. *Show port status*

This command displays port information.

**Format** show port status {<slot/port> | all | port-channel <lag-intf-num>}

**Mode** Privileged EXEC

**Display Message**

| Parameter Definition | Parameter Definition |
|---|---|
| **Interface slot/port** | Interface slot/port |
| **Type** | If not blank, this field indicates that this port is a special type of port. The possible values are:<br>• Mirror — this port is a monitoring port.<br>• PC Mbr— this port is a member of a port-channel (LAG).<br>• Probe — this port is a probe port. |
| **Admin Mode** | The Port control administration state. The port must be enabled in order for it to be allowed into the network. May be enabled or disabled. The factory default is enabled. |
| **Physical Mode** | The desired port speed and duplex mode. If negotiation support is selected, then the duplex mode and speed is set from the negotiation process. Note that the maximum capability of the port (full duplex -100M) is advertised. Otherwise, this object determines the port's duplex mode and transmission rate. |
| **Physical Status** | The port speed and duplex mode. |
| **Link Status** | The Link is up or down. |
| **Link Trap** | This object determines whether or not to send a trap when link status changes. The factory default is enabled. |
| **LACP Mode** | LACP is enabled or disabled on this port. |

Example: The following command shows an example of the command output for all ports.

(Switch) #show port status all

| Intf | Type | Admin Mode | Physical Mode | Physical Status | Link Status | Link Trap | LACP Mode | Actor Timeout |
|---|---|---|---|---|---|---|---|---|
| 0/1 | | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0/2 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/3 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/4 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/5 | Enable | 10G Full | | Down | Enable | Enable | long |
| 0/6 | Enable | 10G Full | | Down | Enable | Enable | long |
| 0/7 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/8 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/9 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/10 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/11 | Enable | 10G Full | | Down | Enable | Enable | long |
| 0/12 | Enable | 10G Full | | Down | Enable | Enable | long |
| 0/13 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/14 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/15 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |
| 0/16 | Enable | 10G Full | 10G Full | Up | Enable | Enable | long |

⋮

### 5.2.1.12. *Show interface description*

This command displays the interface description.

**Format** show interface description {slot/port | port-channel <portchannel-id>}

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Interface** | The slot/port or LAG with the information to view. |
| **ifIndex** | The interface index number associated with the port. |
| **Description** | The alpha-numeric description of the interface created by the command “description” on page 30. |
| **MAC address** | The MAC address of the port. The format is 6 two-digit hexadecimal numbers that are separated by colons, for example 01:23:45:67:89:AB. |
| **Bit Offset Val** | The bit offset value. |

Example: The following example shows the CLI display output for the command *show interface description 0/1*.

(Switch) #show interface description 0/1

Interface..... 0/1
ifIndex..... 1
Description……..
MAC address..... C4:54:44:45:46:AB
Bit Offset Val..... 1

### 5.2.1.13. *Show interface fec*

This command displays forward error correction information for the interface.

**Format** show interface fec [<slot/port>]

| Parameter | Definition |
|---|---|
| **no parameter** | To display information for all ports. |
| **<slot/port>** | Specifies Interface number |

**Mode** Privileged EXEC

### 5.2.1.14. *Show interface advertise*

This command displays advertisement information for interfaces.

**Format** show interface advertise [<slot/port>]

| Parameter | Definition |
|---|---|
| **no parameter** | To display information for all ports. |
| **<slot/port>** | Specifies Interface number |

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show interface advertise*.

```
(Switch) (Config)#show interface advertise

 Intf    Type            Neg      Operational Link Advertisement
--------- ---------------- -------- -------------------------------------

0/1      25G - Level      Disabled -    -    -    -    -    -

0/2      25G - Level      Disabled -    -    -    -    -    -

0/3      25G - Level      Disabled -    -    -    -    -    -

0/4      25G - Level      Disabled -    -    -    -    -    -

0/5      25G - Level      Enabled  25000f
```

0/6 25G - Level Enabled 25000f

(Switch) (Config)#show interface advertise 0/5

Port: 0/5

Type: 25G - Level

Link State: Up

Auto Negotiation:Enabled

Clock:Slave

| | 100000f | 50000f | 40000f | 25000f | 10000f | 1000f |
|---|---|---|---|---|---|---|
| Admin Local link Advertisement | no | no | no | yes | no | no |
| Oper Local link Advertisement | no | no | no | yes | no | no |
| Oper Peer Advertisement | no | no | no | yes | no | no |
| Priority Resolution | no | no | no | yes | no | no |

### 5.2.1.15. *Interface*

This command is used to enter Interface configuration mode.

**Format** interface {<slot/port> | control-plane | loopback <0-63> | port-channel <1-64> | range <intf-range>| tunnel <0-7> | vlan <1-4093> | vxlan <1-1>}

| Parameter | Definition |
|---|---|
| **<slot/port>** | Enter into interface mode |
| **control-plane** | Enter into Control Plane Mode |
| **loopback <0-63>** | Configuration of Loopback Interface |
| **port-channel <1-64>** | Enter into interface port-channel mode. |
| **Range <intf-range>** | Enter into interface range mode.Specifies the interface(s) in slot/port format, use comma for a list and hyphen for ranges. |
| **tunnel <0-7>** | Configure IPv6 Tunnel. |
| **vlan <1-4093>** | Enter into interface VLAN mode. |

| | |
|---|---|
| **vxlan <1-1>** | Enter into VxLAN Mode. |

**Mode** Global Config

### 5.2.1.16. *Cable-type*

The command sets the cable type to the DAC mode for the interface.

**Format** cable-type dac

**Default** Actual interface type

**Mode** Interface Config

### no cable-type

This command resets the cable-type of the interface to the default value.

**Format** no cable-type

**Mode** Interface Config

### 5.2.1.17. *Capabilities*

This command is used to set the capabilities on specific interface.

This no command removes the advertised capability with using parameter.

**Format** [no] capabilities {100 {full-duplex | half-duplex} | {1000 | 10000} full-duplex}

| Parameter | Definition |
|---|---|
| 100 | 100BASE-T |
| 1000 | 1000BASE-T |
| 10000 | 10000BASE-T |
| full-duplex | Full duplex |
| half-duplex | Half duplex |
| no | Reset to default. |

**Default** 1G full-duplex for 1G ports
10G full-duplex for 10G ports

**Mode** Interface Config

The following command is used to set the capabilities on all interface.

This no command removes the advertised capability with using parameter.

**Format** [no] capabilities all {100 {full-duplex | half-duplex} | {1000 | 10000} full-duplex}

| Parameter | Definition |
|---|---|
| all | Indicates to set for all interfaces |
| no | Reset to default. |
| 100 | 100BASE-T |
| 1000 | 1000BASE-T |
| 10000 | 10000BASE-T |
| full-duplex | Full duplex |
| half-duplex | Half duplex |

**Default** 1G full-duplex for 1G ports
10G full-duplex for 10G ports

**Mode** Global Config

### 5.2.1.18. *Description*

This command is used to create an alpha-numeric description of the port.

**Format** description <description>

| Parameter | Definition |
|---|---|
| **<description>** | an alpha-numeric description |

**Default** None

**Mode** Interface Config

## no description

This command removes the description of the interface.

**Format** no description

**Mode** Interface Config

### 5.2.1.19. *Flowcontrol*

This command enables 802.3x flow control for the interface(s).

**Format** flowcontrol {asymmetric | symmetric}

| Parameter | Definition |
|---|---|
| asymmetric | Indicates to enable an asymmetric flow control |
| symmetric | Indicates to enable a symmetric flow control |

**Default** Disabled

**Mode** Global Config
Interface Config

## no flowcontrol

This command removes the flow control feature from the interface(s).

**Format** no flowcontrol

**Mode** Global Config, Interface Config

### 5.2.1.20. *Mdi*

This command is used to configure the physical port MDI/MDIX state.

**Format** mdi {auto|across|normal}

| Parameter | Definition |
|---|---|
| **auto** | This type is auto selecting cable type. |
| **across** | This type is only allowed the Across-over cable. |
| **normal** | This type is only allowed the Normal cable. |

**Default** auto

**Mode** Interface Config

## no mdi

This command restores the port mode to “auto”.

**Format** no mdi

**Mode** Interface Config

### 5.2.1.21. *Mtu*

Use the mtu command to set the maximum transmission unit (MTU) size, in bytes, for frames that ingress or egress the interface. You can use the mtu command to configure jumbo frame support for physical and port- channel (LAG) interfaces. For the standard ICOS implementation, the MTU size is a valid integer between 1522–9412 for tagged packets and a valid integer between 1518 and 9412 for untagged packets. The actual maximal packet size depends on HW platform.

**Format** mtu 1518-9412

**Default** 1518

**Mode** Interface Config

## no mtu

This command sets the default MTU size (in bytes) for the interface.

**Format** no mtu

**Mode** Interface Config

### 5.2.1.22. *Negotiate*

This command enables automatic negotiation on a port.

**Format** negotiate

**Default** Enable

**Mode** Interface Config

### no negotiate

This command disables automatic negotiation on a port.

**Format** no negotiate

**Mode** Interface Config

### negotiate all

This command enables automatic negotiation on all ports.

**Note**: This command is not applied to IX7D/IX8D modules.

**Format** negotiate all

**Mode** Global Config

### no negotiate all

This command disables automatic negotiation on all ports.

**Note**: This command is not applied to IX7D/IX8D modules.

**Format** no negotiate all

**Mode** Global Config

### 5.2.1.23. *Port-mode*

Use this command to configure a 100G QSFP28 port in either 1x100G, 1x40G, 2x50G, 4x25G, or 4x10G mode, a 40G port in either 1x40G or 4x10G mode, or four 25G SFP28 ports in either 4x25G or 4x10G mode.

**Note**: In IX8D model, every four 25G ports form a group from port 1 until port 48. The *port-mode* command can only be applied on the first port of each group and all the four ports in the same group are configured to the same speed. For example, you can issue the *port-mode 4x10G* command on ethernet port 0/1 but not on ethernet port 0/2, 0/3, or 0/4; all the four ports from 0/1 to 0/4 are configured to 10G.

**Format** port-mode {1x100G | 1x40G | 2x50G | 4x25G | 4x10G}

| Parameter | Definition |
|---|---|
| **1x100G** | Configure the port as a single 100G port using four lanes. |
| **1x40G** | Configure the port as a single 40G port using four lanes. |
| **2x50G** | Configure the port as two 50G ports, each on two lanes. |
| **4x25G** | Configure the port as four 25G ports, each on a separate lane. This mode requires the use of a suitable 4x25G to 1x100G pigtail cable. |
| **4x10G** | Configure the port as a four 10G ports, each on a separate lane. This mode requires the use of a suitable 4x10G to 1x40G pigtail cable. |

**Default** 1x100G for 100G ports
1x40G for 40G ports
4x25G for 25G ports

**Mode** Interface Config

## no port-mode

This command resets to the default value. The default value is 1x100G for 100G ports, 1x40G for 40G ports, and 4x25G for 25G ports.

**Format** no port-mode

**Mode** Interface Config

## 5.2.1.24. *Shutdown*

This command is used to disable a port.

The no command is used to enables a port.

**Format** [no] shutdown

| Parameter | Definition |
|---|---|
| no. | Reset to default. |

**Default** Enable

**Mode** Interface Config

### 5.2.1.25. *Shutdown all*

This command is used to disable all ports.

**Format** [no] shutdown all

| Parameter | Definition |
|---|---|
| no. | Reset to default. |

**Mode** Global Config

### 5.2.1.26. *Speed-duplex*

Enable or disable auto-negotiation and set the speed and duplex setting for the port. Use the command without the *auto* keyword to ensure auto-negotiation is disabled and to set the port speed and duplex mode according to the command values. If auto-negotiation is disabled, the speed and duplex mode must be set.

Use the *auto* keyword to enable auto-negotiation on the port.

**Note**: This command is only supported on the modules which has the RJ45 ports.

**Format** speed-duplex auto [10 | 100 | 1000] [full-duplex | half-duplex]

speed-duplex {10 | 100} {full-duplex | half-duplex}

| Parameter | Definition |
|---|---|
| auto | Enable auto-negotiation on the port |
| 10 | 10BASE-T |

| | |
|---|---|
| 100 | 100BASE-T |
| 1000 | 1000BASE-T |
| full-duplex | Full duplex |
| half-duplex | Half duplex |

**Default** speed auto

**Mode** Interface Config

## speed-duplex all

This command is used to set speed and duplex on all ports. Need to use the command *no negotiate all* before issuing this command.

**Note**: This command is only supported on the modules which has the RJ45 ports.

**Format** speed-duplex all {10 | 100} { full-duplex | half-duplex }

**Mode** Global Config

## 5.2.1.27. *Fec*

Enable forward error correction on the 25G, 50G, or 100G interface.

**Note**:
1. Different type of FEC should be applied on different speed. FEC CL74 is applied on 25G/50G interface, FEC CL91 is applied on 100G/50G interface, and FEC CL108 is applied on 25G interface.
2. FEC enable/disable is applied to the first interface of each group, which works in the same way as the command *port-mode*. For example, you can issue the *fec CL108* command on ethernet port 0/1 but not on ethernet port 0/2, 0/3, or 0/4; all the four ports from 0/1 to 0/4 are configured to CL108. For the 50G ports, such as 0/161 and 0/162 on IX7D model, you can issue the *fec CL91* command on ethernet port 0/161 but not on ethernet port 0/162; both ports, 0/161 and 0/162, are configured to CL91.

**Format** fec {CL74 | CL91 | CL108}

| Parameter | Definition |
|---|---|
| CL74 | Enable CL74/Base-R FEC. |
| CL91 | Enable CL91/RS FEC. |
| CL108 | Enable RS108 FEC. |

**Default** Enable

**Mode** Interface Config

## 5.2.2. L2 MAC Address and Multicast Forwarding Database Tables

### 5.2.2.1. *Show mac-addr-table*

This command displays the forwarding database entries. If the command is entered with no parameter, the entire table is displayed. The administrator can enter a MAC Address to display the table entry for the requested MAC address and all entries following the requested MAC address.

**Format** show mac-addr-table [{<macaddr> <vlan-id>}]

**Default** None

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mac-addr-table*.

(Switch) #show mac-addr-table

VLAN ID MAC Address Interface IfIndex Status

------- ------------------ ---------------------- ------- ------------

1 C4:54:44:56:D3:57 vlan 1 136 Management

### 5.2.2.2. *Show mac-addr-table count*

This command displays the total forwarding database entries, the number of static and learnning mac address, and the max address available on the switch.

**Format** show mac-addr-table count

**Default** None

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mac-addr-table count*.

(Switch) #show mac-addr-table count

Dynamic Address count..... 0

Static Address (User-defined) count..... 1

Total MAC Addresses in use..... 1

Total MAC Addresses available..... 98304

### 5.2.2.3. *Show mac-addr-table interface*

This command displays the forwarding database entries. The user can search FDB table by using specific interface number.

**Format** show mac-addr-table interface {<slot/port> | port-channel <portchannel-id> | vlan <vlan-id>}

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mac-addr-table vlan 1.*

(Switch) #show mac-addr-table interface vlan 1

MAC Address Interface Status

----------- ---------- ----------

C4:54:44:56:D3:57 vlan 1 Management

### 5.2.2.4. *Show mac-address-table igmpsnooping*

This command displays the IGMP Snooping entries in the Multicast Forwarding Database (MFDB) table.

**Format** show mac-address-table igmpsnooping

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mac-address-table igmpsnooping.*

(Switch) (Config)#show mac-address-table igmpsnooping

VLAN ID MAC Address Type Description Interfaces

---------- ---------- ---------- ----------

00:01:01:00:5E:01:01:01 Static Network Assist Fwd: 0/1,ch1

00:02:01:00:5E:AA:BB:CC Static Network Assist Fwd: 0/2

### 5.2.2.5. *Show mac-address-table multicast*

This command displays the MFDB information. If the command is entered with no parameter, the entire table is displayed. This is the same as entering the all parameter. The user can display the table entry for one MAC Address by specifying the MAC address as an optional parameter.

**Format** show mac-address-table multicast [{<macaddr> <vlan-id>]]

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mac-address-table multicast.*

(Switch) (Config)#show mac-address-table multicast

| VLAN ID | MAC Address | Source | Type | Description | Interface | Fwd Interface |
|---|---|---|---|---|---|---|
| 1 | 01:00:5E:01:01:01 | IGMP | Static | Network Assist | Fwd: 0/1, ch1 | Fwd: 0/1, ch1 |
| 2 | 01:00:5E:AA:BB:CC | IGMP | Static | Network Assist | Fwd: 0/2 | Fwd: 0/2 |

### 5.2.2.6. *Show mac-address-table status*

This command displays the MFDB statistics.

**Format** show mac-address-table stats

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mac-address-table stats.*

(Switch) #show mac-address-table stats

Max MFDB Table Entries..... 1024

Most MFDB Entries Since Last Reset..... 0

Current Entries..... 0

#### 5.2.2.7. *Show mac-addr-table agetime*

This command displays the forwarding database address aging timeout.

**Format** show mac-addr-table agetime

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mac-addr-table agetime.*

(Switch) #show mac-addr-table agetime

Address Aging Timeout:300

#### 5.2.2.8. *Mac-addr-table aging-time*

This command configures the forwarding database address aging timeout in seconds.

**Format** mac-addr-table aging-time <10-1000000>

**Default** 300s

**Mode** Global Config

#### no mac-addr-table aging-time

Use this command to return the address aging timeout the default settings.

**Format** no mac-addr-table aging-time

**Mode** Global Config

### 5.2.3. VLAN Commands

This section describes the commands you use to configure VLAN settings.

#### 5.2.3.1. *Vlan database*

This command gives you access to the VLAN Config mode, which allows you to configure VLAN characteristics.

**Format** vlan database

**Mode** Global Config

### 5.2.3.2. *Vlan*

This command creates a new VLAN and assigns it an ID. The ID is a valid VLAN identification number (ID 1 is reserved for the default VLAN). VLAN range is 1-4093.

**Format** vlan <vlan-list>

**Mode** VLAN Config

### no vlan

This command deletes an existing VLAN. The ID is a valid VLAN identification number (ID 1 is reserved for the default VLAN). The VLAN range is 1-4093.

**Format** no vlan <vlan-list>

**Mode** VLAN Config

### 5.2.3.3. *Vlan makestatic*

This command changes a dynamically created VLAN to a static VLAN (one that is permanently configured and defined). The ID is a valid VLAN identification number. VLAN range is 2-4093.

**Format** vlan makestatic <2-4093>

**Mode** VLAN Config

### 5.2.3.4. *Vlan name*

This command changes the name of a VLAN. The name is an alphanumeric string of up to 32 characters, and the ID is a valid VLAN identification number. ID range is 1-4093.

**Format** vlan name <1-4093> <newname>

**Default** VLAN ID 1 - default
Other VLANS - blank string

**Mode** VLAN Config

### no vlan name

This command sets the name of a VLAN to a blank string.

**Format** no vlan name <1-4093>

**Mode** VLAN Config

## 5.2.3.5. *Switchport acceptable-frame-types*

This command sets the frame acceptance mode per interface. For VLAN Only mode, untagged frames or priority frames received on this interface are discarded. For Admit All mode, untagged frames or priority frames received on this interface are accepted and assigned the value of the interface VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance with the IEEE 802.1Q VLAN specification.

**Format** switchport acceptable-frame-types {all | tagged | untagged}

**Default** all

**Mode** Interface Config

### no switchport acceptable-frame-types

This command resets the frame acceptance mode for the interface to the default value.

**Format** no switchport acceptable-frame-types

**Mode** Interface Config

## 5.2.3.6. *Switchport acceptbale-frame-type all*

This command sets the frame acceptance mode for all interfaces. For VLAN Only mode, untagged frames or priority frames received on this interface are discarded. For Admit All mode, untagged frames or priority frames received on this interface are accepted and assigned the value of the interface VLAN ID for this port.

With either option, VLAN tagged frames are forwarded in accordance with the IEEE 802.1Q VLAN specification.

**Format** switchport acceptable-frame-types all {all | tagged | untagged}

**Default** all

**Mode** Global Config

### no switchport acceptable-frame-types all

This command resets the frame acceptance mode for all interfaces to the default value.

**Format** no switchport acceptable-frame-types all

**Mode** Global Config

## 5.2.3.7. *Switchport ingress-filtering*

This command enables ingress filtering. If ingress filtering is disabled, frames received with VLAN IDs that do not match the VLAN membership of the receiving interface are admitted and forwarded to ports that are members of that VLAN.

**Format** switchport ingress-filtering

**Default** disabled

**Mode** Interface Config

### no switchport ingress-filtering

This command disables ingress filtering. If ingress filtering is disabled, frames received with VLAN IDs that do not match the VLAN membership of the receiving interface are admitted and forwarded to ports that are members of that VLAN.

**Format** no switchport ingress-filtering

**Mode** Interface Config

## 5.2.3.8. *Switchport ingress-filtering all*

This command enables ingress filtering for all interfaces. If ingress filtering is disabled, frames received with VLAN IDs that do not match the VLAN membership of the receiving interface are admitted and forwarded to ports that are members of that VLAN.

**Format** switchport ingress-filtering all

**Default** disabled

**Mode** Global Config

### no switchport ingress-filtering all

This command disables ingress filtering for all interfaces. If ingress filtering is disabled, frames received with VLAN IDs that do not match the VLAN membership of the receiving interface are admitted and forwarded to ports that are members of that VLAN.

**Format** no switchport ingress-filtering all

**Mode** Global Config

## 5.2.3.9. *Switchport native vlan*

This command changes the VLAN ID which will be assigned to untagged or priority tagged frames per interface.

**Format** switchport native vlan <1-4093>

**Default** 1

**Mode** Interface Config

### no switchport native vlan

This command sets the VLAN ID per interface to 1.

**Format** no switchport native vlan

**Mode** Interface Config

## 5.2.3.10. *Switchport native vlan all*

This command changes the VLAN ID which will be assigned to untagged or priority tagged frames for all interfaces.

**Format** switchport native vlan all <1-4093>

**Default** 1

**Mode** Global Config

### no switchport native vlan all

This command sets the VLAN ID for all interfaces to 1.

**Format** no switchport native vlan all

**Mode** Global Config

## 5.2.3.11. *Switchport allowed vlan*

This command configures the degree of participation for a specific interface in a VLAN. The ID is a valid VLAN identification number, and the interface is a valid interface number.

**Format** switchport allowed vlan {add [tagged | untagged] | remove} <vlan-list>

**Mode** Interface Config

## 5.2.3.12. *Switchport allowed vlan all*

This command configures the degree of participation for all interfaces in a VLAN. The ID is a valid VLAN identification number.

**Format** switchport allowed vlan {add {tagged | untagged} | remove} all <1-4093>

**Mode** Global Config

## 5.2.3.13. *Switchport tagging*

This command configures the tagging behavior for a specific interface in a VLAN to enable. If tagging is enabled, traffic is transmitted as tagged frames. If tagging is disabled, traffic is transmitted as untagged frames. The ID is a valid VLAN identification number.

**Format** switchport tagging <vlan-list>

**Default** Disable

**Mode** Interface Config

### no switchport tagging

This command configures the tagging behavior for a specific interface in a VLAN to disabled. If tagging is disabled, traffic is transmitted as untagged frames. The ID is a valid VLAN identification number.

**Format** no switchport tagging <vlan-list>

**Mode** Interface Config

## 5.2.3.14. *Switchport tagging all*

This command configures the tagging behavior for all interfaces in a VLAN to be enabled. If tagging is enabled, traffic is transmitted as tagged frames. If tagging is disabled, traffic is transmitted as untagged frames. The ID is a valid VLAN identification number.

**Format** switchport tagging all <1-4093>

**Default** Disable

**Mode** Global Config

### no switchport tagging all

This command configures the tagging behavior for all interfaces in a VLAN to disabled. If tagging is disabled, traffic is transmitted as untagged frames. The ID is a valid VLAN identification number.

**Format** no switchport tagging all <1-4093>

**Mode** Global Config

## 5.2.3.15. *Show vlan*

This command displays brief information on a list of all configured VLANs.

**Format** show vlan

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Term | Definition |
|---|---|
| **VLAN ID** | There is a VLAN Identifier (vlanid) associated with each VLAN. The range of the VLAN ID is 1 to 4093. |
| **VLAN Name** | A string associated with this VLAN as a convenience. It can be up to 16 alphanumeric characters, including blanks. The default is blank. VLAN ID 1 is always named `Default`. This field is optional. |
| **VLAN Type** | Type of VLAN, which can be Default, (VLAN ID = 1), can be static (one that is configured and permanently defined), or Dynamic (one that is created by GVRP registration). |
| **Interface(s)** | Indicates by slot id and port number which port belongs to this VLAN. |

### 5.2.3.16. *Show vlan id*

This command displays detailed information, including interface information, for a specific VLAN.

**Format** show vlan {id <1-4093> | name <vlanname>}

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Term | Definition |
|---|---|
| **VLAN ID** | There is a VLAN Identifier (VID) associated with each VLAN. The range of the VLAN ID is 1 to 4093. |
| **VLAN Name** | A string associated with this VLAN as a convenience. It can be up to 32 alphanumeric characters, including blanks. The default is blank. VLAN ID 1 is always named `Default`. This field is optional. |
| **VLAN Type** | Type of VLAN, which can be Default, (VLAN ID = 1), can be static (one that is configured and permanently defined), or Dynamic (one that is created by GVRP registration). |
| **Interface** | Indicates by slot id and port number which port is controlled by the fields on this line. |
| **Current:**<br>• **Include**<br>• **Exclude**<br>• **Autodetect** | Determines the degree of participation of this port in this VLAN. The permissible values are:<br>• This port is always a member of this VLAN. This is equivalent to registration fixed in the IEEE 802.1Q standard.<br>• This port is never a member of this VLAN. This is equivalent to registration forbidden in the IEEE 802.1Q standard.<br>• Specifies to allow the port to be dynamically registered in this VLAN via GVRP. The port will not participate in this VLAN unless a join request is received on this port. This is equivalent to registration normal in the IEEE 802.1Q standard. |
| **Configured:** | Determines the configured degree of participation of this port in this VLAN. |

| | |
|---|---|
| • **Include**<br>• **Exclude**<br>• **Autodetect** | The permissible values are:<br>• This port is always a member of this VLAN. This is equivalent to registration fixed in the IEEE 802.1Q standard.<br>• This port is never a member of this VLAN. This is equivalent to registration forbidden in the IEEE 802.1Q standard.<br>• Specifies to allow the port to be dynamically registered in this VLAN via GVRP. The port will not participate in this VLAN unless a join request is received on this port. This is equivalent to registration normal in the IEEE 802.1Q standard. |
| **Tagging:**<br>• **Tagged**<br>• **Untagged** | Select the tagging behavior for this port in this VLAN:<br>• Specifies to transmit traffic for this VLAN as tagged frames.<br>• Specifies to transmit traffic for this VLAN as untagged frames. |

### 5.2.3.17. *Show vlan internal usage*

This command displays information about the VLAN ID allocation on the switch.

**Format** show vlan internal usage

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Base VLAN ID** | Identifies the base VLAN ID for Internal allocation of VLANs to the routing interface. |
| **Allocation policy** | Identifies whether the system allocates VLAN IDs in ascending or descending order. |

### 5.2.3.18. *Show interface switchport*

This command displays VLAN port information.

**Format** show interface switchport {<slot/port> | port-channel <1-64>}

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Indicates by slot id and port number which port is controlled by the fields on this line. It is possible to set the parameters for all ports by using the selectors on the top line. |
| **Native VLAN** | The VLAN ID that this port will assign to untagged frames or priority tagged frames received on this port. The value must be for an existing VLAN. The factory default is 1. |

| | |
|---|---|
| **Mode** | Indicates this interface is operating on Access mode or General mode. |
| **Ingress Filtering** | May be enabled or disabled. When enabled, the frame is discarded if this port is not a member of the VLAN with which this frame is associated. In a tagged frame, the VLAN is identified by the VLAN ID in the tag. In an untagged frame, the VLAN is the Port VLAN ID specified for the port that received this frame. When disabled, all frames are forwarded in accordance with the 802.1Q VLAN bridge specification. The factory default is disabled. |

| Term | Definition |
|---|---|
| **Acceptable Frame Type** | Specifies the types of frames that may be received on this port. The options are 'VLAN only' and 'Admit All'. When set to 'VLAN only', untagged frames or priority tagged frames received on this port are discarded. When set to 'Admit All', untagged frames or priority tagged frames received on this port are accepted and assigned the value of the Port VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance to the 802.1Q VLAN specification. |

## 5.2.4. Private VLAN Commands

This section describes the commands you use for private VLANs. Private VLANs provides Layer 2 isolation between ports that share the same broadcast domain. In other words, it allows a VLAN broadcast domain to be partitioned into smaller point-to-multipoint subdomains. The ports participating in a private VLAN can be located anywhere in the Layer 2 network.

### 5.2.4.1. *Switchport private-vlan*

This command defines a private-VLAN association for an isolated or community port or a mapping for a promiscuous port.

**Format** switchport private-vlan {host-association <primary-vlan-id> <secondary-vlan-id> | mapping <primary-vlan-id> [add | remove] <secondary-vlan-list>}

| Parameter | Definition |
|---|---|
| **host-association** | Defines the VLAN association for community or host ports. |
| **mapping** | Defines the private VLAN mapping for promiscuous ports. |
| **primary-vlan-id** | Primary VLAN ID of a private VLAN. |
| **secondary-vlanid** | Secondary (isolated or community) VLAN ID of a private VLAN. |
| **add** | Associates the secondary VLAN with the primary one. |
| **remove** | Deletes the secondary VLANs from the primary VLAN association. |
| **secondary-vlanlist** | A list of secondary VLANs to be mapped to a primary VLAN. |

**Mode** Interface Config

### no switchport private-vlan

This command removes the private-VLAN association or mapping from the port.

**Format** no switchport private-vlan {host-association|mapping}

**Mode** Interface Config

### 5.2.4.2. *Switchport mode private-vlan*

This command configures a port as a promiscuous or host private VLAN port. Note that the properties of each mode can be configured even when the switch is not in that mode. However, they will only be applicable once the switch is in that particular mode.

**Format** switchport mode private-vlan {host|promiscuous}

| Parameter | Definition |
|---|---|
| **host** | Configures an interface as a private VLAN host port. It can be either isolated or community port depending on the secondary VLAN it is associated with. |
| **promiscuous** | Configures an interface as a private VLAN promiscuous port. The promiscuous ports are members of the primary VLAN. |

**Default** general

**Mode** Interface Config

### no switchport mode private-vlan

This command removes the private-VLAN association or mapping from the port.

**Format** no switchport mode private-vlan

**Mode** Interface Config

### 5.2.4.3. *Private-vlan*

This command configures the private VLANs and configures the association between the primary private VLAN and secondary VLANs.

**Format** private-vlan {association [add|remove] <secondary-vlanlist> | community | isolated | primary}

| Parameter | Definition |
|---|---|
| **association** | Associates the primary and secondary VLAN. |
| **secondary-vlan-list** | A list of secondary VLANs to be mapped to a primary VLAN. |
| **community** | Designates a VLAN as a community VLAN. |

| | |
|---|---|
| **isolated** | Designates a VLAN as the isolated VLAN. |
| **primary** | Designates a VLAN as the primary VLAN. |

**Mode** VLAN Config

### no private-vlan

This command restores normal VLAN configuration.

**Format** no private-vlan [association]

**Mode** VLAN Config

## 5.2.5. Switch Ports

This section describes the commands used for switch port mode.

### 5.2.5.1. *Switchport mode*

This command configures an interface to be operated on VLAN access mode. In this mode, only one VLAN could be assigned to this interface. Use 'switchport access vlan <vlan-id>' to configure the access VLAN. In VLAN access mode, only the untagged packets are handled.

**Format** switchport mode <access | general | trunk>

**Default** General Mode

**Mode** Interface Config

### no switchport mode

This command sets the mode to General.

**Format** no switchport mode

**Mode** Interface Config

### 5.2.5.2. *Switchport trunk allowed vlan*

Use this command to configure the list of allowed VLANs that can receive and send traffic on this interface in tagged format when in trunking mode. The default is all.

The VLANs list can be modified using the add or remove options or replaced with another list using the vlan-list, all, or except options. If all is choosen, all VLANs are added to the list of allowed vlan. The except option provides an exclusion list.

Trunk ports accept tagged packets, where tagged packets are processed on the VLAN ID contained in the packet, if this VLAN is in the allowed VLAN list. Tagged packets received with a VLAN ID to which the port is not a member are discarded and MAC learning is not performed. If a VLAN is added to the system after a port is set to the Trunk mode and it is in the allowed VLAN list, this VLAN is assigned to this port automatically.

**Format** switchport trunk allowed vlan {<vlan-list> | all | add <vlan-list> | remove <vlan-list> | except <vlan-list>}

| Parameter | Definition |
|---|---|
| **All** | Specifies all VLANs from 1 to 4093. This keyword is not allowed on commands that do not permit all VLANs in the list to be set at the same time. |
| **add** | Adds the defined list of VLANs to those currently set instead of replacing the list. |
| **remove** | Removes the defined list of VLANs from those currently set instead of replacing the list. Valid IDs are from 1 to 4093; extended-range VLAN IDs of the form XY or X, Y, Z are valid in this command. |
| **except** | Lists the VLANs that should be calculated by inverting the defined list of VLANs. (VLANs are added except the ones specified.) |
| **vlan-list** | Either a single VLAN number from 1 to 4093 or a continuous range of VLANs described by two VLAN numbers, the lesser one first, separated by a hyphen. |

**Default** All

**Mode** Interface Config

## no switchport trunk allowed vlan

This command resets the list of allowed VLANs on the trunk port to its default value.

**Format** no switchport trunk allowed vlan

**Mode** Interface Config

### 5.2.5.3. *Switchport trunk native vlan*

Use this command to configure the Trunk port Native VLAN (PVID) parameter. Any ingress untagged packets on the port are tagged with the value of Native VLAN. Native VLAN must be in the allowed VLAN list

for tagging of received untagged packets. Otherwise, untagged packets are discarded. Packets marked with Native VLAN are transmitted untagged from Trunk port. The default is 1.

**Format** switchport trunk native vlan <vlan-id>

**Default** 1 (Default VLAN)

**Mode** Interface Config

### no switchport trunk native vlan

Use this command to reset the switch port trunk mode native VLAN to its default value.

**Format** no switchport trunk native vlan

**Mode** Interface Config

## 5.2.5.4. *Switchport access vlan*

Use this command to configure the VLAN on the Access port. Only one VLAN can be assigned to the Access port. Access ports are members of VLAN 1 by default. Access ports may be assigned to a VLAN other than VLAN 1. Removing the Access VLAN on the switch makes the Access port a member of VLAN 1. Configuring an Access port to be a member of a VLAN that does not exist results in an error and does not change the configuration.

**Format** switchport access vlan <vlan-id>

**Default** 1 (Default VLAN)

**Mode** Interface Config

### no switchport access vlan

This command sets the access VLAN ID to 1.

**Format** no switchport access vlan

**Mode** Interface Config

## 5.2.5.5. *Show interfaces switchport*

Use this command to display the switchport status for all interfaces or a specified interface.

**Format** show interfaces switchport [<slot/port> | port-channel <trunk-id>]

**Mode** Privileged EXEC

## 5.2.6. Double VLAN Commands

This section describes the commands you use to configure double VLAN (DVLAN). Double VLAN tagging is a way to pass VLAN traffic from one customer domain to another through a Metro Core in a simple and cost effective manner. The additional tag on the traffic helps differentiate between customers in the MAN while preserving the VLAN identification of the individual customers when they enter their own 802.1Q domain.

### 5.2.6.1. *Dvlan-tunnel ethertype*

This command configures the ethertype for the all interfaces. The two-byte hex ethertype is used as the first 16 bits of the DVLAN tag. The ethertype may have the values of 802.1Q, vman, or custom. If the ethertype has an optional value of custom, then it is a custom tunnel value, and ethertype must be set to a value in the range of 1 to 65535.

**Format** dvlan-tunnel ethertype {802.1Q | vman | custom <1–65535>}

| Parameter | Definition |
|---|---|
| **802.1Q** | Configure the ethertype as 0x8100. |
| **custom** | Configure the value of the custom tag in the range from 1 to 65535. |
| **vman** | Represents the commonly used value of 0x88A8. |

**Mode** Global Config

### no dvlan-tunnel ethertype

Use the no form of the command to disassociate globally defined TPID(s) to all interfaces.

**Format** no dvlan-tunnel ethertype

**Mode** Global Config

### 5.2.6.2. *Dot1q-tunnel ethertype*

This command configures the ethertype for the all interfaces. The two-byte hex ethertype is used as the first 16 bits of the DVLAN tag. The ethertype may have the values of 802.1Q, vman, or custom. If the

ethertype has an optional value of custom, then it is a custom tunnel value, and ethertype must be set to a value in the range of 1 to 65535.

**Format** dot1q-tunnel ethertype {802.1Q | vman | custom <1–65535>}

**Mode** Global Config

### no dot1q-tunnel ethertype

Use the no form of the command to disassociate globally defined TPID(s) to all interfaces.

**Format** no dot1q-tunnel ethertype

**Mode** Global Config

## 5.2.6.3. *Mode dot1q-tunnel*

This command is used to enable Double VLAN Tunneling on the specified interface.

**Format** mode dot1q-tunnel

**Default** disabled

**Mode** Interface Config

### no mode dot1q-tunnel

This command is used to disable Double VLAN Tunneling on the specified interface. By default, Double VLAN Tunneling is disabled.

**Format** no mode dot1q-tunnel

**Mode** Interface Config

## 5.2.6.4. *Mode dvlan-tunnel*

Use this command to enable Double VLAN Tunneling on the specified interface.

**Note**: When you use the mode dvlan-tunnel command on an interface, it becomes a service provider port. Ports that do not have double VLAN tunneling enabled are customer ports.

**Format** mode dvlan-tunnel

**Default** disabled

**Mode** Interface Config

## no mode dvlan-tunnel

This command is used to disable Double VLAN Tunneling on the specified interface. By default, Double VLAN Tunneling is disabled.

**Format** no mode dvlan-tunnel

**Mode** Interface Config

## 5.2.6.5. *Show dot1q-tunnel*

Use this command with the optional parameter interface to display all interfaces enabled for Double VLAN Tunneling. Use the optional parameters to display detailed information about Double VLAN Tunneling for the specified interface.

**Format** show dot1q-tunnel [interface [{<slot/port> | port-channel <port-channel-id >}]]

| Parameter | Definition |
|---|---|
| **Interface** | slot/port |
| **Mode** | The administrative mode through which Double VLAN Tunneling can be enabled or disabled. The default value for this field is disabled. |
| **EtherType** | A 2-byte hex EtherType to be used as the first 16 bits of the DVLAN tunnel. There are three different EtherType tags. The first is 802.1Q, which represents the commonly used value of 0x8100. The second is vMAN, which represents the commonly used value of 0x88A8. If EtherType is not one of these two values, then it is a custom tunnel value, representing any value in the range of 1 to 65535. |

**Mode** Privileged EXEC

User EXEC

Example: The following shows examples of the CLI display output for the commands *show dot1q-tunnel*.

(QCT) #show dot1q-tunnel

Ethertype..... 0x8100

Interfaces Enabled for DVLAN Tunneling..... None

(QCT) #show dvlan-tunnel interface port-channel 1

| Interface | Mode | EtherType |
|---|---|---|
| ch1 | Disable | 0x8100 |

### 5.2.6.6. *Show dvlan-tunnel*

Use this command with the optional parameter interface to display all interfaces enabled for Double VLAN Tunneling. Use the optional parameters to display detailed information about Double VLAN Tunneling for the specified interface.

**Format** show dvlan-tunnel [interface [{<slot/port> | port-channel <portchannel-id >}]]

| Parameter | Definition |
|---|---|
| **Interface** | slot/port |
| **Mode** | The administrative mode through which Double VLAN Tunneling can be enabled or disabled. The default value for this field is disabled. |
| **EtherType** | A 2-byte hex EtherType to be used as the first 16 bits of the DVLAN tunnel. There are three different EtherType tags. The first is 802.1Q, which represents the commonly used value of 0x8100. The second is vMAN, which represents the commonly used value of 0x88A8. If EtherType is not one of these two values, then it is a custom tunnel value, representing any value in the range of 1 to 65535. |

**Mode** Privileged EXEC

User EXEC

Example: The following shows examples of the CLI display output for the commands *show dvlan-tunnel*.

(QCT) #show dvlan-tunnel

Ethertype..... 0x8100

Interfaces Enabled for DVLAN Tunneling..... None

(QCT) #show dvlan-tunnel interface port-channel 1

| Interface | Mode | EtherType |
|---|---|---|
| ch1 | Disable | 0x8100 |

## 5.2.7. IGMP snooping commands

This section describes the commands which are used to configure IGMP Snooping.

IGMP snooping is designed to prevent flooding multicast traffic which can cause unnecessary load on host devices.

Note: IGMP Snooping can be enabled with MLAG. The configuration of IGMP Snooping on peers of MLAG must be the same to guarantee that MLAG can work correctly.

### 5.2.7.1. *Ip igmp snooping*

Use this command to enable IGMP snooping globally.

**Format** ip igmp snooping

**Default** Disable

**Mode** Global Config

### no ip igmp snooping

Use this command to disable IGMP snooping globally.

**Format** no ip igmp snooping

**Mode** Global Config

### 5.2.7.2. *Clear igmp snooping*

Use this command to delete all dynamic entries in Multicast Forwarding Database which is managed by the IGMP Snooping.

**Format** clear igmp snooping

**Default** None

**Mode** Privileged Exec

### 5.2.7.3. *Ip igmp snooping interfacemode*

Use this command to enable IGMP snooping on one particular interface.

**Format** ip igmp snooping interfacemode

**Default** Disable

**Mode** Interface Config

### no ip igmp snooping interfacemode

Use this command to disable IGMP snooping on one particular interface.

**Format** no ip igmp snooping interfacemode

**Mode** Interface Config

## 5.2.7.4. *Ip igmp snooping interfacemode all*

Use this command to enable IGMP snooping on all interfaces.

**Format** ip igmp snooping interfacemode all

**Default** Disable

**Mode** Global Config

### no ip igmp snooping interfacemode all

Use this command to disable IGMP snooping on all interfaces.

**Format** no ip igmp snooping interfacemode all

**Mode** Global Config

## 5.2.7.5. *Ip igmp snooping fast-leave*

Use this command to enable IGMP snooping fast-leave admin mode on one particular interface or all interfaces.

**Format** ip igmp snooping fast-leave

**Default** Disable

**Mode** Global Config
Interface Config

## no ip igmp snooping fast-leave

Use this command to disable IGMP snooping fast-leave admin mode on one particular interface or all interfaces.

**Format** no ip igmp snooping fast-leave

**Mode** Global Config

Interface Config

### 5.2.7.6. *Ip igmp snooping groupmembershipinterval*

Use this command to configure IGMP Group Membership Interval time on one particular interface or all interfaces.

**Format** ip igmp snooping groupmembershipinterval <2-3600>

**Default** 260

**Mode** Global Config

Interface Config

## no ip igmp snooping groupmembershipinterval

Use this command to restore IGMP Group Membership Interval time to default value.

**Format** no ip igmp snooping groupmembershipinterval

**Mode** Global Config

Interface Config

### 5.2.7.7. *Ip igmp snooping mcrtrexpiretime*

Use this command to configure Multicast Router Present Expiration time globally or on one particular interface.

**Format** ip igmp snooping mcrtrexpiretime <0-3600>

**Default** 0

**Mode** Global Config

Interface Config

### no ip igmp snooping mcrtrexpiretime

Use this command to restore Multicast Router Present Expiration time to default value.

**Format** no ip igmp snooping mcrtrexpiretime

**Mode** Global Config

Interface Config

## 5.2.7.8. *Ip igmp snooping mrouter*

Use this command to configure one particular interface as a multicast router-attached interface or configure the VLAN ID for the VLAN that has the multicast router attached mode enabled.

**Format** ip igmp snooping mrouter {interface | <vlan-id>}

**Default** Disable

**Mode** Interface Config

### no ip igmp snooping mrouter

Use this command to disable multicast router attached mode for one particular interface or a VLAN.

**Format** no ip igmp snooping mrouter {interface | <vlan-id>}

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Interface Config

## 5.2.7.9. *Set igmp*

Use this command to enable IGMP Snooping on a particular VLAN.

**Format** set igmp <vlan-id>

**Default** Disable

**Mode** VLAN database

## no set igmp

Use this command to disable IGMP Snooping on a particular VLAN.

**Format** no set igmp <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.7.10. *Set igmp fast-leave*

Use this command to enable IGMP Snooping fast-leave admin mode on a particular VLAN.

**Format** set igmp fast-leave <vlan-id>

**Default** Disable

**Mode** VLAN database

## no set igmp fast-leave

Use this command to disable IGMP Snooping fast-leave admin mode on a particular VLAN.

**Format** no set igmp fast-leave <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.7.11. *Set igmp groupmembership-interval*

Use this command to configure IGMP Group Membership Interval time on a particular VLAN.

**Format** set igmp groupmembership-interval <vlan-id> <2-3600>

**Default** 260

**Mode** VLAN database

## no set igmp groupmembership-interval

Use this command to restore IGMP Group Membership Interval time on a particular VLAN to default value.

**Format** no set igmp groupmembership-interval <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

## 5.2.7.12. *Set igmp maxresponse*

Use this command to configure IGMP Maximum Response time on a particular VLAN.

**Format** set igmp maxresponse <vlan-id> <1-25>

**Default** 10

**Mode** VLAN database

## no set igmp maxresponse

Use this command to restore IGMP Maximum Response time on a particular VLAN to default value.

**Format** no set igmp maxresponse <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

## 5.2.7.13. *Set igmp mcrtrexpiretime*

Use this command to configure Multicast Router Present Expiration time on a particular VLAN.

**Format** set igmp mcrtrexpiretime <vlan-id> <0-3600>

**Default** 0

**Mode** VLAN database

## no set igmp mcrtrexpiretime

Use this command to restore Multicast Router Present Expiration time on a particular VLAN to default value.

**Format** no set igmp mcrtrexpiretime <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.7.14. *Set igmp report-suppression*

Use this command to enable Report Suppression one a particular VLAN.

**Format** set igmp report-suppression <vlan-id>

**Default** Disable

**Mode** VLAN database

## no set igmp report-suppression

Use this command to disable Report Suppression on a particular VLAN.

**Format** no set igmp report-suppression <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.7.15. *Set snoop-vlan-block*

Use this command to enable Snooping Vlan Block mode for a list of VLAN.

**Format** set snoop-vlan-block <vlan-list>

**Default** None

**Mode** VLAN database

## no set snoop-vlan-block

Use this command to disable Snooping Vlan Block mode for a list of VLAN.

**Format** no set snoop-vlan-block <vlan-list>

| Parameter | Description |
|---|---|
| **vlan-list** | The VLANs which apply this command. |

**Mode** VLAN database

### 5.2.7.16. *Ip igmp snooping static*

Use this command to add an interface to a multicast group.

**Format** ip igmp snooping static <macaddr> vlan <vlan-id> interface {<slot/port> | port-channel <portchannel-id>}

**Default** None

**Mode** Global Config

## no ip igmp snooping static

Use this command to remove an interface from a multicast group.

**Format** no ip igmp snooping static <macaddr> vlan <vlan-id> interface {<slot/port> | port-channel <portchannel-id>}

| Parameter | Description |
|---|---|
| vlan-id | The VLAN ID. (Range: 1-4093) |
| macaddr | Multicast Group MAC address |
| slot/port | Interface number |
| portchannel-id | Port-channel interface number. The range of port-channel ID is 1 to 64. |

**Mode** Global Config

### 5.2.7.17. *Ip igmp snooping router-alert-check*

Use this command to enable Router-Alert validation for IGMP packets.

**Format** ip igmp snooping router-alert-check

**Default** Disable

**Mode** Global Config

## no ip igmp snooping router-alert-check

Use this command to disable Router-Alert validation for IGMP packets.

**Format** no ip igmp snooping router-alert-check

**Mode** Global Config

## 5.2.7.18. *Show ip igmp snooping*

Use this command to display IGMP snooping information.

**Format** show ip igmp snooping [interface <slot/port> | vlan <vlan-id> | port-channel <portchannel-id>]

| Parameter | Description |
|---|---|
| **vlan-id** | The VLAN ID. (Range: 1-4093) |
| **slot/port** | Interface number |
| **portchannel-id** | Port-channel interface number. The range of port-channel ID is 1 to 64. |

**Mode** Privilege Exec

**Display Message**

If no parameters are specified, this command displays the following information:

| Term | Definition |
|---|---|
| **Admin Mode** | Indicates whether or not IGMP Snooping is active on the switch. |
| **Multicast Control Frame Count** | Displays the number of IGMP Control frames that are processed by the CPU. |
| **IGMP Snooping Router-Alert check** | Indicates whether or not Router-Alert Validation is active on the switch. |
| **Interfaces Enabled for IGMP Snooping** | Interfaces on which IGMP Snooping is enabled. |
| **VLANs enabled for IGMP snooping** | VLANs on which IGMP Snooping is enabled. |
| **VLANs Block enabled for snooping** | VLANs on which IGMP Snooping is disabled. |

If parameter <slot/port> or <portchannel-id> is specified, the following information is displayed:

| Term | Definition |
|---|---|
| **IGMP Snooping Admin Mode** | Indicates whether IGMP Snooping is active on the interface. |
| **Fast Leave Mode** | Indicates whether IGMP Snooping Fast Leave is active on the interface. |
| **Group Membership Interval** | Shows the amount of time in seconds that a switch will wait for a report from a particular group on a particular interface, which is participating on the interface, before deleting the interface from the entry. This value may be configured. |
| **Max Response Time** | Shows the amount of time in seconds that a switch will wait after receive IGMP Leave Packet. |
| **Multicast Router Expiry Time** | Displays the amount of time to wait before removing an interface that is participating on the interface from the list of interfaces with multicast routers attached. The interface is removed if a query is not received. This value may be configured. |
| **Last Member Query Count** | Shows the number of group-specific query messages which would be transmitted when the querier received a leave message. |
| **Last Member Query Interval** | Shows the amount of time between the group-specific query messages. The unit is second. |

If parameter <vlan-id> is specified, the following information appears:

| Term | Definition |
|---|---|
| **VLAN ID** | VLAN Id |
| **IGMP Snooping Admin Mode** | Indicates whether IGMP Snooping is active on the VLAN. |
| **Fast Leave Mode** | Indicates whether IGMP Snooping Fast Leave is active on the VLAN. |
| **Flood IGMP Report and Leave PDU** | Indicates whether IGMP report and leave PDUs are flooded on the VLAN. |
| **Group Membership Interval** | Shows the amount of time in seconds that a switch will wait for a report from a particular group on a particular interface, which is participating in the VLAN, before deleting the interface from the entry. This value may be configured. |
| **Max Response Time** | Shows the amount of time in seconds that a switch will wait after receive IGMP Leave Packet. |
| **Multicast Router Block Mode** | Indicates whether the Multicast Router Block mode is enabled or disabled on the VLAN. |
| **Multicast Router Expiry Time** | Displays the amount of time to wait before removing an interface that is participating in the VLAN from the list of interfaces with multicast routers attached. The interface is removed if a query is not received. This value may be configured. |
| **Report Suppression Mode** | Indicate whether Report Suppression mode is active on the VLAN. |
| **Vlan Block Mode** | Indicate whether Vlan Block Mode is active on the VLAN. |
| **Last Member Query Count** | Shows the number of group-specific query messages which would be transmitted when the querier received a leave message. |
| **Last Member Query Interval** | Shows the amount of time between the group-specific query messages. The unit is second. |

### 5.2.7.19. *Show ip igmp snooping mrouter interface*

Use this command to display information about dynamically learned or statically configured multicast router-attached interfaces.

**Format** show ip igmp snooping mrouter interface {<slot/port> | port-channel <portchannel-id>}

| Parameter | Description |
|---|---|
| slot/port | Interface number |
| portchannel-id | Port-channel interface number. The range of port-channel ID is 1 to 64. |

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Shows the interface on which multicast router information is being displayed. |
| **Multicast Router Attached** | Indicates whether multicast router is statically enabled on the interface. |

### 5.2.7.20. *Show ip igmp snooping mrouter vlan*

Use this command to display information about dynamically learned or statically configured multicast router-attached interfaces.

**Format** show ip igmp snooping mrouter vlan {<slot/port> | port-channel <portchannel-id>}

| Parameter | Description |
|---|---|
| slot/port | Interface number |
| portchannel-id | Port-channel interface number. The range of port-channel ID is 1 to 64. |

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Shows the interface on which multicast router information is being displayed. |
| **VLAN ID** | Displays the list of VLANs of which the interface is a member. |

### 5.2.7.21. *Show ip igmp snooping static*

Use this command to display IGMP snooping static information.

**Format** show ip igmp snooping static

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN** | The VLAN ID used with the MAC address to fully identify the L2Mcast Group packets |
| **MAC Address** | The MAC address of the L2Mcast Group in the format 01:00:5e:xx:xx:xx. |

| | |
|---|---|
| **Port** | List the ports you want included into L2Mcast Group. |
| **State** | The active interface number belongs to this Multicast Group. |

### 5.2.7.22. *Show mac-address-table igmpsnooping*

Use this command to display the IGMP Snooping entries in the Multicast Forwarding Database (MFDB) table.

**Format** show mac-address-table igmpsnooping

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN ID** | The VLAN ID used with the MAC address to fully identify the L2Mcast Group packets |
| **MAC Address** | A multicast MAC address for which the switch has forwarding or filtering interfaces. The format is 01:00:5e:xx:xx:xx. |
| **Type** | The type of entry, which is either static (added by the user) or dynamic (added to the table as a result of a learning process or protocol.) |
| **Description** | The text description of this multicast table entry. |
| **Interfaces** | The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:). |

### 5.2.7.23. *Show ip igmp snooping ssm entries*

Use this command to display IGMP source specific multicast forwarding database.

**Format** show ip igmp snooping ssm entries

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN ID** | VLAN ID |
| **Group** | Multicast Group IP address |
| **Source IP** | Source IP address |
| **Source Filter Mode** | Source filter mode (Include or Exclude) for the specified group on the specified interface and VLAN |
| **Interfaces** | The list of interfaces which are included or excluded for specified group, VLAN and source address. |

### 5.2.7.24. *Show ip igmp snooping ssm groups*

Use this command to display IGMP SSM group membership information.

**Format** show ip igmp snooping ssm groups

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN ID** | VLAN ID |
| **Group** | Multicast Group IP address |
| **Interface** | Interface which is included or excluded for specified group, VLAN and source address. |
| **Reporter** | IP Address of the source of last membership report received for the specified group address on the specified interface and VLAN |
| **Source Filter Mode** | Source filter mode (Include or Exclude) for the specified group on the specified interface and VLAN |
| **Source Address List** | Source List Entry for the specified group address, interface and VLAN |

### 5.2.7.25. *Show ip igmp snooping ssm stats*

Use this command to display statistics of IGMP snooping SSMFDB.

**Format** show ip igmp snooping ssm stats

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **Total Entries** | Maximum number of entries that the SSM MFDB table can hold for IGMP snooping. |
| **Most SSM FDB Entries Ever Used** | Most number of entries ever used in the IGMP snooping SSM MFDB table. |
| **Current Entries** | Current number of entries in the IGMP snooping SSM MFDB table. |

### 5.2.7.26. *Ip igmp snooping maxresponse*

Use this command to configure IGMP Maximum Response time on a particular interface. The range is 1 to 25 seconds.

**Format** ip igmp snooping maxresponse <1-25>

**Default** 10 seconds

**Mode** Interface Config

### no ip igmp snooping maxresponse

Use this command to restore IGMP Maximum Response time on a particular interface to default value.

**Format** no ip igmp snooping maxresponse

**Mode** Interface Config

### 5.2.7.27. *Ip igmp snooping last-member-query-count*

Use this command to configure the number of group-specific query messages, which would be transmitted when the querier received a leave message, on one particular interface or on all physical and port-channel interfaces. The range is 1 to 20.

**Format** ip igmp snooping last-member-query-count <1-20>

**Default** 2

**Mode** Global Config
Interface Config

### no ip igmp snooping last-member-query-count

Use this command to restore IGMP snooping last member query count to the default value.

**Format** no ip igmp snooping last-member-query-count

**Mode** Global Config
Interface Config

### 5.2.7.28. *Ip igmp snooping last-member-query-interval*

Use this command to configure the amount of time between the group-specific query messages on one particular interface or on all physical and port-channel interfaces. The range is 0 to 25 seconds.

**Format** ip igmp snooping last-member-query-interval <0-25>

**Default** 1

**Mode** Global Config
Interface Config

## no ip igmp snooping last-member-query-interval

Use this command to restore IGMP snooping last member query interval to the default value.

**Format** no ip igmp snooping last-member-query-interval

**Mode** Global Config

Interface Config

## 5.2.7.29. *set igmp last-member-query-count*

Use this command to configure the number of group-specific query messages, which would be transmitted when the querier received a leave message, for the specific VLAN. The range is 1 to 20.

**Format** set igmp last-member-query-count <1-20>

**Default** 2

**Mode** VLAN database

## no set igmp last-member-query-count

Use this command to restore IGMP snooping last member query count to the default value.

**Format** no set igmp last-member-query-count

**Mode** VLAN database

## 5.2.7.30. *set igmp last-member-query-interval*

Use this command to configure the amount of time between the group-specific query messages for the specific VLAN. The range is 0 to 25 seconds.

**Format** set igmp last-member-query-count <0-25>

**Default** 1

**Mode** VLAN database

## no set igmp last-member-query-interval

Use this command to restore IGMP snooping last member query interval to the default value.

**Format** no set igmp last-member-query-interval

**Mode** VLAN database

## 5.2.8. IGMP snooping querier commands

This section describes the commands which are used to configure IGMP Snooping querier.

**Note**: If you configure the specific IP address as the IGMP snooping querier address, the querier IP address assigned for a VLAN takes preference over global querier IP address. If the VLAN is a routing interface with IP address, this IP address takes preference over the querier IP address assigned for that VLAN.

### 5.2.8.1. *Ip igmp snooping querier*

Use this command to enable IGMP snooping querier admin mode.

**Format** ip igmp snooping querier

**Default** Disable

**Mode** Global Config

### no ip igmp snooping querier

Use this command to disable IGMP snooping querier admin mode.

**Format** no ip igmp snooping querier

**Mode** Global Config

### 5.2.8.2. *Ip igmp snooping querier address*

Use this command to configure IGMP snooping querier address.

**Format** ip igmp snooping querier address <ip-address>

**Default** 0.0.0.0

**Mode** Global Config

### no ip igmp snooping querier address

Use this command to restore IGMP snooping querier address to default value.

**Format** no ip igmp snooping querier address

**Mode** Global Config

## 5.2.8.3. *Ip igmp snooping querier query-interval*

Use this command to configure IGMP snooping querier query interval.

**Format** ip igmp snooping querier query-interval <1-1800>

**Default** 60

**Mode** Global Config

### no ip igmp snooping querier query-interval

Use this command to restore IGMP snooping querier query interval to default value.

**Format** no ip igmp snooping querier query-interval

**Mode** Global Config

## 5.2.8.4. *Ip igmp snooping querier querier-expiry-interval*

Use this command to configure IGMP snooping querier querier expiry interval.

**Format** ip igmp snooping querier querier-expiry-interval <60-300>

**Default** 125

**Mode** Global Config

### no ip igmp snooping querier querier-expiry-interval

Use this command to restore IGMP snooping querier querier expiry interval to default value.

**Format** no ip igmp snooping querier querier-expiry-interval

**Mode** Global Config

### 5.2.8.5. *Ip igmp snooping querier version*

Use this command to configure IGMP snooping querier version.

**Format** ip igmp snooping querier version <1-2>

**Default** 2

**Mode** Global Config

### no ip igmp snooping querier version

Use this command to restore IGMP snooping querier version to default value.

**Format** no ip igmp snooping querier version

**Mode** Global Config

### 5.2.8.6. *Ip igmp snooping querier vlan*

Use this command to enable IGMP snooping querier vlan admin mode.

**Format** ip igmp snooping querier vlan <vlan-id>

**Default** Disable

**Mode** Global Config

### no ip igmp snooping querier vlan <vlan-id>

Use this command to disable IGMP snooping querier vlan admin mode.

**Format** no ip igmp snooping querier vlan <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Global Config

### 5.2.8.7. *Ip igmp snooping querier vlan address*

Use this command to configure IGMP snooping querier vlan address.

**Format** ip igmp snooping querier vlan <vlan-id> address <ip-address>

**Default** 0.0.0.0

**Mode** Global Config

### no ip igmp snooping querier vlan address

Use this command to restore IGMP snooping querier vlan address to default value.

**Format** no ip igmp snooping querier vlan <vlan-id> address

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Global Config

### 5.2.8.8. *Ip igmp snooping querier vlan election participate*

Use this command to enable IGMP snooping querier vlan election participate mode.

**Format** ip igmp snooping querier vlan election participate <vlan-id>

**Default** Disable

**Mode** Global Config

### no ip igmp snooping querier vlan election participate

Use this command to disable IGMP snooping querier vlan election participate mode.

**Format** no ip igmp snooping querier vlan election participate <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Global Config

### 5.2.8.9. *Show ip igmp snooping querier*

Use this command to display IGMP snooping querier global information.

**Format** show ip igmp snooping querier

**Display Message**

| Term | Definition |
|---|---|
| **IGMP Snooping Querier Mode** | Administrative mode for IGMP Snooping. The default is disable. |
| **Querier Address** | Specify the Snooping Querier Address to be used as source address in periodic IGMP queries. This address is used when no address is configured on the VLAN on which query is being sent. |
| **IGMP Version** | Specify the IGMP protocol version used in periodic IGMP queries. |
| **Querier Query Interval** | Specify the time interval in seconds between periodic queries sent by the snooping querier. The Query Interval must be a value in the range of 1 and 1800. The default value is 60. |
| **Querier Expiry Interval** | Specify the time interval in seconds after which the last querier information is removed. The Querier Expiry Interval must be a value in the range of 60 and 300. The default value is 120. |

**Mode** Privilege Exec

### 5.2.8.10. *Show ip igmp snooping querier vlan*

Use this command to display IGMP snooping querier vlan information.

**Format** show ip igmp snooping querier vlan <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **IGMP Snooping Querier Vlan Mode** | Display the administrative mode for IGMP Snooping for the switch. |
| **Querier Election Participation Mode** | Displays the querier election participate mode on the VLAN. When this mode is disabled, up on seeing a query of the same version in the vlan, the snooping querier move to non querier state. Only when this mode is enabled, the snooping querier will participate in querier election where in the least ip address will win the querier election and operates as the querier in that |

| | |
|---|---|
| | VLAN. The other querier moves to non-querier state. |
| **Querier Vlan Address** | Displays the Snooping Querier Address to be used as source address in periodic IGMP queries sent on the specified VLAN. |
| **Operational State** | Specifies the operational state of the IGMP Snooping Querier on a VLAN. |
| **Operational Version** | Displays the operational IGMP protocol version of the querier. |

### 5.2.8.11. *Show ip igmp snooping querier detail*

Use this command to dsplay all of IGMP snooping querier information.

**Format** show ip igmp snooping querier detail

**Display Message**

Table of Last Querier

| Term | Definition |
|---|---|
| **VLAN ID** | Indicate the VLAN on which the Querier exists. |
| **Address** | Indicate the IP address of the most recent Querier from which a Query was received on this VLAN. |
| **IGMP Version** | Indicate the IGMP protocol version of the most recent Querier from which a Query was received on this VLAN. |

Table of Global IGMp Snooping querier status

| Term | Definition |
|---|---|
| **IGMP Snooping Querier Mode** | Administrative mode for IGMP Snooping. The default is disable. |
| **Querier Address** | Specify the Snooping Querier Address to be used as source address in periodic IGMP queries. This address is used when no address is configured on the VLAN on which query is being sent. |
| **IGMP Version** | Specify the IGMP protocol version used in periodic IGMP queries. |
| **Querier Query Interval** | Specify the time interval in seconds between periodic queries sent by the snooping querier. The Query Interval must be a value in the range of 1 and 1800. The default value is 60. |
| **Querier Expiry Interval** | Specify the time interval in seconds after which the last querier information is removed. The Querier Expiry Interval must be a value in the range of 60 and 300. The default value is 120. |

**Mode** Privilege Exec

## 5.2.9. MLD Snooping Commands

### 5.2.9.1. *Show ipv6 mld snooping*

Use this command to display mld snooping information.

**Format** show ipv6 mld snooping [interface {<slot/port> | vlan <vlan-id> | port-channel <portchannel-id>}]

| Parameter | Description |
|---|---|
| vlan-id | The VLAN ID. (Range: 1-4093) |
| slot/port | Interface number |
| portchannel-id | Port-channel interface number. The range of port-channel ID is 1 to 64. |

**Mode** Privilege Exec

**Display Message**

If no parameters are specified, following information is displayed.

| Term | Definition |
|---|---|
| **Admin Mode** | Indicates whether or not MLD Snooping is enabled on the switch. |
| **Operational Mode** | Indicates whether or not MLD Snooping is active on the switch. |
| **Multicast Control Frame Count** | Displays the number of MLD Control frames that are processed by the CPU. |
| **Interfaces Enabled for MLD Snooping** | Interfaces on which MLD Snooping is enabled. |
| **VLANs enabled for MLD snooping** | VLANs on which MLD Snooping is enabled. |
| **VLANs Block enabled for snooping** | VLANs on which MLD Snooping is disabled. |

If parameter <slot/port> or <portchannel-id> is specified, following information is displayed.

| Term | Definition |
|---|---|
| **MLD Snooping Admin Mode** | Indicates whether MLD Snooping is active on the interface. |
| **Fast Leave Mode** | Indicates whether MLD Snooping Fast Leave is active on the interface. |
| **Group Membership Interval** | Shows the amount of time in seconds that a switch will wait for a report from a particular group on a particular interface, which is participating on the interface, before deleting the interface from the entry. This value may be configured. |
| **Max Response Time** | Displays the amount of time the switch waits after it sends a query on in interface, participating in the VLAN, because it did not receive a report for a particular group on that interface. This value may be configured. |
| **Multicast Router Expiry Time** | Displays the amount of time to wait before removing an interface that is participating on the interface from the list of interfaces with multicast routers attached. The interface is removed if a query is not received. This value may be configured. |

If parameter <vlan-id> is specified, following information appears.

| Term | Definition |
|---|---|
| **VLAN ID** | VLAN ID. |
| **MLD Snooping Admin Mode** | Indicates whether MLD Snooping is active on the VLAN. |
| **Fast Leave Mode** | Indicates whether MLD Snooping Fast Leave is active on the VLAN. |
| **Group Membership Interval** | Shows the amount of time in seconds that a switch will wait for a report from a particular group on a particular interface, which is participating in the |

| | |
|---|---|
| | VLAN, before deleting the interface from the entry. This value may be configured. |
| **Max Response Time** | Shows the amount of time in seconds that a switch will wait after receive MLD Leave Packet. |
| **Multicast Router Expiry Time** | Displays the amount of time to wait before removing an interface that is participating in the VLAN from the list of interfaces with multicast routers attached. The interface is removed if a query is not received. This value may be configured. |
| **Vlan Block Mode** | Indicate whether Vlan Block Mode is active on the VLAN. |

### 5.2.9.2. *Show ipv6 mld snooping mrouter interface*

Use this command to display information about statically configured multicast router-attached interfaces.

**Format** show ipv6 mld snooping mrouter interface {<slot/port> | port-channel <portchannel-id>}

| Parameter | Description |
|---|---|
| slot/port | Interface number |
| portchannel-id | Port-channel interface number. The range of port-channel ID is 1 to 64. |

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Shows the interface on which multicast router information is being displayed. |
| **Multicast Router Attached** | Indicates whether multicast router is statically enabled on the interface. |

### 5.2.9.3. *Show ipv6 mld snooping mrouter vlan*

Use this command to display information about statically configured multicast router-attached interfaces.

**Format** show ipv6 mld snooping mrouter vlan {<slot/port> | port-channel <portchannel-id>}

| Parameter | Description |
|---|---|
| slot/port | Interface number |
| portchannel-id | Port-channel interface number. The range of port-channel ID is 1 to 64. |

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Shows the interface on which multicast router information is being displayed. |
| **VLAN ID** | Displays the list of VLANs of which the interface is a member. |

### 5.2.9.4. *Show ipv6 mld snooping static*

Use this command to display MLD snooping static information.

**Format** show ipv6 mld snooping static

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN** | The VLAN ID used with the MAC address to fully identify packets you want L2Mcast Group |
| **MAC Address** | The MAC address of the L2Mcast Group in the format 33:33:xx:xx:xx:xx. |
| **Port** | List the ports you want included into L2Mcast Group |
| **State** | The active interface number belongs to this Multicast Group. |

### 5.2.9.5. *Show mac-address-table mldsnooping*

Use this command to display the MLD Snooping entries in the Multicast Forwarding Database (MFDB) table.

**Format** show mac-address-table mldsnooping

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **MAC Address** | A multicast MAC address for which the switch has forwarding or filtering information. The format is twodigit hexadecimal numbers that are separated by colons, for example 33:33:45:67:89:AB. |
| **Type** | The type of entry, which is either static (added by the user) or dynamic (added to the table as a result of a learning process or protocol.) |
| **Description** | The text description of this multicast table entry. |
| **Interfaces** | The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:). |

### 5.2.9.6. *Show ipv6 mld snooping ssm entries*

Use this command to display MLD source specific multicast forwarding database.

**Format** show ipv6 mld snooping ssm entries

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN ID** | VLAN ID |
| **Group** | Multicast Group IP address |
| **Source IP** | Source IP address |

| | |
|---|---|
| **Source Filter Mode** | Source filter mode (Include or Exclude) for the specified group on the specified interface and VLAN |
| **Interfaces** | The list of interfaces which are included or excluded for specified group, VLAN and source address. |

### 5.2.9.7. *Show ipv6 mld snooping ssm groups*

Use this command to display MLD SSM group membership information.

**Format** show ipv6 mld snooping ssm groups

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN ID** | VLAN ID |
| **Group** | Multicast Group IP address |
| **Interface** | Interface which is included or excluded for specified group, VLAN and source address. |
| **Reporter** | IP Address of the source of last membership report received for the specified group address on the specified interface and VLAN |
| **Source Filter Mode** | Source filter mode (Include or Exclude) for the specified group on the specified interface and VLAN |
| **Source Address List** | Source List Entry for the specified group address, interface and VLAN |

### 5.2.9.8. *Show ipv6 mld snooping ssm stats*

Use this command to display statistics of MLD snooping SSMFDB.

**Format** show ipv6 mld snooping ssm stats

**Mode** Privilege Exec

**Display Message**

| Term | Definition |
|---|---|
| **Total Entries** | Maximum number of entries that the SSM MFDB table can hold for MLD snooping. |
| **Most SSM FDB Entries Ever Used** | Most number of entries ever used in the MLD snooping SSM MFDB table. |
| **Current Entries** | Current number of entries in the MLD snooping SSM MFDB table. |

### 5.2.9.9. *Ipv6 mld snooping*

Use this command to enable MLD Snooping globally.

**Format** ipv6 mld snooping

**Default** Disable

**Mode** Global Config

### no ipv6 mld snooping

Use this command to disable MLD Snooping globally.

**Format** no ipv6 mld snooping

**Mode** Global Config

### 5.2.9.10. *Clear mld snooping*

Use this command to delete all dynamic entries in Multicast Forwarding Database which is managed by the MLD Snooping.

**Format** clear mld snooping

**Default** None

**Mode** Privilege Exec

### 5.2.9.11. *Ipv6 mld snooping interfacemode*

Use this command to enable MLD Snooping on a particular interface.

**Format** ipv6 mld snooping interfacemode

**Default** Disable

**Mode** Interface Config

### no ipv6 mld snooping interfacemode

Use this command to disable MLD Snooping on a particular interface.

**Format** no ipv6 mld snooping interfacemode

**Mode** Interface Config

### 5.2.9.12. *Ipv6 mld snooping interfacemode all*

Use this command to enable MLD Snooping on all interfaces.

**Format** ipv6 mld snooping interfacemode all

**Default** Disable

**Mode** Global Config

### no ipv6 mld snooping interfacemode all

Use this command to disable MLD Snooping on all interfaces.

**Format** no ipv6 mld snooping interfacemode all

**Mode** Global Config

### 5.2.9.13. *Ipv6 mld snooping fast-leave*

Use this command to enable MLD Snooping fast-leave admin mode on a particular interface or all interfaces.

**Format** ipv6 mld snooping fast-leave

**Default** Disable

**Mode** Global Config
Interface Config

### no ipv6 mld snooping fast-leave

Use this command to disable MLD Snooping fast-leave admin mode on a particular interface or all interfaces.

**Format** no ipv6 mld snooping fast-leave

**Mode** Global Config
Interface Config

### 5.2.9.14. *Ipv6 mld snooping groupmembershipinterval*

Use this command to configure the MLD Group Membership Interval time on a particular interface or all interfaces.

**Format** ipv6 mld snooping groupmembershipinterval <2-3600>

**Default** 260

**Mode** Global Config
Interface Config

### no ipv6 mld snooping groupmembershipinterval

Use this command to restore the MLD Group Membership Interval time to default value.

**Format** no ipv6 mld snooping groupmembershipinterval

**Mode** Global Config
Interface Config

### 5.2.9.15. *Ipv6 mld snooping mcrtrexpiretime*

Use this command to configure the Multicast Router Present Expiration time for the system or on a particular interface.

**Format** ipv6 mld snooping mcrtrexpiretime <0-3600>

**Default** 0

**Mode** Global Config
Interface Config

### no ipv6 mld snooping mcrtrexpiretime

Use this command to restore the Multicast Router Present Expiration time to default value.

**Format** no ipv6 mld snooping mcrtrexpiretime

**Mode** Global Config

Interface Config

### 5.2.9.16. *Ipv6 mld snooping mrouter*

Use this command to configure the interface as a multicast router-attached interface or configure the VLAN ID for the VLAN that has the multicast router attached mode enabled.

**Format** ipv6 mld snooping mrouter {interface |<vlan-id>}

**Default** None

**Mode** Interface Config

### no ipv6 mld snooping mrouter

Use this command to disable multicast router attached mode for the interface or a VLAN.

**Format** no ipv6 mld snooping mrouter {interface|<vlan-id>}

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Interface Config

### 5.2.9.17. *Ipv6 mld snooping static*

Use this command to add an interface to ipv6 multicast group.

**Format** ipv6 mld snooping static <macaddr> vlan <vlan-id> interface {<slot/port> | port-channel <portchannel-id>}

**Default** None

**Mode** Global Config

### no ipv6 mld snooping static

Use this command to remove an interface from ipv6 multicast group.

**Format** no ipv6 mld snooping static <macaddr> vlan <vlan-id> interface {<slot/port> | port-channel <portchannel-id>}

| Parameter | Description |
|---|---|
| vlan-id | The VLAN ID. (Range: 1-4093) |
| macaddr | Multicast Group MAC address |
| slot/port | Interface number |
| portchannel-id | Port-channel interface number. The range of port-channel ID is 1 to 64. |

**Mode** Global Config

### 5.2.9.18. *Set mld*

Use this command to enable MLD Snooping on a particular VLAN.

**Format** set mld <vlan-id>

**Default** Disable

**Mode** VLAN database

### no set mld

Use this command to disable MLD Snooping on a particular VLAN.

**Format** no set mld <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.9.19. *Set mld fast-leave*

Use this command to enable MLD Snooping fast-leave admin mode on a particular VLAN.

**Format** set mld fast-leave <vlan-id>

**Default** Disable

**Mode** VLAN database

### no set mld fast-leave

Use this command to disable MLD Snooping fast-leave admin mode on a particular VLAN.

**Format** no set mld fast-leave <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.9.20. *Set mld groupmembership-interval*

Use this command to configure the MLD Group Membership Interval time on a particular VLAN.

**Format** set mld groupmembership-interval <vlan-id> <2-3600>

**Default** 260

**Mode** VLAN database

### no set mld groupmembership-interval

Use this command to restore the MLD Group Membership Interval time on a particular VLAN to default value.

**Format** no set mld groupmembership-interval <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.9.21. *Set mld maxresponse*

Use this command to configure the MLD Maximum Response time on a particular VLAN.

**Format** set mld maxresponse <vlan-id> <1-65>

**Default** 10

**Mode** VLAN database

### no set mld maxresponse

Use this command to restore the MLD Maximum Response time on a particular VLAN to default value.

**Format** no set mld maxresponse <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.9.22. *Set mld mcrtrexpiretime*

Use this command to configure the Multicast Router Present Expiration time on a particular VLAN.

**Format** set mld mcrtrexpiretime <vlan-id> <0-3600>

**Default** 0

**Mode** VLAN database

### no set mld mcrtrexpiretime

Use this command to restore the Multicast Router Present Expiration time on a particular VLAN to default value.

**Format** no set mld mcrtrexpiretime <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** VLAN database

### 5.2.9.23. *Ipv6 mld snooping last-member-query-count*

Use this command to configure the number of group-specific query messages, which would be transmitted when the querier received a leave message, on one particular interface or on all physical and port-channel interfaces. The range is 1 to 20.

**Format** ipv6 mld snooping last-member-query-count <1-20>

**Default** 2

**Mode** Global Config

Interface Config

## no ipv6 mld snooping last-member-query-count

Use this command to restore the MLD snooping last member query count to the default value.

**Format** no ipv6 mld snooping last-member-query-count

**Mode** Global Config

Interface Config

## 5.2.9.24. *Ipv6 mld snooping last-member-query-interval*

Use this command to configure the amount of time between the group-specific query messages on one particular interface or on all physical and port-channel interfaces. The range is 0 to 25 seconds.

**Format** ipv6 mld snooping last-member-query-interval <0-25>

**Default** 1

**Mode** Global Config

Interface Config

## no ipv6 mld snooping last-member-query-interval

Use this command to restore the MLD snooping last member query interval to the default value.

**Format** no ipv6 mld snooping last-member-query-interval

**Mode** Global Config

Interface Config

## 5.2.9.25. *Set mld last-member-query-count*

Use this command to configure the number of group-specific query messages, which would be transmitted when the querier received a leave message, for the specific VLAN. The range is 1 to 20.

**Format** set mld last-member-query-count <0-25>

**Default** 1

**Mode** VLAN database

### no set mld last-member-query-count

Use this command to restore the MLD snooping last member query count to the default value.

**Format** no set mld last-member-query-count

**Mode** VLAN database

### 5.2.9.26. *Set mld last-member-query-interval*

Use this command to configure the amount of time between the group-specific query messages for the specific VLAN. The range is 0 to 25 seconds.

**Format** set mld last-member-query-interval <0-25>

**Default** 1

**Mode** VLAN database

### no set mld last-member-query-interval

Use this command to restore the MLD snooping last member query interval to the default value.

**Format** no set mld last-member-query-interval

**Mode** VLAN database

## 5.2.10. MLD Snooping Querier Commands

This section describes the commands which are used to configure MLD Snooping querier.

### 5.2.10.1. *Show ipv6 mld snooing querier*

Use this command to display MLD snooping querier global information.

**Format** show ipv6 mld snooping querier

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **MLD Snooping Querier Mode** | Specify the Snooping Querier Address to be used as source address in periodic MLD queries. This address is used when no address is configured on |

| | |
|---|---|
| | the VLAN on which query is being sent. |
| **Querier Address** | Specify the Snooping Querier Address to be used as source address in periodic MLD queries. This address is used when no address is configured on the VLAN on which query is being sent. |
| **MLD Version** | Specify the MLD protocol version used in periodic MLD queries. |
| **Querier Query Interval** | Specify the time interval in seconds between periodic queries sent by the snooping querier. The Query Interval must be a value in the range of 1 and 1800. The default value is 60. |
| **Querier Expiry Interval** | Specify the time interval in seconds after which the last querier information is removed. The Querier Expiry Interval must be a value in the range of 60 and 300. The default value is 120. |

### 5.2.10.2. *Show ipv6 mld snooping querier vlan*

Use this command to display MLD snooping querier vlan information.

**Format** show ipv6 mld snooping querier vlan <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **MLD Snooping Querier Vlan Mode** | Displays the querier election participate mode on the VLAN. When this mode is disabled, up on seeing a query of the same version in the vlan, the snooping querier move to non querier state. Only when this mode is enabled, the snooping querier will participate in querier election where in the least ip address will win the querier election and operates as the querier in that VLAN. The other querier moves to non-querier state. |
| **Querier Election Participation Mode** | Displays the querier election participate mode on the VLAN. When this mode is disabled, up on seeing a query of the same version in the vlan, the snooping querier move to non querier state. Only when this mode is enabled, the snooping querier will participate in querier election where in the least ip address will win the querier election and operates as the querier in that VLAN. The other querier moves to non-querier state. |
| **Querier Vlan Address** | Displays the Snooping Querier Address to be used as source address in periodic MLD queries sent on the specified VLAN. |
| **Operational State** | Specifies the operational state of the MLD Snooping Querier on a VLAN. |
| **Operational Version** | Displays the operational MLD protocol version of the querier. |

### 5.2.10.3. *Show ipv6 mld snooping querier detail*

Use this command to display MLD snooping querier global information.

**Format** show ipv6 mld snooping querier detail

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN ID** | Specify the VLAN ID on which the MLD snooping querier is enabled. |
| **Last Querier Address** | Specify the IP address of the most recent Querier from which a Query was received. |
| **MLD Snooping Querier Mode** | Specify the Snooping Querier Address to be used as source address in periodic MLD queries. This address is used when no address is configured on the VLAN on which query is being sent. |
| **Querier Address** | Specify the Snooping Querier Address to be used as source address in periodic MLD queries. This address is used when no address is configured on the VLAN on which query is being sent. |
| **MLD Version** | Specify the MLD protocol version used in periodic MLD queries. |
| **Querier Query Interval** | Specify the time interval in seconds between periodic queries sent by the snooping querier. The Query Interval must be a value in the range of 1 and 1800. The default value is 60. |
| **Querier Expiry Interval** | Specify the time interval in seconds after which the last querier information is removed. The Querier Expiry Interval must be a value in the range of 60 and 300. The default value is 120. |

### 5.2.10.4. *Ipv6 mld snooping querier*

Use this command to enable MLD snooping querier admin mode.

**Format** ipv6 mld snooping querier

**Default** Disable

**Mode** Global Config

### no ipv6 mld snooping querier

Use this command to disable MLD snooping querier admin mode.

**Format** no ipv6 mld snooping querier

**Mode** Global Config

### 5.2.10.5. *Ipv6 mld snooping querier address*

Use this command to configure MLD snooping querier address.

**Format** ipv6 mld snooping querier address <ipv6-address>

**Default** 0

**Mode** Global Config

### no ipv6 mld snooping querier address

Use this command to restore MLD snooping querier address to default value.

**Format** no ipv6 mld snooping querier address

**Mode** Global Config

### 5.2.10.6. *Ipv6 mld snooping querier query-interval*

Use this command to configure MLD snooping querier querier interval.

**Format** ipv6 mld snooping querier query-interval <1-1800>

**Default** 60

**Mode** Global Config

### no ipv6 mld snooping querier querier-interval

**Format** no ipv6 mld snooping querier query-interval

**Mode** Global Config

### 5.2.10.7. *Ipv6 mld snooping querier querier-expiry-interval*

Use this command to configure MLD snooping querier querier expiry interval.

**Format** ipv6 mld snooping querier querier-expiry-interval <60-300>

**Default** 125

**Mode** Global Config

### no ipv6 mld snooping querier querier-expiry-interval

Use this command to restore MLD snooping querier querier expiry interval to default value.

**Format** no ipv6 mld snooping querier querier-expiry-interval

**Mode** Global Config

## 5.2.10.8. *Ipv6 mld snooping querier vlan*

Use this command to enable MLD snooping querier vlan admin mode.

**Format** ipv6 mld snooping querier vlan <vlan-id>

**Default** Disable

**Mode** Global Config

### no ipv6 mld snooping querier vlan

Use this command to disable MLD snooping querier vlan admin mode.

**Format** no ipv6 mld snooping querier vlan <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Global Config

## 5.2.10.9. *Ipv6 mld snooping querier vlan address*

Use this command to configure MLD snooping querier vlan address.

**Format** ipv6 mld snooping querier vlan <vlan-id> address <ipv6-address>

**Default** 0

**Mode** Global Config

### no ipv6 mld snooping querier vlan address

**Format** no ipv6 mld snooping querier vlan <vlan-id> address

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Global Config

### 5.2.10.10. *Ipv6 mld snooping querier vlan election participate*

Use this command to enable MLD snooping querier vlan election participate mode.

**Format** ipv6 mld snooping querier vlan election participate <vlan-id>

**Default** Disable

**Mode** Global Config

### no ipv6 mld snooping querier vlan election participate

Use this command to disable MLD snooping querier vlan election participate mode.

**Format** no ipv6 mld snooping querier vlan election participate <vlan-id>

| Parameter | Description |
|---|---|
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Mode** Global Config

## 5.2.11. Port-Channel/LAG (802.3ad) Commands

This section describes the commands you use to configure port-channels, which is defined in the 802.3ad specification, and that are also known as link aggregation groups (LAGs). Link aggregation allows you to combine multiple full-duplex Ethernet links into a single logical link. Network devices treat the aggregation

as if it were a single link, which increases fault tolerance and provides load sharing. The LAG feature initially load shares traffic based upon the source and destination MAC address. Assign the port-channel (LAG) VLAN membership after you create a port-channel. If you do not assign VLAN membership, the port-channel might become a member of the management VLAN which can result in learning and switching issues.

A port-channel (LAG) interface can be either static or dynamic, but not both. All members of a port channel must participate in the same protocols. A static port-channel interface does not require a partner system to be able to aggregate its member ports.

**Note**: If you configure the maximum number of dynamic port-channels (LAGs) that your platform supports, additional port-channels that you configure are automatically static.

### 5.2.11.1. *Show interface port-channel brief*

This command displays the capability of all port-channels (LAGs) on the device as well as a summary of individual port-channels.

**Format** show interface port-channel brief

**Mode** Privileged EXEC
User EXEC

For each port-channel the following information is displayed:

| Parameter | Definition |
|---|---|
| **Channel ID** | The field displays the port-channel's ID. |
| **Port-Channel Name** | This field displays the name of the port-channel. |
| **Min-links** | This field displays the minimum links value of the port-channel. |
| **Link State** | This field indicates whether the link is up or down. |
| **Trap Flag** | This object determines whether or not to send a trap when link status changes. The factory default is enabled. |
| **Type** | This field displays the status designating whether a particular port-channel (LAG) is statically or dynamically maintained. The possible values of this field are Static, indicating that the port-channel is statically maintained; and Dynamic, indicating that the port-channel is dynamically maintained. |
| **Mbr Ports** | This field lists the ports that are members of this port-channel, in slot/port notation. |
| **Active Ports** | This field lists the ports that are actively participating in this port-channel. |

Example: The following example displays the interface port-channel brief configurations.

(QCT) #show interface port-channel brief

| Channel ID | Port-Channel Name | Min Link State | Trap Flag | Type | Mbr Ports | Active Ports |
|---|---|---|---|---|---|---|
| 1 | ch1 | 3 | Down | Disabled | Static | |
| 2 | ch2 | 1 | Down | Disabled | Static | |
| 3 | ch3 | 1 | Down | Disabled | Static | |
| 4 | ch4 | 1 | Down | Disabled | Static | |
| 5 | ch5 | 1 | Down | Disabled | Static | |
| 6 | ch6 | 1 | Down | Disabled | Static | |

⋮

### 5.2.11.2. *Show interface port-channel*

This command displays an overview of all port-channels (LAGs) or a specific port-channel on the switch.

**Format** show interface port-channel [<ID>]

**Mode** Privileged EXEC
User EXEC

If you do not use the optional parameters *ID*, the command displays following information for all port-channels:

| Parameter | Definition |
|---|---|
| **Channel ID** | The field displays the port-channel's ID. |
| **Channel Name** | This field displays the name of the port-channel. |
| **Min** | This field displays the minimum links value of the port-channel. |
| **Link** | This field indicates whether the link is up or down. |
| **Admin Mode** | May be enabled or disabled. The factory default is enabled. |

| | |
|---|---|
| **Link Trap** | This object determines whether or not to send a trap when link status changes. The factory default is enabled |
| **STP Mode** | This field displays the MSTP administrative bridge port state. |
| **Type** | This field displays the status designating whether a particular port-channel (LAG) is statically or dynamically maintained. The possible values of this field are Static, indicating that the port-channel is statically maintained; and Dynamic, indicating that the port-channel is dynamically maintained. |
| **Mbr Ports** | This field lists the ports that are members of this port-channel, in slot/port notation. |
| **Device Timeout** | This field displays the device timeout value of actor and partner. The value of device timeout should be short(1 second) or long(30 seconds). |
| **Port Speed** | Speed of the port-channel port. |
| **Active Ports** | This field lists the ports that are actively participating in the port-channel (LAG). |

Example: The following example displays the interface port-channel configurations.

(QCT) #show interface port-channel

| Channel ID | Channel Name | Min Link | Adm. Mode | Link Trap | STP Mode | Mbr Type | Device/ Ports | Timeout | Port Speed | Port Active |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ch1 | 3 | Down | En. | Dis. | En. | Stat | | | |
| 2 | ch2 | 1 | Down | En. | Dis. | En. | Stat | | | |
| 3 | ch3 | 1 | Down | En. | Dis. | En. | Stat | | | |
| 4 | ch4 | 1 | Down | En. | Dis. | En. | Stat | | | |
| 5 | ch5 | 1 | Down | En. | Dis. | En. | Stat | | | |
| 6 | ch6 | 1 | Down | En. | Dis. | En. | Stat | | | |

⋮

If you use the optional parameters *ID*, the command displays following information for the specific port-channel:

| Parameter | Definition |
|---|---|
| **Port Channel ID** | The field displays the port-channel's ID. |
| **Channel Name** | This field displays the name of the port-channel. |
| **Link State** | This field indicates whether the link is up or down. |
| **Admin Mode** | May be enabled or disabled. The factory default is enabled. |
| **Link Trap Mode** | This object determines whether or not to send a trap when link status changes. The factory default is enabled |
| **STP Mode** | This field displays the MSTP administrative bridge port state. |
| **Type** | This field displays the status designating whether a particular port-channel (LAG) is statically or dynamically maintained. The possible values of this field are Static, indicating that the port-channel is statically maintained; and Dynamic, indicating that the port-channel is dynamically maintained. |
| **Port-channel Min-links** | This field displays the minimum links value of the port-channel. |
| **Load Balance Option** | The load balance option associated with the port-channel. |
| **Mbr Ports** | This field lists the ports that are members of this port-channel, in slot/port notation. |
| **Device Timeout** | This field displays the device timeout value of actor and partner. The value of device timeout should be short(1 second) or long(30 seconds). |
| **Port Speed** | Speed of the port-channel port. |
| **Active Ports** | This field lists the ports that are actively participating in the port-channel (LAG). |

Example: The following example displays the interface port-channel configurations.

(QCT) #show interface port-channel 1

Port Channel ID..... 1

Channel Name..... ch1

Link State..... Down

Admin Mode..... Enabled

Link Trap Mode..... Disabled

STP Mode..... Enabled

Type..... Static

Port-channel Min-links..... 3

Load Balance Option..... 3

(Src/Dest MAC, VLAN, EType, incoming port)

Mbr Device/ Port Port

Ports Timeout Speed Active

-------- ------------- --------- ----------

### 5.2.11.3. *Show interface port-channel system priority*

This command displays the port-channel system priority.

**Format** show interface port-channel system priority

**Mode** Privileged EXEC
User EXEC

### 5.2.11.4. *Show lacp actor*

This command displays LACP actor attributes.

**Format** show lacp actor [slot/port]

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Parameter | Description |
|---|---|
| Admin Key | The administrative value of the key |
| Port Priority | The priority value assigned to the Aggregation Port |
| Admin State | The administrative values of the actor state as transmitted by the Actor in LACPUDs |

### 5.2.11.5. *Show lacp interface*

This command displays LACP status for interface.

**Format** show lacp interface [slot/port]

**Mode** Privileged EXEC
User EXEC

### 5.2.11.6. *Interface port-channel*

This command configures a new port-channel (LAG) with the specified ID. Display the information of this port-channel using the **show interface port-channel <portchannel-id>.**

**Note**: Before including a port in a port-channel, set the port physical mode. For more information, see **speed-duplex** command

**Format** interface port-channel <portchannel-id>

**Mode** Global Config

### 5.2.11.7. *Staticcapability*

This command enables the static function to support on specific port-channels (static link aggregations - LAGs) on the device.

**Format** staticcapability

**Default** Disabled

**Mode** Interface Config

## no staticcapability

This command disables the static function to support on specific port-channels (static link aggregations - LAGs) on the device.

**Format** no staticcapability

**Mode** Interface Config

### 5.2.11.8. *Port-channel linktrap*

This command enables link trap notifications for the port-channel (LAG). The interface is an ID for a configured port-channel. The option **all** sets every configured port-channel with the same administrative mode setting.

**Format** port-channel linktrap {<ID> | all}

**Default** Enabled

**Mode** Global Config

## no port-channel linktrap

This command disables link trap notifications for the port-channel (LAG). The interface is a ID for a configured port-channel. The option **all** sets every configured port-channel with the same administrative mode setting.

**Format** no port-channel linktrap {<ID> | all}

**Mode** Global Config

### 5.2.11.9. *Port-channel load-balance*

This command selects the load-balancing option used on a port-channel (LAG). Traffic is balanced on a port-channel (LAG) by selecting one of the links in the channel over which to transmit specific packets. The link is selected by creating a binary pattern form selected fields in a packet, and associating that pattern with a particular link.

This command can be configured for a single interface, a range of interfaces, or all interfaces.

**Format** port-channel load-balance {src-mac | dst-mac | dst-src-mac | src-ip | dst-ip | dst-src-ip | enhanced} {<ID> | all}

| Parameter | Definition |
|---|---|
| **src-mac** | Sets the mode on the source MAC address. |
| **dst-mac** | Sets the mode on the destination MAC address. |
| **src-dst-mac** | Sets the mode on the source and destination MAC addresses. |
| **src-ip** | Sets the mode on the source IP address. |

| | |
|---|---|
| **dst-ip** | Sets the mode on the destination IP addresses. |
| **src-dst-ip** | Sets the mode on the source and destination IP addresses. |
| **enhanced** | Set the mode on the source and destination MAC addresses if it is a L2 packet or on the source and destination IP addresses if it is a IP packet. |
| **<ID> \| all** | Global Config Mode only: The interface is an identifier of a configured port-channel. A**ll** applies the command to every configured port-channel. |

**Default** src-dst-mac

**Mode** Global Config

### no port-channel load-balance

This command reverts to the default load balancing configuration.

**Format** no port-channel load-balance {<ID> | all}

**Mode** Global Config

## 5.2.11.10. *Load-balance*

This command selects the load-balancing option used on a port-channel (LAG). Traffic is balanced on a port-channel (LAG) by selecting one of the links in the channel over which to transmit specific packets. The link is selected by creating a binary pattern form selected fields in a packet, and associating that pattern with a particular link.

**Format** load-balance {src-mac | dst-mac | dst-src-mac | src-ip | dst-ip | dst-src-ip | enhanced}

| Parameter | Definition |
|---|---|
| **src-mac** | Sets the mode on the source MAC address. |
| **dst-mac** | Sets the mode on the destination MAC address. |
| **src-dst-mac** | Sets the mode on the source and destination MAC addresses. |
| **src-ip** | Sets the mode on the source IP address. |
| **dst-ip** | Sets the mode on the destination IP addresses. |
| **src-dst-ip** | Sets the mode on the source and destination IP addresses. |

| | |
|---|---|
| **enhanced** | Set the mode on the source and destination MAC addresses if it is a L2 packet or on the source and destination IP addresses if it is a IP packet. |

**Default** src-dst-mac

**Mode** Interface Config

## no load-balance

This command reverts to the default load balancing configuration.

**Format** no load-balance

**Mode** Interface Config

### 5.2.11.11. *Port-channel system priority*

This command configures port-channel system priority. The value range of priority is 0-65535.

**Format** port-channel system priority <priority-value>

**Default** 32768 (0x8000)

**Mode** Global Config

## no port-channel system priorty

This command configures the default port-channel system priority vlaue.

**Format** no port-channel system priority

**Mode** Global Config

### 5.2.11.12. *Lacp*

This command enables Link Aggregation Control Protocol (LACP) on a port or a range of interfaces.

**Format** lacp

**Default** Enabled

**Mode** Interface Config

## no lacp

This command disables Link Aggregation Control Protocol (LACP) on a port or a range of interfaces.

**Format** no lacp

**Mode** Interface Config

### 5.2.11.13. *Lacp all*

This command enables Link Aggregation Control Protocol (LACP) on all ports.

**Format** lacp all

**Default** Enabled

**Mode** Global Config

## no lacp

This command disables Link Aggregation Control Protocol (LACP) on all ports.

**Format** no lacp all

**Mode** Global Config

### 5.2.11.14. *Lacp admin key*

This command configures the administrative value of the key for the port-channel. This command can be used to configure a single interface or a range of interfaces.

**Note**: This command is applicable only to port-channel interfaces

**Format** lacp admin key <0-65535>

**Default** Internal interface number of this port-channel

**Mode** Interface Config

## no lacp admin key

This command configures the default administrative value of the key for the port-channel.

**Format** no lacp admin key

**Mode** Interface Config

## 5.2.11.15. *Lacp actor admin key*

This command configures the administrative value of the LACP actor admin key on an interface or a range of interfaces. “0” means that this value is not configured yet and the key value of the physical interfaces will be adjusted to the internal interface number of the port-channel that this physical interface is going to join to.

**Note**: This command is applicable only to physical interfaces

**Format** lacp actor admin key <0-65535>

**Default** 0

**Mode** Interface Config

## no lacp actor admin key

This command configures the default administrative value of the key.

**Format** no lacp actor admin key

**Mode** Interface Config

## 5.2.11.16. *Lacp actor admin state*

This command configures the administrative value of the actor state as transmitted by the Actor in LACPUDs. This command can be used to configure a single interface or a range of interfaces.

**Note**: This command is applicable only to physical interfaces

**Format** lacp actor admin state <individual | longtimeout | passive>

**Default** no Individual (aggregation)
longtimeout (no shorttimeout)
no passive (active)

**Mode** Interface Config

### no lacp actor admin state

This command configures the default administrative value of actor state as transmitted by the Actor in LACPDUs.

**Note**: Both the **no port lacptimeout** and the **no lacp actor admin state** commands set the values back to default, regardless of the command used to configure the ports.

**Format** no lacp actor admin state <individual | longtimeout | passive>

**Mode** Interface Config

## 5.2.11.17. *Lacp actor port priority*

This command configures the priority value assigned to the Aggregation Port for an interface or a range of interfaces.

**Note**: This command is applicable only to physical interfaces

**Format** lacp actor port priority <0-65535>

**Default** 128 (0x80)

**Mode** Interface Config

### no lacp actor port priority

This command configures the default priority value assigned to the Aggregation Port.

**Format** no lacp actor port priority

**Mode** Interface Config

### 5.2.11.18. *min-links*

This command configures the minimum links for port-channel interfaces. The maximum number of members for each port-channel is 32. For T1048-LB9/T1048-LB9A, the maximum number of members is 8.

**Note**: This command is applicable only to port-channel interfaces

**Format** min-links <1-*max number*>

**Default** 1

**Mode** Interface Config

### no min-links

This command configures the default minimum links for port-channel interfaces.

**Format** no min-links

**Mode** Interface Config

### 5.2.11.19. *Lacp fallback*

This command configures the fallback feature for Link Aggregation.

**Note**: This command is applicable only to port-channel interfaces

**Format** lacp fallback

**Default** Disabled

**Mode** Interface Config

### no lacp fallback

This command restores the fallback feature to default value.

**Format** no lacp fallback

**Mode** Interface Config

### 5.2.11.20. *Lacp fallback timeout*

This command configures the fallback timeout value for Link Aggregation.

**Note**: This command is applicable only to port-channel interfaces

**Format** lacp fallback timeout <1-100>

**Default** 5

**Mode** Interface Config

### no lacp fallback timeout

This command restores the fallback feature to default timeout value.

**Format** no lacp fallback timeout

**Mode** Interface Config

### 5.2.11.21. *Channel-group*

This command assigns and configures an interface to a port-channel (LAG) group. The interface is an ID of a configured port-channel.

**Note**: Before adding a port to a port-channel, set the physical mode of the port. See '**speed-duplex**' or '**port-mode**'command.

You can change the mode for an interface only if it is the only interface designated to the specified channel group. If you enter this command on an interface that is added to a channel with a different protocol (than the protocol you are entering), the command is rejected.

**Format** channel-group <ID> mode {active | on}

| Parameter | Definition |
|---|---|
| **active** | Enables LACP unconditionally. |
| **on** | Enables static mode (Cisco EtherChannel-like). |

**Default** None

**Mode** Interface Config

### no channel-group

This command removes the interface from the specified channel group.

**Format** no channel-group <ID>

**Mode** Interface Config

### 5.2.11.22. *Delete-channel-group*

This command deletes all configured ports from the port-channel (LAG). The interface is an ID of a configured port-channel.

**Note:** This command is applicable only to port-channel interfaces

**Format** delete-channel-group <ID> all

**Default** None

**Mode** Global Config

## 5.2.12. Storm Control

This section describes the commands you use to configure storm control or display storm control information. A traffic storm is a condition that occurs when incoming packets flood the LAN, which creates performance degradation in the network. The Storm-Control feature protects against this condition.

### 5.2.12.1. *Show storm-control*

This command displays switch configuration information. If you do not use any of the optional parameters, this command displays global storm control configuration parameters.

Use the all keyword to display the per-port configuration parameters for all interfaces, or specify the slot/port to display information about a specific interface.

**Format** show storm-control [{ <slot/port> | all | port-channel <id>}]

| Parameter | Definition |
|---|---|
| **<slot/port>** | Specifies a valid slot number and port number for the system. |
| **all** | Indicates to display the configuration parameters for all ports. |

| | |
|---|---|
| **id** | Specifies the port channel ID |

**Mode** Privileged EXEC, Global Config, Interface Config

The following is the display format for the command without any optional parameter.

**Display Message**

| Fields | Definition |
|---|---|
| **Broadcast Storm Control Mode** | The storm-control configuration mode for broadcast traffic. |
| **Broadcast Storm Control Level** | The storm-control speed threshold for broadcast traffic. |
| **Broadcast Storm Control Action** | The storm-control action for broadcast traffic. |
| **Multicast Storm Control Mode** | The storm-control configuration mode for multicast traffic. |
| **Multicast Storm Control Level** | The storm-control speed threshold for multicast traffic. |
| **Multicast Storm Control Action** | The storm-control action for multicast traffic. |
| **Unicast Storm Control Mode** | The storm-control configuration mode for unicast traffic. |
| **Unicast Storm Control Level** | The storm-control speed threshold for unicast traffic. |
| **Unicast Storm Control Action** | The storm-control action for unicast traffic. |

The following is the display format for the command with a specific parameter.

**Display Message**

| Fields | Definition |
|---|---|
| **Intf** | The interface number. |
| **Bcast Mode** | The storm-control configuration mode for broadcast traffic. |
| **Bcast Level** | The storm-control speed threshold for broadcast traffic. |
| **Bcast Action** | The storm-control action for broadcast traffic. |
| **Mcast Mode** | The storm-control configuration mode for multicast traffic. |
| **Mcast Level** | The storm-control speed threshold for multicast traffic. |

| | |
|---|---|
| **Mcast Action** | The storm-control action for multicast traffic. |
| **Ucast Mode** | The storm-control configuration mode for unicast traffic. |
| **Ucast Level** | The storm-control speed threshold for unicast traffic. |
| **Ucast Action** | The storm-control action for unicast traffic. |
| **Flow Mode** | The storm-control speed threshold for unicast traffic. |

### 5.2.12.2. *Storm-control Configuration*

Use this command to enable storm control on each port or all ports.

**Format** storm-control {broadcast | multicast | unicast} [ {action { shutdown| trap} | level <0-100>| rate <0-14880000>}]

| Parameter | Definition |
|---|---|
| broadcast \| multicast \| unicast | Specifies to enable one of storm control modes for an interface or all interfaces. |
| action shutdown \| trap | Indicates the action to be taken if the storm occurs. Shutdown is to disable the interface. Trap is to send SNMP trap. |
| level <0-100> | Specifies a threshold level (a percentage of link speed) for all interfaces or one interface. The default is 5. |
| rate <0-14880000> | Specifies a threshold rate( in packets per second) for all interfaces or one interface. The default is 0. |

**Default** disabled

**Mode** Global Config

Interface Config

### 5.2.12.3. *Storm-control broadcast*

Use this command to enable broadcast storm control for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

If the mode is enabled, broadcast storm recovery is active and, if the rate of L2 broadcast traffic ingressing on an interface increases beyond the configured threshold, the traffic will be dropped. Therefore, the rate of broadcast traffic will be limited to the configured threshold.

**Format** storm-control broadcast

**Default** disabled

**Mode** Global Config
Interface Config

## no storm-control broadcast

This command disables broadcast storm control for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

**Format** no storm-control broadcast

**Mode** Global Config
Interface Config

### 5.2.12.4. *Storm-control broadcast action*

This command configures the broadcast storm recovery action to either shutdown or trap for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

If configured to shutdown, the interface that receives the broadcast packets at a rate above the threshold is diagnostically disabled. If set to trap, the interface sends trap messages approximately every 30 seconds until broadcast storm control recovers.

**Format** storm-control broadcast action { shutdown | trap }

**Default** None

**Mode** Global Config
Interface Config

## no storm-control broadcast action

This command configures the broadcast storm recovery action option to the default value for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

**Format** no storm-control broadcast action

**Mode** Global Config
Interface Config

### 5.2.12.5. *Storm-control broadcast rate*

Use this command to configure the broadcast storm recovery threshold for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) in packets per second.

If the mode is enabled, broadcast storm recovery is active, and if the rate of L2 broadcast traffic ingressing on an interface increases beyond the configured threshold, the traffic is dropped. Therefore, the rate of broadcast traffic is limited to the configured threshold.

**Format** storm-control broadcast rate <0-14880000>

**Default** 0

**Mode** Global Config
Interface Config

### no storm-control broadcast rate

This command sets the broadcast storm recovery threshold to the default value for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) and disables broadcast storm recovery.

**Format** no storm-control broadcast rate

**Mode** Global Config
Interface Config

### 5.2.12.6. *Storm-control broadcast level*

Use this command to configure the broadcast storm recovery threshold for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) as a percentage of link speed and enable broadcast storm recovery.

If the mode is enabled, broadcast storm recovery is active, and if the rate of L2 broadcast traffic ingressing on an interface increases beyond the configured threshold, the traffic is dropped. Therefore, the rate of broadcast traffic is limited to the configured threshold.

**Format** storm-control broadcast level <0-100>

**Default** 5

**Mode** Global Config
Interface Config

## no storm-control broadcast level

This command sets the broadcast storm recovery threshold to the default value for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) and disables broadcast storm recovery

**Format** no storm-control broadcast level

**Mode** Global Config
Interface Config

### 5.2.12.7. *Storm-control multicast*

This command enables multicast storm recovery mode for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

If the mode is enabled, multicast storm recovery is active, and if the rate of L2 multicast traffic ingressing on an interface increases beyond the configured threshold, the traffic will be dropped. Therefore, the rate of multicast traffic will be limited to the configured threshold.

**Format** storm-control multicast

**Default** disabled

**Mode** Global Config
Interface Config

## no storm-control multicast

This command disables multicast storm recovery mode for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

**Format** no storm-control multicast

**Mode** Global Config
Interface Config

### 5.2.12.8. *Storm-control multicast action*

This command configures the multicast storm recovery action to either shutdown or trap for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

If configured to shutdown, the interface that receives multicast packets at a rate above the threshold is diagnostically disabled. The option trap sends trap messages approximately every 30 seconds until multicast storm control recovers

**Format** storm-control multicast action {shutdown | trap}

**Default** None

**Mode** Global Config
Interface Config

## no storm-control multicast action

This command returns the multicast storm recovery action option to the default value for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

**Format** no storm-control multicast action

**Mode** Global Config
Interface Config

## 5.2.12.9. *Storm-control multicast level*

This command configures the multicast storm recovery threshold for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) as a percentage of link speed and enables multicast storm recovery mode.

If the mode is enabled, multicast storm recovery is active, and if the rate of L2 multicast traffic ingressing on an interface increases beyond the configured threshold, the traffic will be dropped. Therefore, the rate of multicast traffic will be limited to the configured threshold

**Format** storm-control multicast level <0-100>

**Default** 5

**Mode** Global Config
Interface Config

## no storm-control multicast level

This command sets the multicast storm recovery threshold to the default value for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) and disables multicast storm recovery.

**Format** no storm-control multicast level

**Mode** Global Config
Interface Config

### 5.2.12.10. *Storm-control multicast rate*

Use this command to configure the multicast storm recovery threshold for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) in packets per second.

If the mode is enabled, multicast storm recovery is active, and if the rate of L2 broadcast traffic ingressing on an interface increases beyond the configured threshold, the traffic is dropped. Therefore, the rate of multicast traffic is limited to the configured threshold.

**Format** storm-control multicast rate <0-14880000>

**Default** 0

**Mode** Global Config
Interface Config

### no storm-control multicast rate

This command sets the multicast storm recovery threshold to the default value for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) and disables multicast storm recovery.

**Format** no storm-control multicast rate

**Mode** Global Config
Interface Config

### 5.2.12.11. *Storm-control unicast*

This command enables unicast storm recovery mode for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

If the mode is enabled, unicast storm recovery is active, and if the rate of unknown L2 unicast (destination lookup failure) traffic ingressing on an interface increases beyond the configured threshold, the traffic will be dropped. Therefore, the rate of unknown unicast traffic will be limited to the configured threshold.

**Format** storm-control unicast

**Default** disabled

**Mode** Global Config
Interface Config

## no storm-control unicast

This command disables unicast storm recovery mode for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

**Format** no storm-control unicast

**Mode** Global Config
Interface Config

## 5.2.12.12. *Storm-control unicast action*

This command configures the unicast storm recovery action to either shutdown or trap for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode).

If configured to shutdown, the interface that receives unicast packets at a rate above the threshold is diagnostically disabled. The option trap sends trap messages approximately every 30 seconds until unicast storm control recovers.

**Format** storm-control unicast action { shutdown | trap }

**Default** None

**Mode** Global Config
Interface Config

## no storm-control unicast action

This command returns the unicast storm recovery action option to the default value for all interfaces (GlobalConfig mode) or one or more interfaces (Interface Config mode).

**Format** no storm-control unicast action

**Mode** Global Config
Interface Config

### 5.2.12.13. *Storm-control unicast level*

This command configures the unicast storm recovery threshold for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) as a percentage of link speed, and enables unicast storm recovery.

If the mode is enabled, unicast storm recovery is active, and if the rate of unknown L2 unicast (destination lookup failure) traffic ingressing on an interface increases beyond the configured threshold, the traffic will be dropped.

Therefore, the rate of unknown unicast traffic will be limited to the configured threshold.This command also enables unicast storm recovery mode for an interface.

**Format** storm-control unicast level <0-100>

**Default** 5

**Mode** Global Config
Interface Config

### no storm-control unicast level

This command sets the unicast storm recovery threshold to the default value for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) and disables unicast storm recovery.

**Format** no storm-control multicast level

**Mode** Global Config
Interface Config

### 5.2.12.14. *Storm-control unicast rate*

Use this command to configure the unicast storm recovery threshold for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) in packets per second.

If the mode is enabled, unicast storm recovery is active, and if the rate of L2 broadcast traffic ingressing on an interface increases beyond the configured threshold, the traffic is dropped.

Therefore, the rate of unicast traffic is limited to the configured threshold.

**Format** storm-control unicast rate <0-14880000>

**Default** 0

**Mode** Global Config
Interface Config

### no storm-control unicast rate

This command sets the unicast storm recovery threshold to the default value for all interfaces (Global Config mode) or one or more interfaces (Interface Config mode) and disables unicast storm recovery.

**Format** no storm-control unicast rate

**Mode** Global Config
Interface Config

## 5.2.13. Port Mirror

This section describes the commands you use to select network traffic that you can analyze with a network analyzer.

**Note:** On LY4R, one port cannot join more than one port-monitor session regardless of source port or destination port due to the HW limitation.

### 5.2.13.1. *Show port-mirror session*

Use this command to display the port monitoring information for the specified session.

**Format** show port-monitor session { <1-4> | all }

| Parameter | Definition |
|---|---|
| <1-4> | An integer value used to identify the session.Its value can be anything between 1 and the maximum number of mirroring sessions(4) allowed on the platform. |
| **all** | Displays the all sessions |

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Session ID** | The session ID. The range of session ID is 1 to 4. |

| | |
|---|---|
| **Admin Mode** | Indicates whether the Port Monitoring feature is enabled or disabled. The possible values are enabled and disabled. |
| **Probe Port** | Probe port (destination port) for the session identified with session-id. If probe port is not set then this field is blank. |
| **Src VLAN** | All member ports of this VLAN are mirrored. If the source VLAN is not configured, this field is blank. |
| **Mirrored Port** | The port that is configured as a mirrored port (source port) for the session identified with session-id. If no source port is configured for the session, this field is blank. |
| **Ref. Port** | This port carries all the mirrored traffic at the source switch. |
| **Src RVLAN** | The source VLAN is configured at the destination switch. If the remote VLAN is not configured, this field is blank. |
| **Dst RVLAN** | The destination VLAN is configured at the source switch. If the remote VLAN is not configured, this field is blank. |
| **Type** | Direction in which source port configured for port mirroring. Types are tx for transmitted packets and rx for receiving packets. |
| **IP ACL** | The IP access-list id or name attached to the port mirroring session. |
| **MAC ACL** | The MAC access-list id or name attached to the port mirroring session. |

### 5.2.13.2. *Port-monitor session source*

This command configures the source interface for a selected monitor session. Use the source interface slot/port parameter to specify the interface to monitor. Use rx to monitor only ingress packets, or use tx to monitor only egress packets. If you do not specify an {rx | tx} option, the destination port monitors both ingress and egress packets.

A VLAN can be configured as the source to a session (all member ports of that VLAN are monitored). Remote port mirroring is configured by adding the RSPAN VLAN ID. At the source switch, the destination is configured as the RSPAN VLAN and at the destination switch, the source is configured as the RSPAN VLAN.

**Note:** The source and destination cannot be configured as remote on the same device. On LY4R, one port cannot join more than one port-monitor session regardless of source port or destination port due to the HW limitation.

**Format** port-monitor session <1-4> source { interface { <Port-List> | <slot/port> | cpu | port-channel { <1-64> | <ChId-List> } } [{rx | tx}] } | remote vlan <1-4093>| vlan <1-4093> }

| Parameter | Definition |
|---|---|
| <1-4> | Session number. The range of session id is 1 to 4 |

| | |
|---|---|
| <Port-List> | The physical-port IDs in range <1-48>. Use '-' to specify a range, or ',' to separate physical-port IDs in a list. Spaces and zeros are not permitted. |
| <slot/port> | The Interface number |
| port-channel <1-64> | Port-channel interface number. The range of port-channel ID is 1 to 64. |
| port-channel <ChId-List> | The channel IDs in range <1-64>. Use '-' to specify a range, or ',' to separate physical-port IDs in a list. Spaces and zeros are not permitted. |
| rx \| tx | Option rx is used to monitor only ingress packets.<br><br>Option tx is used to monitor only egress packets. If no option is specified, both ingress and egress packets, RX and TX, are monitored. |
| remote vlan <1-4093> | The VLAN ID to be monitored on the remote switch. The range is 1 to 4093. |
| vlan <1-4093> | The VLAN ID to be monitored. The range is 1 to 4093. |

**Default** None

**Mode** Global Config

### no port-monitor session source

Use this command to remove the specified mirrored port from the selected port mirroring session.

**Format** no port-monitor session <session-id> source { interface {<slot/port> | cpu | port-channel } [ {rx | tx} } | remote vlan <vlan-id>| vlan <vlan-id> }

**Default** None

**Mode** Global Config

## 5.2.13.3. *Port-monitor session destination*

This command configures the probe interface for a selected monitor session. This command configures a probe port and a monitored port for monitor session (port monitoring).

Use rx to monitor only ingress packets, or use tx to monitor only egress packets. If you do not specify an {rx | tx} option, the destination port monitors both ingress and egress packets.

A VLAN can be configured as the source to a session (all member ports of that VLAN are monitored). Remote port mirroring is configured by adding the RSPAN VLAN ID. At the source switch, the destination is configured as the RSPAN VLAN and at the destination switch, the source is configured as the RSPAN VLAN.

**Note:** The source and destination cannot be configured as remote on the same device. On LY4R, one port cannot join more than one port-monitor session regardless of source port or destination port due to the HW limitation.

The reflector-port is configured at the source switch along with the destination RSPAN VLAN. The reflector port forwards the mirrored traffic towards the destination switch.

**Note**: This port must be configured with RSPAN VLAN membership.

**Format** port-monitor session <1-4> destination { interface <slot/port> | remote vlan <1-4093> reflector-port <slot/port> }

| Parameter | Definition |
|---|---|
| <1-4> | Session number. The range of session id is 1 to 4 |
| interface <slot/port> | The Interface number . |
| remote vlan <1-4093> | The VLAN ID to be monitored on the remote switch. The range is 1 to 4093. |
| reflector-port <slot/port> | The Interface number for reflector-port. |

**Default** None

**Mode** Global Config

### no port-monitor session destination

Use this command to remove the specified probe port from the selected port mirroring session.

**Format** no port-monitor session <session-id> destination { interface <slot/port> | remote vlan <vlan-id> reflector-port <slot/port> }

**Default** None

**Mode** Global Config

## 5.2.13.4. *Port-monitor session filter*

This command attaches an IP/MAC ACL to a selected monitor session. This command configures a probe port and a monitored port for monitor session (port monitoring).

An IP/MAC ACL can be attached to a session by giving the access list number/name.

Use the filter parameter to filter a specified access group either by IP address or MAC address.

**Note**: IP/MAC ACL can be attached to a session by giving the access list number/name. On the platforms that do not support both IP and MAC ACLs to be assigned on the same Monitor session, an error message is thrown when user tries to configure ACLs of both types.

**Format** port-monitor session <1-4> filter { ip | mac } access-group <aclid | ip-acl-name>

| Parameter | Definition |
|---|---|
| <1-4> | Session number. The range of session id is 1 to 4 |
| ip \| mac | Indicates IP or MAC ACLs will be attached to the session. |
| <aclid> | Enter an integer specifying an IP ACL number. |
| <ip-acl-name> | Enter access-list name up to 31 characters in length . |

**Default** None

**Mode** Global Config

### no port-monitor session filter

Use this command to remove the specified IP/MAC ACL from the selected monitoring session.

**Format** no port-monitor session <session-id> filter { ip | mac } access-group

**Default** None

**Mode** Global Config

## 5.2.13.5. *Port-monitor session mode*

Use this command to configure the mode parameters to enable the administrative mode of the selected port mirroring session. If enabled, the probe port monitors all the traffic received and transmitted on the physical monitored port.

**Format** port-monitor session <1-4> mode

| Parameter | Definition |
|---|---|
| <1-4> | Session number. The range of session id is 1 to 4 |

**Default** None

**Mode** Global Config

### no port-monitor session mode

The command disables port-monitoring function for the selected port monitoring session.

**Format** no port-monitor session <session-id> mode

**Default** None

**Mode** Global Config

## 5.2.13.6. *No port-monitor session*

Use this command without optional parameters to remove the monitor session (port monitoring) destination from the source probe port, the destination monitored port and all VLANs. Once the port is removed from the VLAN, you must manually add the port to any desired VLANs.

**Format** no port-monitor session <session-id>

| Parameter | Definition |
|---|---|
| <1-4> | Session number. The range of session id is 1 to 4 |

**Default** None

**Mode** Global Config

## 5.2.13.7. *No port-monitor*

This command removes all the source ports and a destination port and restores the default value for mirroring session mode for all the configured sessions.

**Format** no port-monitor

**Default** enabled

**Mode** Global Config

# 5.2.14. Link State

## 5.2.14.1. *Show link state*

Show link state information.

**Format** show link state group [<1-48>]

| Parameter | Description |
|---|---|
| **<1-48>** | The range of group id is 1 to 48. |

**Default** None

**Mode** Global Config

**Display Message**

| Fields | Definition |
|---|---|
| **Group ID** | The group ID for each displayed row. |
| **DownStream** | Display such port was included to DownStream set. |
| **UpStream** | Display such port was included to UpStream set. |
| **Link Action** | This group was set which action |
| **Group State** | The state of this group |

### 5.2.14.2. *Link state group action*

This command is used to Link DOWN the group downstream interface list when upstream link goes down (link is up othewise) or Link UP the group downstream interface list when upstream link goes down (link is down otherwise).

**Format** link state group <1-48> action {down | up}

no link state group <1-48>

| Parameter | Description |
|---|---|
| **<1-48>** | The range of group id is 1 to 48. |
| **no** | Disable the group action |

**Default** None

**Mode** Global Config

### 5.2.14.3. *Link state group*

This command is used to add interface to the downstream/upstream interface list.

**Format** link state group <1-48> {downstream| upstream}

no link state group <1-48> {downstream| upstream}

| Parameter | Description |
|---|---|
| **<1-48>** | The range of group id is 1 to 48. |
| **no** | Remove the selected interface from downstream/upstream list. |

**Default** None

**Mode** Interface Config

## 5.2.15. Port-backup Commands

This section describes commands you use to configure port-backup group. Port- backup group consists of two ports, one port is used under normal condition and treated as an “active port”, the other port is NOT used while the other port is active mode and it is treated as a “Backup (Stand-by) port”.

### 5.2.15.1. *Show port-backup*

This command displays information about port-backup group.

**Format** show port-backup

**Mode** Privileged EXEC

The following example shows the CLI display output for the command *show port-backup*.

(QCT) #show port-backup

Admin Mode: Enable

| Group | Mode | MAC Update | Failback | Active Port | Backup Port | Current Active Port |
|---|---|---|---|---|---|---|
| 1 | En. | Enable | 60(sec) | 0/1 | 0/2 | |

### 5.2.15.2. *Port-backup*

Use this command to enable port-backup admin mode.

**Format** port-backup

**Default** Disable

**Mode** Global Config

### no port-backup

Use this command to disable port-backup admin mode.

**Format** no port-backup

**Mode** Global Config

### 5.2.15.3. *Port-backup group*

Use this command to create the port backup group.

**Format** port-backup group [<group id>]

**Default** NA

**Mode** Global Config

### no port-backup group

Use this command to destroy the port-backup group.

**Format** no port-backup group <group id>

**Mode** Global Config

### 5.2.15.4. *Port-backup group active*

Use this command to set active port for a port-backup group.

**Format** port-backup group <group id> active

**Default** NA

**Mode** Interface Config

### no port-backup group active

Use this command to reset active port for a port-backup group.

**Format** no port-backup group <group id> active

**Mode** Interface Config

### 5.2.15.5. *Port-backup group backup*

Use this command to set backup port for a port-backup group.

**Format** port-backup group <group id> backup

**Default** NA

**Mode** Interface Config

### no port-backup group backup

Use this command to reset backup port for a port-backup group.

**Format** no port-backup group <group id> backup

**Mode** Interface Config

### 5.2.15.6. *Port-backup group enable*

Use this command to enable a port-backup group.

**Format** port-backup group enable <group id>

**Default** Disable

**Mode** Global Config

### 5.2.15.7. *Port-backup group mac-move-update*

Use this command to enable the MAC address-table move update feature for a port-backup group.

**Format** port-backup group <group id> mac-move-update

**Default** Disable

**Mode** Global Config

### no port-backup group mac-move-update

Use this command to disable the MAC address-table move update feature for a port-backup group.

**Format** no port-backup group <group id> mac-move-update

**Mode** Global Config

### 5.2.15.8. *Port-backup group failback-time*

Use this command to set auto-failback time for a port-backup group. Setting the value to 0 means that auto-failback time feature is disabled.

**Format** port-backup group <group id> failback-time 0

port-backup group <group id> failback-time <10-60>

**Default** 60s

**Mode** Global Config

### no port-backup group failback-time

Use this command to reset auto-failback time for a port-backup group.

**Format** no port-backup group <group id> failback-time

**Mode** Global Config

## 5.3. Provisioning (IEEE 802.1p) Commands

This section describes the commands you use to configure provisioning (IEEE 802.1p,) which allows you to prioritize ports.

### 5.3.1. Switchport priority all

This command configures the port priority assigned for untagged packets for all ports presently plugged into the device. Any subsequent per port configuration will override this configuration setting.

**Format** switchport priority all <0-7>

**Default** 0

**Mode** Global Config

#### no switchport priority all

This command restores the priority value to default value for all interfaces.

**Format** no switchport priority all

**Mode** Global Config

### 5.3.2. Switchport priority

This command configures the default 802.1p port priority assigned for untagged packets for a specific interface.

**Format** switchport priority <0-7>

**Default** 0

**Mode** Interface Config

#### no switchport priority

This command restores the priority configuration to default value.

**Format** no switchport priority

**Mode** Interface Config

# 5.4. Management Commands

## 5.4.1. Network Commands

### 5.4.1.1. *Show ip interface*

This command displays configuration settings associated with the switch's network interface. The network interface is the logical interface used for in-band connectivity with the switch via any of the switch's front panel ports. The configuration parameters associated with the switch's network interface do not affect the configuration of the front panel ports through which traffic is switched or routed.

**Format** show ip interface

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **VLAN ID** | Indicates whether the VLAN ID is used for this vlan interface. |
| **Interface Status** | Indicates whether the interface is up or down. |
| **IP Address** | The IP address of the interface. The factory default value is 0.0.0.0 |
| **Subnet Mask** | The IP subnet mask for this interface. The factory default value is 0.0.0.0 |
| **MAC Address** | The MAC address used for in-band connectivity. |
| **Network Configuration Protocol Current** | Indicates which network protocol is being used. The options are bootp \| dhcp \| none. |

### 5.4.1.2. *Show ip filter*

This command displays management IP filter status and all designated management stations.

**Format** show ip filter

**Default** None

**Mode** Privileged Exec

### 5.4.1.3. *Mtu*

Use the mtu command to set the maximum transmission unit(MTU) size, in bytes, for frames that ingress or egress the interface. You can use the mtu command to configure jumbo frame support for physical and port-channel(LAG) interfaces.

**Note**: To receive and process packets, the Ethernet MTU must include any extra bytes that Layer-2 headers might require. To configure the IP MTU size, which is the maximum size of the IP packet(IP Header + IP payload). And the actual maximal packet size depends on HW platform.

**Format** mtu <1518-9412>

**Default** 1518 (untagged)

**Mode** Interface Config

### no mtu

This command sets the default MTU size(in bytes) for the interface.

**Format** no mtu

**Mode** Interface Config

## 5.4.1.4. *Interface vlan*

This command is used to create a vlan interface and enter Interface-vlan configuration mode.

**Format** interface vlan <vlan-id>

| Parameter | Definition |
|---|---|
| **<vlan-id>** | VLAN ID (Range: 1 - 4093). |

**Default** None

**Mode** Global Config

## 5.4.1.5. *Ip address*

This command configures an IP address on an interface or range of interfaces. You can also use this command to configure one or more secondary IP addresses on the interface. The command supports RFC 3021 and accepts using 31-bit prefixes on IPv4 point-to-point links. This command adds the label IP address in the command "show ip interface".

**Format** ip address <ipaddr> {subnetmask | /prefix-length} [secondary]

| Parameter | Definition |
|---|---|
| **ipaddr** | The IP address of the interface. |
| **subnetmask** | A 4-digit dotted-decimal number which represents the subnet mask of the interface. |
| **masklen** | Implements RFC 3021. Using the/notation of the subnet mask, this is and integer that indicates the length of subnet mask. Range is 5 to 32 bits. |

**Default** IP address: 0.0.0.0

Subnet Mask: 0.0.0.0

**Mode** Interface-Vlan Config

Example: The following example of the command shows the configuration of the subnet mask with an IP address in the dotted decimal format on interface vlan 100.

(QCT) (if-vlan100)#ip address 192.168.10.2 255.255.255.254

(QCT) (if-vlan100)#

## no ip addess

This command deletes an IP address from an interface. The value for ipaddr is the IP address of the interface in a.b.c.d format where the range for a,b,c, and d is 1-255. The value for subnetmask is a 4-digit dotted-decimal number which represents the Subnet Mask of the interface. To remove all of the IP addresses(primary and secondary) configured on the interface, enter the command no ip address.

**Format** no ip address <ipaddr> {subnetmask | /prefix-length} [secondary]

**Mode** Interface-Vlan Config

## 5.4.1.6. *Ip default-gateway*

This command sets the IP Address of the default gateway.

**Format** ip default-gateway <gateway-addr>

no ip default-gateway

| Parameter | Definition |
|---|---|

| | |
|---|---|
| **< gateway-addr >** | IP address of the default gateway. |
| **no** | Restore the default IP address of the default gateway. |

**Default** IP address: 0.0.0.0

**Mode** Global Config

### 5.4.1.7. *Ip address dhcp*

This command enables the DHCPv4 client on an in-band interface so that it can acquire network information, such as the IP address, subnet mask, and default gateway, from a network DHCP server..

**Format** ip address dhcp [{client-id | restart}]

| Parameter | Definition |
|---|---|
| client-id | Enable the DHCP client to specify the unique client identifier (option 61). |
| **restart** | To restart the DHCP process. |

**Default** None

**Mode** Interface Config

### no ip address dhcp

Use this command to release a leased address and disable DHCPv4 on an interface.

**Format** no ip address dhcp [client-id]

**Mode** Interface Config

### 5.4.1.8. *Ip filter*

This command is used to enable the IP filter function.

**Format** ip filter

**Default** Disabled

**Mode** Global Config

### no ip filter

Disable ip filter.

**Format** no ip filter

**Mode** Global Config

### 5.4.1.9. *Ip filter <name> {ipv4|ipv6}<ipAddr>[<mask>]*

This command is used to set an IP address to be a filter.

**Format** ip filter <name> {ipv4 <ipAddr> [<mask>] | ipv6 <prefix/length>}

no ip filter <name>

| Parameter | Definition |
|---|---|
| **<name>** | The name of the IP filter. |
| **<ipAddr>** | Configure a IP address to the filter. |
| **<mask>** | Specifies the mask for a range filter. |
| **<prefix/length>** | Enter a IPv6 prefix and prefixlength. |

**Default** None

**Mode** Global Config

### no ip filter<name>

Remove this IP address from filter.

**Format** no ip filter <name>

**Mode** Global Config

## 5.4.2. Serial Interface Commands

### 5.4.2.1. *Show line console*

This command displays serial communication settings for the switch.

**Format** show line console

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Serial Port Login Timeout (minutes)** | Specifies the time, in minutes, of inactivity on a Serial port connection, after which the Switch will close the connection. Any numeric value between 0 and 160 is allowed, the factory default is 5. A value of 0 disables the timeout. |
| **Baud Rate** | The default baud rate at which the serial port will try to connect. The available values are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 bauds. |
| **Character Size** | The number of bits in a character. The number of bits is always 8. |
| **Flow Control** | Whether Hardware Flow-Control is enabled or disabled. Hardware Flow Control is always disabled. |
| **Stop Bits** | The number of Stop bits per character. The number of Stop bits is always 1. |
| **Parity** | The Parity Method used on the Serial Port. The Parity Method is always None. |
| **Password Threshold** | When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes. |
| **Silent Time (sec)** | Use this command to set the amount of time the management console is inaccessible after the number of unsuccessful logon attempts exceeds the threshold set by the password threshold command. |
| **Terminal Length** | The columns per page for terminal serial port. |

### 5.4.2.2. *Line console*

This command is used to enter Line configuration mode

**Format** line console

**Default** None

**Mode** Global Config

### 5.4.2.3. *Baudrate*

This command specifies the communication rate of the terminal interface. The supported rates are 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

**Format** baudrate {1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200}

**Default** 115200

**Mode** Line Config

### no baudrate

This command sets the communication rate of the terminal interface to **115200**.

**Format** line console

**Mode** Line Config

## 5.4.2.4. *Exec-timeout*

This command specifies the maximum connect time (in minutes) without console activity. A value of 0 indicates that a console can be connected indefinitely. The time range is 0 to 160.

**Format** exec-timeout <0-160>

**Default** 5

**Mode** Line Config

### no exec-timeout

This command sets the maximum connect time (in minutes) without console activity to 5.

**Format** no exec-timeout

**Mode** Line Config

## 5.4.2.5. *Password-threshold*

This command is used to set the password instruction threshold limiting the number of failed login attempts.

**Format** password-threshold <0-120>

**Default** 3

**Mode** Line Config

### no password-threshold

This command sets the maximum value to the default.

**Format** no password-threshold

**Mode** Line Config

### 5.4.2.6. *Silent-time*

This command uses to set the amount of time the management console is inaccessible after the number of unsuccessful logon tries exceeds the threshold value.

**Format** silent-time <0-65535>

**Default** 0

**Mode** Line Config

### no silent-time

This command sets the maximum value to the default.

**Format** no silent-time

**Mode** Line Config

### 5.4.2.7. *Terminal length*

This command uses to configure the columns per page for the management console.

**Format** terminal-length <10-100>

**Default** 24

**Mode** Privileged Exec

## 5.4.3. Telnet Session Commands

### 5.4.3.1. *telnet*

This command establishes a new outbound telnet connection to a remote host.

**Format** telnet <ip-address|hostname> [port] [debug] [line]

| Parameter | Definition |
|---|---|
| **<ip-address\|hostname>** | A hostname or a valid IPv4 address. |
| **port** | A valid decimal integer in the range of 0 to 65535, where the default value is 23. |
| **debug** | Display current enabled telnet options. |
| **line** | Set the outbound telnet operational mode as 'linemode', where by default, the operational mode is 'character mode'. |

**Default** None

**Mode** Privileged Exec
User Exec

### 5.4.3.2. *Show line vty*

This command displays telnet settings.

**Format** show line vty

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Remote Connection Login Timeout (minutes)** | This object indicates the number of minutes a remote connection session is allowed to remain inactive before being logged off. A zero means there will be no timeout. May be specified as a number from 0 to 160. The factory default is 5. |
| **Maximum Number of Remote Connection Sessions** | This object indicates the number of simultaneous remote connection sessions allowed. The factory default is 5. |

| | |
|---|---|
| **Allow New Telnet Sessions** | Indicates that new telnet sessions will not be allowed when set to no. The factory default value is yes. |
| **Telnet Server Admin Mode** | The telnet server admin mode status. The factory default is enable. |
| **Password Threshold** | When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes. |
| **Terminal Length** | The columns per page for terminal vty port. |

### 5.4.3.3. *Line vty*

This command is used to enter vty (Telnet) configuration mode.

**Format** line vty

**Default** None

**Mode** Global Config

### 5.4.3.4. *Exec-timeout*

This command sets the remote connection session timeout value, in minutes. A session is active as long as the session has been idle for the value set. A value of 0 indicates that a session remains active indefinitely. The time is a decimal value from 0 to 160.

i Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

**Format** exec-timeout <1-160>

**Default** 5

**Mode** Line Vty

Example:

(QCT) #configure

(QCT) (Config)#line vty

(QCT) (Config-vty)#exec-timeout 10

## no exec-time out

This command sets the remote connection session timeout value, in minutes, to the default.

**Format** no exec-timeout

**Mode** Line Vty

### 5.4.3.5. *Password-threshold*

This command is used to set the password instruction threshold limited for the number of failed login attempts.

**Format** password-threshold <0-120>

**Default** 3

**Mode** Line Vty

Example:

(QCT) #configure

(QCT) (Config)#line vty

(QCT) (Config-vty)#password-threshold 10

## no password-threshold

This command sets the maximum value to the default

**Format** no password-threshold

**Mode** Line Vty

### 5.4.3.6. *Maxsessions*

This command specifies the maximum number of remote connection sessions that can be established. A value of 0 indicates that no remote connection can be established. The range is 0 to 5.

**Format** maxsessions <0-5>

**Default** 5

**Mode** Line Vty

Example:

(QCT) #configure

(QCT) (Config)#line vty

(QCT) (Config-vty)#maxsessions 5

### no maxsessions

This command sets the maximum value to be 5.

**Format** no maxsessions

**Mode** Line Vty

### 5.4.3.7. *Server enable*

This command enables/disables telnet server. If telnet server is enabled, all telnet sessions can be established until there are no more sessions available. If telnet server is disabled, all telnet sessions are closed.

**Format** server enable

**Default** Enabled

**Mode** Line Vty

### no server enable

This command disables telnet server. If telnet server is disabled, all telnet sessions are droped.

**Format** no server enable

**Mode** Line Vty

### 5.4.3.8. *Sessions*

This command regulates new telnet sessions. If sessions are enabled, new telnet sessions can be established until there are no more sessions available. If sessions are disabled, no new telnet sessions are

established. An established session remains active until the session is ended or an abnormal network error ends it.

**Format** sessions

**Default** Enabled

**Mode** Line Vty

### no sessions

This command disables telnet sessions. If sessions are disabled, no new telnet sessions are established.

**Format** no sessions

**Mode** Line Vty

## 5.4.3.9. *telnet sessions*

This command regulates new outbound telnet connections. If enabled, new outbound telnet sessions can be established until it reaches the maximum number of simultaneous outbound telnet sessions allowed. If disabled, no new outbound telnet session can be established. An established session remains active until the session is ended or an abnormal network error ends it.

**Format** telnet sessions

**Default** Enabled

**Mode** Global Config

### no telnet sessions

This command disables new outbound telnet connections. If disabled, no new outbound telnet connection can be established.

**Format** no telnet sessions

**Mode** Global Config

## 5.4.3.10. *telnet maxsessions*

This command specifies the maximum number of simultaneous outbound telnet sessions. A value of 0 indicates that no outbound telnet session can be established.

**Format** telnet maxsessions <0-5>

**Default** 5

**Mode** Global Config

### no telnet maxsessions

This command sets the maximum value to be 5.

**Format** no telnet maxsessions

**Mode** Global Config

### 5.4.3.11. *telnet exec-timeout*

This command sets the outbound telnet session timeout value in minute.

Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

**Format** telnet exec-timeout <1-160>

**Default** 5

**Mode** Global Config

### no telnet exec-timeout

This command sets the remote connection session timeout value, in minutes, to the default.

**Format** no telnet exec-timeout

**Mode** Global Config

### 5.4.3.12. *show telnet*

This command displays the current outbound telnet settings.

**Format** show telnet

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Outbound Telnet Login Timeout (in minutes)** | Indicates the number of minutes an outbound telnet session is allowed to remain inactive before being logged off. A value of 0, which is the default, results in no timeout. |
| **Maximum Number of Outbound Telnet Sessions** | Indicates the number of simultaneous outbound telnet connections allowed. |
| **Allow New Outbound Telnet Sessions** | Indicates whether outbound telnet sessions will be allowed. |

## 5.4.4. SNMP Server Commands

### 5.4.4.1. Show snmp

This command displays SNMP community information and SNMP trap/inform receivers. Trap/Inform messages are sent across a network to an SNMP Network Manager. These messages alert the manager to events occurring within the switch or on the network.

You can add, change, or delete communities. The switch does not have to be reset for changes to take effect.

The SNMP agent of the switch complies with SNMP versions 1, 2c, and 3 (for more about the SNMP specification, see the SNMP RFCs). The SNMP agent sends traps through TCP/IP to an external SNMP manager based on the SNMP configuration (the trap receiver and other SNMP community parameters).

**Note**: By default there is not any community strings such as ‘private’ or ‘public’ for SNMPv1 and SNMPv2. In addition, MD5 authentication procotol is used in SNMPv3 and ‘None’ authentication protocol is not allowed.

**Format** show snmp

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Community-String** | The community string to which this entry grants access. A valid entry is a case-sensitive alphanumeric string of up to 20 characters. Each row of this table must contain a unique community name. |

| | |
|---|---|
| **Community-Access** | The access level for this community string. |
| **View Name** | The view this community has access to. |
| **IP Address** | Access to this community is limited to this IP address. |
| **Group Name** | The community this mapping configures. |
| **Target Address** | An IP address (or portion thereof) from which this device will accept SNMP packets with the associated community. |
| **Type** | The type of message that will be sent, either traps or informs. |
| **Community** | The community traps will be sent to. |
| **Version** | The version of SNMP the trap will be sent as. |
| **SNMP v1** | Uses SNMP v1 to send traps to the receiver. |
| **SNMP v2** | Uses SNMP v2 to send traps to the receiver. |
| **SNMP v3** | Uses SNMP v3 to send traps to the receiver. |
| **UDP Port** | The UDP port the trap or inform will be sent to. |
| **Filter name** | The filter the traps will be limited by for this host. |
| **TO Sec** | The number of seconds before informs will time out when sending to this host. |
| **Retries** | The number of times informs will be sent after timing out. |
| **Username** | The user this mapping configures. |
| **Security Level** | The authentication and encryption level for snmpv3. |
| **NoAuth-N** | No authentication checksum and no encryption algorithm assigned. |
| **Auth-NoP** | Md5 or sha authentication checksum assigned and no encryption algorithm assigned. |
| **Auth-Pri** | Md5 or sha authentication checksum and des encryption algorithm assigned. |

### 5.4.4.2. Snmp-server sysname

This command sets the name of the switch. The range for name is from 1 to 64 alphanumeric characters.

**Format** snmp-server sysname <name>

| Parameter | Definition |
|---|---|
| **<name>** | Range is from 1 to 64 alphanumeric characters. |

**Default** None

**Mode** Global Config

### 5.4.4.3. Snmp-server location

This command sets the physical location of the switch. The range for name is from 1 to 255 alphanumeric characters.

**Format** snmp-server location <loc>

| Parameter | Definition |
|---|---|
| **<loc>** | Range is from 1 to 255 alphanumeric characters. |

**Default** None

**Mode** Global Config

### 5.4.4.4. Snmp-server contact

This command sets the organization responsible for the network. The range for contact is from 1 to 255 alphanumeric characters.

**Format** snmp-server contact <con>

| Parameter | Definition |
|---|---|
| **<con>** | Range is from 1 to 255 alphanumeric characters. |

**Default** None

**Mode** Global Config

### 5.4.4.5. Snmp-server community

This command adds a new SNMP community, and optionally sets the access mode, allowed IP address, and creates a view for the community. The allowed IP address supports IPv4 and IPv6 address but does not support IP mask value to demote a range of IPv6 addresses.

Note: Community names in the SNMP community table must be unique. If you make multiple entries using the same community name, the first entry is kept and processed and all duplicate entries are ignored.

**Format** snmp-server community <community-string> [ipaddress <ipaddress> | ro | rw | su | view <viewname>]

| Parameter | Definition |
|---|---|
| **<Community-String>** | A name associated with the switch and with a set of SNMP managers that manage it with a specified privileged level. The length of community-name can be up to 20 case-sensitive characters. |
| **ipaddress** | The associated community SNMP packet sending address and is used along with the client IP mask value to denote a range of IP addresses from which SNMP clients may use that community to access the device. A value of 0.0.0.0 allows access from any IP address. Otherwise, this value is ANDed with the mask to determine the range of allowed client IP addresses. |
| **ro \| rw \| su** | The access mode of the SNMP community, which can be public (Read-Only/RO), private (Read-Write/RW), or Super User (SU). |
| **<viewname>** | The name of the view to create or update. |

**Default** None

**Mode** Global Config

### no snmp-server community <community-string>

This command deletes snmp community.

**Format** no snmp-server community <community-string>

**Mode** Global Config

## 5.4.4.6. Snmp-server community-group

This command configures a community access string to permit access via the SNMPv1 and SNMPv2c protocols.

**Format** snmp-server community-group <community-string> <group-name> [ipaddress <ip-address>]

| Parameter | Definition |
|---|---|
| **<community-string>** | The community which is created and then associated with the group. The range is 1 to 20 characters. |

| | |
|---|---|
| **<group-name>** | The name of the group that the community is associated with. The range is 1 to 30 characters. |
| **<ip-address>** | Optionally, the IPv4 address that the community may be accessed from. |

**Default** None

**Mode** Global Config

### no snmp-server community-group <community-string>

This command deletes snmp community group.

**Format** no snmp-server community-group <community-string>

**Mode** Global Config

## 5.4.4.7. Show snmp engineid

This command displays the currently configured SNMP engineID.

**Format** show snmp engineid

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Local SNMP EngineID** | The current configuration of the displayed SNMP engineID. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show snmp engineid

Local SNMP engineID : 80001c4c032c600c83ad47

## 5.4.4.8. Snmp-server engineID

This command configures snmp engineID on the local device.

Note: Changing the engineID will invalidate all SNMP configuration that exists on the box.

**Format** snmp-server engineID local {<engine-id> | default}

| Parameter | Definition |
|---|---|
| **<engine-id>** | A hexadecimal string identifying the engine-id. Engine-id must be an even length in the range of 6 to 32 hexadecimal characters. |
| **default** | Sets the engine-id to the default string, based on the device MAC address. |

**Default** The engineID is configured automatically, based on the device MAC address.

**Mode** Global Config

### no snmp-server engineID

This command removes snmp engineID.

**Format** no snmp-server engineID local

**Mode** Global Config

## 5.4.4.9. Show snmp filters

This command displays the configured filters used when sending traps.

**Format** show snmp filters [<filter-name>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Name** | The filter name for this entry. |
| **OID Tree** | The OID tree this entry will include or exclude. |
| **Type** | Indicates if this entry includes or excludes the OID Tree. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show snmp filters

Name OID Tree Type

---

test fastPathSwitching Included

### 5.4.4.10. Snmp-server filter

This command creates a filter entry for use in limiting which traps will be sent to a host.

**Format** snmp-server filter <filter-name> <oid-tree> [excluded | included]

| Parameter | Definition |
|---|---|
| **<filter-name>** | The label for the filter being created. The range is 1 to 30 characters. |
| **<oid-tree>** | The OID subtree to include or exclude from the filter. Subtrees may be specified by numerical (1.3.6.2.4) or keywords (system), and asterisks may be used to specify a subtree family (1.3.*.4). |
| **excluded** | The tree is excluded from the filter. |
| **included** | The tree is included in the filter. |

**Default** None

**Mode** Global Config

### no snmp-server filter <filter-name> [<oid-tree >]

This command removes the specified filter.

**Format** no snmp-server filter <filter-name> [<oid-tree >]

**Mode** Global Config

### 5.4.4.11. Show snmp user

This command displays the currently configured SNMPv3 users.

**Format** show snmp user [<username>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Name** | The name of the user. |
| **Group Name** | The group that defines the SNMPv3 access parameters. |
| **Auth Method** | The authentication algorithm configured for this user. |
| **Privilege Method** | The encryption algorithm configured for this user. |
| **Remote Engine ID** | The engineID for the user defined on the client machine. |

Example: The following shows examples of the CLI display output for the commands.

```
(QCT) (Config)#show snmp user

    Name          Group Name       Auth   Priv

                                   Meth   Meth   Remote Engine ID

----------------  ---------------------  -------  -------  ----------------------------------

test              DefaultRead      MD5    DES    80001c4c032c600c83ad47
```

## 5.4.4.12. Snmp-server user

This command creates an SNMPv3 user for access to the system.

**Format** snmp-server user <name> <group-name> [remote <engine-idstring>] {[auth-md5 <password> | auth-md5-key <md5-key> | auth-sha <password> | auth-sha-key <sha-key>] [priv-des <password> | priv-des-key <des-key>]}

| Parameter | Definition |
|---|---|
| **<name>** | The username the SNMPv3 user will connect to the switch as. The range is 1 to 30 characters. |
| **<group-name>** | The name of the group the user belongs to. The range is 1 to 30 characters. |
| **<engineid-string>** | The engine-id of the remote management station that this user will be connecting from. The range is 6 to 32 characters. |
| **<password>** | The password the user will use for the authentication or encryption mechanism. The range is 8 to 32 characters. |
| **md5-key** | A pregenerated MD5 authentication key. The length is 32 characters. |

| | |
|---|---|
| **sha-key** | A pregenerated SHA authentication key. The length is 48 characters. |
| **priv-des-key** | A pregenerated DES encryption key. The length is 32 characters. |

**Default** None

**Mode** Global Config

### no snmp-server user

This command removes the specified SNMPv3 user.

**Format** no snmp-server user <name> [remote <engine-idstring>]

**Mode** Global Config

## 5.4.4.13. Show snmp group

This command displays the configured groups.

**Format** show snmp group [<groupname>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Name** | The name of the group. |
| **Security Model** | Indicates which protocol can access the system via this group. |
| **Security Level** | Indicates the security level allowed for this group. |
| **Read View** | The view this group provides read access to. |
| **Write View** | The view this group provides write access to. |
| **Notify View** | The view this group provides trap access to. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show snmp group

| Name | Context Prefix | Security Model | Security Level | Views Read | Views Write | Views Notify |
|---|---|---|---|---|---|---|
| DefaultRead | "" | V1 | NoAuth-NoPriv | Default | "" | Default |
| DefaultRead | "" | V2 | NoAuth-NoPriv | Default | "" | Default |
| DefaultRead | "" | V3 | NoAuth-NoPriv | Default | "" | Default |
| DefaultRead | "" | V3 | Auth-NoPriv | Default | "" | Default |
| DefaultRead | "" | V3 | Auth-Priv | Default | "" | Default |
| DefaultSuper | "" | V1 | NoAuth-NoPriv | DefaultSuper | DefaultSuper | DefaultSuper |
| DefaultSuper | "" | V2 | NoAuth-NoPriv | DefaultSuper | DefaultSuper | DefaultSuper |
| DefaultSuper | "" | V3 | NoAuth-NoPriv | DefaultSuper | DefaultSuper | DefaultSuper |
| DefaultWrite | "" | V1 | NoAuth-NoPriv | Default | Default | Default |
| DefaultWrite | "" | V2 | NoAuth-NoPriv | Default | Default | Default |
| DefaultWrite | "" | V3 | NoAuth-NoPriv | Default | Default | Default |
| DefaultWrite | "" | V3 | Auth-NoPriv | Default | Default | Default |
| DefaultWrite | "" | V3 | Auth-Priv | Default | Default | Default |

### 5.4.4.14. Snmp-server group

This command creates an SNMP access group.

**Format** snmp-server group <group-name> [v1 | v2 | v3 {auth | priv}] {[read <readview>] | [write <writeview>] | [context <contextprefix>] | [notify <notifyview>]}

| Parameter | Definition |
|---|---|
| **<group-name>** | The group name to be used when configuring communities or users. The range is 1 to 30 characters. |

| | |
|---|---|
| **v1** | This group can only access via SNMPv1. |
| **v2** | This group can only access via SNMPv2c. |
| **v3** | This group can only access via SNMPv3. |
| **<readview>** | The view this group will use during GET requests. The range is 1 to 30 characters. |
| **<writeview>** | The view this group will use during SET requests. The range is 1 to 30 characters. |
| **<notifyview>** | The view this group will use when sending out traps. The range is 1 to 30 characters. |

**Default** Generic groups are created for all versions and privileges using the default views.

**Mode** Global Config

### no snmp-server group

This command removes the specified group.

**Format** no snmp-server group <group-name> [v1 | v2 | v3 {auth | noauth | priv}] { [context <contextprefix>] | [notify <notifyview>]}

**Mode** Global Config

## 5.4.4.15. Show snmp views

This command displays the currently configured views.

**Format** show snmp views [<viewname>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Name** | The view name for this entry. |
| **OID Tree** | The OID tree that this entry will include or exclude. |
| **Type** | Indicates if this entry includes or excludes the OID tree. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show snmp views

| Name | OID Tree | Type |
|---|---|---|
| Default | iso | Included |
| Default | snmpVacmMIB | Excluded |
| Default | usmUser | Excluded |
| Default | snmpCommunityTable | Excluded |
| DefaultSuper | iso | Included |

### 5.4.4.16. Snmp-server view

This command creates or modifies an existing view entry that is used by groups to determine which objects can be accessed by a community or user.

**Format** snmp-server view <view-name> <oid-tree> [excluded | included]

| Parameter | Definition |
|---|---|
| **<view-name>** | The label for the view being created. The range is 1 to 30 characters. |
| **<oid-tree>** | The OID subtree to include or exclude from the filter. Subtrees may be specified by numerical (1.3.6.2.4) or keywords (system), and asterisks may be used to specify a subtree family (1.3.*.4). |
| **excluded** | The tree is excluded from the view. |
| **included** | The tree is included in the view. |

**Default** Views are created by default to provide access to the default groups.

**Mode** Global Config

### no snmp-server view

This command removes the specified view.

**Format** no snmp-server view <view-name> [<oid-tree>]

**Mode** Global Config

## 5.4.5. SNMP Trap Commands

### 5.4.5.1. Snmp-server host <host-addr> traps

This command configures traps to be sent to the specified host.

**Format** snmp-server host <host-addr> traps version {1 <community> | 2 <community> | 3 <username> [auth | noauth | priv]} [filter <filtername>] [udp-port <1-65535>]

| Parameter | Definition |
|---|---|
| **<host-addr>** | The IPv4 or IPv6 address of the host to send the trap to. |
| **version 1** | Sends SNMPv1 traps. |
| **version 2** | Sends SNMPv2 traps. |
| **<community>** | Community string sent as part of the notification. The range is 1 to 20 characters. |
| **version 3** | Sends SNMPv3 traps. |
| **<username>** | Username of SNMPv3. |
| **auth** | Enables authentication of a packet without encrypting. |
| **noauth** | Disables authentication and encrypting of a packet. |
| **priv** | Enables authentication and encrypting of a packet. |
| **<filtername>** | The filter name to associate with this host. Filters can be used to specify which traps are sent to this host. The range is 1 to 30 characters. |
| **<udp-port>** | The SNMP trap receiver port. The default is port 162. |

**Default** None

**Mode** Global Config

### no snmp-server host <host-addr>

This command deletes trap receivers.

**Format** no snmp-server host <host-addr>

**Mode** Global Config

### 5.4.5.2. Show trapflags

This command displays trap conditions. Configure which traps the switch should generate by enabling or disabling the trap condition. If a trap condition is enabled and the condition is detected, the switch's SNMP agent sends the trap to all enabled trap receivers. The switch does not have to be reset to implement the changes. Cold and warm start traps are always generated and cannot be disabled.

**Format** show trapflags

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Authentication Flag** | May be enabled or disabled. The factory default is enabled. Indicates whether authentication failure traps will be sent. |
| **Link Up/Down Flag** | May be enabled or disabled. The factory default is enabled. Indicates whether link status traps will be sent. |
| **Multiple Users Flag** | May be enabled or disabled. The factory default is enabled. Indicates whether a trap will be sent when the same user ID is logged into the switch more than once at the same time (either via telnet or serial port). |
| **Spanning Tree Flag** | May be enabled or disabled. The factory default is enabled. Indicates whether spanning tree traps will be sent. |
| **ACL Traps** | May be enabled or disabled. The factory default is disabled. Indicates whether ACL traps will be sent. |
| **BGP Traps** | May be enabled or disabled. The factory default is disabled. Indicates whether BGP traps will be sent. |
| **OSPFv2 Traps** | May be enabled or disabled. The factory default is disabled. Indicates whether OSPF traps will be sent. |
| **PIM Traps** | May be enabled or disabled. The factory default is disabled. Indicates whether PIM traps will be sent. |
| **OSPFv3 Traps** | May be enabled or disabled. The factory default is disabled. Indicates whether OSPFv3 traps will be sent. |
| **Power Supply Module state trap** | May be enabled or disabled. The factory default is enabled. Indicates whether power supply status traps will be sent. |
| **Temperature trap** | May be enabled or disabled. The factory default is enabled. Indicates whether temperature status traps will be sent. |
| **Fan trap** | May be enabled or disabled. The factory default is enabled. Indicates whether fan status traps will be sent. |
| **FIP snooping Traps** | May be enabled or disabled. The factory default is enabled. Indicates |

| | |
|---|---|
| | whether snooping traps will be sent. |
| **Transceiver Traps** | May be enabled or disabled. The factory default is disabled. Indicates whether Transceiver traps will be sent. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show trapflags

Authentication Flag..... Enable

Link Up/Down Flag..... Enable

Multiple Users Flag..... Enable

Spanning Tree Flag..... Enable

ACL Traps..... Disable

BGP Traps..... Disable

OSPFv2 traps..... Disable

PIM Traps..... Disable

OSPFv3 Traps..... Disable

Power Supply Module state trap..... Enable

Temperature trap..... Enable

Fan trap..... Enable

FIP snooping Traps..... Enable

Transceiver Flag..... Disable

### 5.4.5.3. Snmp trap link-status all

This command enables link status traps for all interfaces.

Note: This command is valid only when the Link Up/Down Flag is enabled. See 'snmp-server enable traps linkmode‘ command.

**Format** snmp trap link-status all

**Default** Disabled

**Mode** Global Config

### no snmp trap link-status all

This command disables link status traps for all interfaces.

**Format** no snmp trap link-status all

**Mode** Global Config

### 5.4.5.4. Snmp-server enable traps acl-trapflags

This command enables the acl trap.

**Format** snmp-server enable traps acl-trapflags

**Default** Disabled

**Mode** Global Config

### no snmp-server enable traps acl-trapflags

This command disables the acl trap.

**Format** no snmp-server enable traps acl-trapflags

**Mode** Global Config

### 5.4.5.5. Snmp-server enable traps authentication

This command enables the Authentication trap.

**Format** snmp-server enable traps authentication

**Default** Enabled

**Mode** Global Config

### no snmp-server enable traps authentication

This command enables the Authentication trap.

**Format** no snmp-server enable traps authentication

**Mode** Global Config

### 5.4.5.6. Snmp-server enable traps bgp state-changes limited

This command enables the BGP trap.

**Format** snmp-server enable traps bgp state-changes limited

**Default** Disabled

**Mode** Global Config

### no snmp-server enable traps bgp state-changes limited

This command disables the BGP trap.

**Format** no snmp-server enable traps bgp state-changes limited

**Mode** Global Config

### 5.4.5.7. Snmp-server enable traps fan

This command enables the fan status trap.

**Format** snmp-server enable traps fan

**Default** Enabled

**Mode** Global Config

### no snmp-server enable traps fan

This command disables the fan status trap.

**Format** no snmp-server enable traps fan

**Mode** Global Config

### 5.4.5.8. Snmp-server enable traps linkmode

This command enables Link Up/Down traps for the entire switch. When enabled, link traps are sent only if the Link Trap flag setting associated with the port is enabled (see 'snmp trap link-status' command).

**Format** snmp-server enable traps linkmode

**Default** Enabled

**Mode** Global Config

### no snmp-server enable traps linkmode

This command disables Link Up/Down traps for the entire switch.

**Format** no snmp-server enable traps linkmode

**Mode** Global Config

### 5.4.5.9. Snmp-server enable traps multiusers

This command enables Multiple User traps. When the traps are enabled, a Multiple User Trap is sent when a user logs in to the terminal interface (EIA 232 or telnet) and there is an existing terminal interface session.

**Format** snmp-server enable traps multiusers

**Default** Enabled

**Mode** Global Config

### no snmp-server enable traps multiusers

This command disables Multiple User trap.

**Format** no snmp-server enable traps multiusers

**Mode** Global Config

### 5.4.5.10. Snmp-server enable traps ospf

This command enables OSPF traps.

**Format** snmp-server enable traps ospf {all | errors {all | authentication-failure | bad-packet | config-error | virt-authentication-failure | virt-bad-packet | virt-config-error} | lsa {all | lsa-maxage | lsa-originate} | overflow {all | lsdb-overflow | lsdb-approaching-overflow} | retransmit {all | packets | virt-packets} | state-change {all | if-state-change | neighbor-state-change | virtif-state-change | virtneighbor-state-change}}

**Default** Disabled

**Mode** Global Config

## no snmp-server enable traps ospf

This command disables OSPF trap.

**Format** no snmp-server enable traps ospf {all | errors {all | authentication-failure | bad-packet | config-error | virt-authentication-failure | virt-bad-packet | virt-config-error} | lsa {all | lsa-maxage | lsa-originate} | overflow {all | lsdb-overflow | lsdb-approaching-overflow} | retransmit {all | packets | virt-packets} | state-change {all | if-state-change | neighbor-state-change | virtif-state-change | virtneighbor-state-change}}

**Mode** Global Config

## 5.4.5.11. Snmp-server enable traps ospfv3

This command enables OSPFv3 traps.

**Format** snmp-server enable traps ospfv3 {all | errors {all | bad-packet | config-error | virt-bad-packet | virt-config-error} | lsa {all | lsa-maxage | lsa-originate} | overflow {all | lsdb-overflow | lsdb-approaching-overflow} | retransmit {all | packets | virt-packets} | state-change {all | if-state-change | neighbor-state-change | virtif-state-change | virtneighbor-state-change}}

**Default** Disabled

**Mode** Global Config

## no snmp-server enable traps ospfv3

This command disables OSPFv3 trap.

**Format** no snmp-server enable traps ospfv3 {all | errors {all | bad-packet | config-error | virt-bad-packet | virt-config-error} | lsa {all | lsa-maxage | lsa-originate} | overflow {all | lsdb-overflow | lsdb-approaching-overflow} | retransmit {all | packets | virt-packets} | state-change {all | if-state-change | neighbor-state-change | virtif-state-change | virtneighbor-state-change}}

**Mode** Global Config

### 5.4.5.12. Snmp-server enable traps pim

This command enables PIM traps.

**Format** snmp-server enable traps pim

**Default** Disabled

**Mode** Global Config

### no snmp-server enable traps pim

This command disables PIM trap.

**Format** no snmp-server enable traps pim

**Mode** Global Config

### 5.4.5.13. Snmp-server enable traps powersupply

This command enables power supply status traps.

**Format** snmp-server enable traps powersupply

**Default** Enabled

**Mode** Global Config

### no snmp-server enable traps powersupply

This command disables power supply status trap.

**Format** no snmp-server enable traps powersupply

**Mode** Global Config

### 5.4.5.14. Snmp-server enable traps stpmode

This command enables the sending of new root traps and topology change notification traps.

**Format** snmp-server enable traps stpmode

**Default** Enabled

**Mode** Global Config

### no snmp-server enable traps stpmode

This command disables the sending of new root traps and topology change notification traps.

**Format** no snmp-server enable traps stpmode

**Mode** Global Config

## 5.4.5.15. Snmp-server enable traps temperature

This command enables the temperature status trap.

**Format** snmp-server enable traps temperature

**Default** Enabled

**Mode** Global Config

### no snmp-server enable traps temperature

This command disables the temperature status trap.

**Format** no snmp-server enable traps temperature

**Mode** Global Config

## 5.4.5.16. Snmp-server enable traps transceiver

This command enables the transceiver trap.

**Format** snmp-server enable traps transceiver

**Default** Disabled

**Mode** Global Config

### no snmp-server enable traps transceiver

This command disables the transceiver trap.

**Format** no snmp-server enable traps transceiver

**Mode** Global Config

## 5.4.5.17. Snmp-server enable traps violation

This command enables the violation trap.

**Format** snmp-server enable traps violation

**Default** Disabled

**Mode** Global Config

### no snmp-server enable traps violation

This command disables the violation trap.

**Format** no snmp-server enable traps violation

**Mode** Global Config

## 5.4.5.18. Show snmp source-interface

This command displays the configured global source interface used for the SNMP client. The IP address of the selected interface is used as source IP for all communications with the server.

**Format** show snmp source-interface

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|

| | |
|---|---|
| **SNMP trap Client Source Interface** | The interface configured as the source interface for the SNMP trap/inform client. |
| **SNMP trap Client IPv4 Address** | The IP address configured on the SNMP client source interface. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show snmp source-interface

SNMP trap Client Source Interface..... serviceport
SNMP trap Client Source IPv4 Address..... 172.16.3.60 [Up]
SNMP trap Client Source IPv6 Address..... fe80::2e60:cff:fe83:ad47 [Up]

## 5.4.5.19. Snmptrap source-interface

Use this command in Global configuration mode to configure the global source-interface (Source IP address) for all SNMP communications between the SNMP client and the server. This command takes effect for both SNMP trap and inform client.

**Format** snmptrap source-interface {<slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}

| Parameter | Definition |
|---|---|
| **<slot/port>** | Specifies the interface to use as the source interface. |
| **<loopback-id>** | Specifies the loopback interface to use as the source interface. The range of the loopback ID is 0 to 63. |
| **<tunnel-id>** | Specifies the tunnel interface to use as the source interface. The range of the tunnel ID is 0 to 7. |
| **<vlan-id>** | Specifies the VLAN interface to use as the source interface. The range of VLAN ID is 1 to 4093. |

**Default** Disabled

**Mode** Global Config

## no snmptrap source-interface

This command removes the global source-interface for all SNMP communication between the SNMP client and the server.

**Format** no snmptrap source-interface

**Mode** Global Config

## 5.4.6. SNMP Inform Commands

### 5.4.6.1. Snmp-server host <host-addr> informs

This command configures informs to be sent to the specified host.

**Format** snmp-server host <host-addr> informs version 2 <community> [filter <filtername>] [udp-port <1-65535>] [retries <0-255>] [timeout <1-300>]

| Parameter | Definition |
|---|---|
| **<host-addr>** | The IPv4 or IPv6 address of the host to send the inform to. |
| **version 2** | Sends SNMPv2 informs. |
| **<community>** | Community string sent as part of the notification. The range is 1 to 20 characters. |
| **<filtername>** | The filter name to associate with this host. Filters can be used to specify which informs are sent to this host. The range is 1 to 30 characters. |
| **<udp-port>** | The SNMP Inform receiver port. The default is port 162. |
| **<retries>** | The number of times to resend an Inform. The default is 3 attempts. The range is 0 to 255 retries. |
| **<timeout>** | The number of seconds to wait for an acknowledgement before resending the Inform. The default is 15 seconds. The range is 1 to 300 seconds. |

**Default** None

**Mode** Global Config

### no snmp-server host <host-addr>

This command deletes inform receivers.

**Format** no snmp-server host <host-addr>

**Mode** Global Config

## 5.4.7. Secure Shell (SSH) Commands

### 5.4.7.1. *Show ip ssh*

This command displays the SSH settings.

**Format** show ip ssh

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Administrative Mode** | This field indicates whether the administrative mode of SSH is enabled or disabled. |
| **SSH Port** | The listen port number of SSH service. |
| **Protocol Levels** | The protocol level supports. |
| **SSH Sessions Currently Active** | This field specifies the current number of SSH connections. |
| **Max SSH Sessions Allowed** | The maximum number of inbound SSH sessions allowed on the switch. |
| **SSH Timeout** | This field is the inactive timeout value for incoming SSH sessions to the switch. |
| **Keys Present** | Indicates whether the SSH RSA and DSA key files are present on the device. |
| **Key Generation in Progress** | Indicates whether RSA or DSA key files generation is currently in progress. |
| **User Password Authentication** | Indicates whether the SSH authentication mode of user password is enabled or disabled. |
| **User Public Key Authentication** | Indicates whether the SSH authentication mode of user public key is enabled or disabled. |
| **Terminal Length** | indicates the number of lines to be paginated and displayed on a screen for a new SSH session. |

### 5.4.7.2. *Show ip ssh user-public-key current-user*

This command displays the public key content of current login session.

**Format** show ip ssh user-public-key current-user

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Username** | Username of current login session. |
| **Key Type** | Type of user public key. Possible values are DSA or RSA. |
| **Context of Public Key** | Full context of current user's public key. |

### 5.4.7.3. *Show ip ssh user-public-key who-has-key*

This command displays a username list which indicates the owners of public keys, and it only allows user "admin" to execute this command.

**Format** show ip ssh user-public-key who-has-key

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Public Key Owners** | A username list which indicates the owners of public keys in this device. |

### 5.4.7.4. *Ip ssh*

This command is used to enable SSH.

**Format** ip ssh

**Default** Enabled

**Mode** Global Config

### no ip ssh

This command is used to disable SSH.

**Format** no ip ssh

**Mode** Global Config

### 5.4.7.5. *Ip ssh maxsessions*

This command specifies the maximum number of SSH connection sessions that can be established. A value of 0 indicates that no ssh connection can be established. The range is 0 to 5.

**Format** ip ssh maxsessions <0-5>

**Default** 5

**Mode** Global Config

### no ip ssh maxsessions

This command sets the maximum number of SSH connection sessions that can be established to the default value.

**Format** no ip ssh maxsessions

**Mode** Global Config

### 5.4.7.6. *Ip ssh port*

This command specifies the listen port number of SSH service. The range is 1 to 65535.

**Format** ip ssh port <1-65535>

**Default** 22 (1234 for IX1/IX7D/IX8D modules)

**Mode** Global Config

### no ip ssh port

This command sets the listen port number of SSH service to the default value.

**Format** no ip ssh port

**Mode** Global Config

### 5.4.7.7. *Ip ssh timeout*

This command specifies the maximum idle time for each SSH login session. The range is 1 to 160 minutes.

**Format** ip ssh port <1-160>

**Default** 5

**Mode** Global Config

### no ip ssh timeout

This command sets the maximum idle time for each SSH login session to the default value.

**Format** no ip ssh timeout

**Mode** Global Config

### 5.4.7.8. *Ip ssh user-password-auth*

This command is used to enable the SSH authentication mode of user password.

**Format** ip ssh user-password-auth

**Default** Enabled

**Mode** Global Config

### no ip ssh user-password-auth

This command is used to disable the SSH authentication mode of user password.

**Format** no ip ssh user-password-auth

**Mode** Global Config

### 5.4.7.9. *Ip ssh user-public-key-auth*

This command is used to enable the SSH authentication mode of user public key.

**Format** ip ssh user-public-key-auth

**Default** Disabled

**Mode** Global Config

### no ip ssh user-public-key-auth

This command is used to disable the SSH authentication mode of user public key.

**Format** no ip ssh user-public-key-auth

**Mode** Global Config

## 5.4.8. Management Security Commands

### 5.4.8.1. *Crypto key generation {RSA|DSA}*

This command is used to generate an RSA or DSA key pair for SSH. Please note that the SSHv1 key will not be generated.

**Format** crypto key generate {RSA | DSA}

**Default** None

**Mode** Global Config

### no crypto key generate {RSA | DSA}

This command is used to delete the RSA or DSA key from the device.

**Format** no crypto key generate {RSA | DSA}

**Mode** Global Config

### 5.4.8.2. *Crypto certificate generation*

This command is used to generate a certificate for HTTPS.

**Format** crypto certificate generate

**Default** None

**Mode** Global Config

### no crypto certificate generate

This command is used to delete the certificate from the device.

**Format** no crypto certificate generate

**Mode** Global Config

## 5.4.9. DHCP Client Commands

### 5.4.9.1. *dhcp client vendor-id-option*

This command is used to enable the inclusion of the DCHP Option 60, Vendor Class Identifier, in the requests transmitted to the DHCP server by the DHCP client in this switch. Use the **no** form to restore to default value.

**Format** dhcp client vendor-id-option

**Default** Not include DHCP Option 60

**Mode** Global Config

### no dhcp client vendor-id-option

This command is used to restore to default value.

**Format** no dhcp client vendor-id-option

**Mode** Global Config

### 5.4.9.2. *dhcp client vendor-id-option-string*

This command is used to set the DCHP Option 60 string in the requests transmitted to the DHCP server by the DHCP client in this switch. The length of the string is from 0 to 128 characters. Use the **no** form to restore to default value.

**Format** dhcp client vendor-id-option-string <string>

**Default** No string defined

**Mode** Global Config

### no dhcp client vendor-id-option-string

This command is used to restore to default value.

**Format** no dhcp client vendor-id-option-string

**Mode** Global Config

### 5.4.9.3. *Show dhcp client vendor-id-option*

This command is used to display the configured administration mode of the vendor-id-option and the vendor-id string to be included in DHCP requests.

**Format** show dhcp client vendor-id-option

**Default** None

**Mode** Privilege Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **DHCP Client Vendor Identifier Option** | The administration mode of the Vendor ID Option |
| **DHCP Client Vendor Identifier Option String** | The string to be included in the Vendor ID Option |

### 5.4.9.4. *Show dhcp lease*

This command is used to display the DHCP client lease parameters.

**Format** show dhcp lease [interface {<slot/port> | vlan <vlan-id>}]

**Default** None

**Mode** Privilege Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **IP address** | The IP address allocated by DHCP server and correspond interface. |
| **Subnet mask** | The IP subnet mask allocated by DHCP server for the interface. |
| **DHCP lease server** | The IPv4 address of the DHCP server that leased the address |
| **State** | State of the DHCP client on this interface |
| **DHCP transaction id** | The transaction ID of the DHCP client |
| **Lease** | The time (in seconds) that the IP address was leased by the server |
| **Renewal** | The time (in seconds) when the next DHCP RENEW request is sent by DHCP |

| | |
|---|---|
| | client to renew the leased IP address |
| **Rebind** | The time (in seconds) when the DHCP Rebind process starts |
| **Retry count** | Number of times the DHCP client sends a DHCP REQUEST before the server responds |

## 5.4.10. sFlow Commands

### 5.4.10.1. *Show sflow agent*

The user can go to the CLI Privilege Exec to get the sFlow agent information, use the **show sflow agent** Privilege command.

**Format** show sflow agent

**Default** None

**Mode** Privilege Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **sFlow Version** | Uniquely identifies the version and implementation of this MIB. The version string must have the following structure: MIB Version; Organization; Software Revision where:<br>• MIB Version: 1.3, the version of this MIB.<br>• Organization:<br>• Revision: The version of FW |
| **IP Address** | The IP address associated with this agent. |

### 5.4.10.2. *Show sflow pollers*

The user can go to the CLI Privilege Exec to get the sFlow polling instances created on the switch, use the **show sflow pollers** Privilege command.

**Format** show sflow pollers

**Default** None

**Mode** Privilege Exec

**Display Message**

| Parameter | Definition |
|---|---|

| | |
|---|---|
| **Poller Data Source** | The sFlowDataSource (slot/port) for this sFlow sampler. This agent will support Physical ports only. |
| **Receiver Index** | The sFlowReceiver associated with this sFlow counter poller. |
| **Poller Interval** | The number of seconds between successive samples of the counters associated with this data source. |

### 5.4.10.3. *Show sflow receivers*

The user can go to the CLI Privilege Exec to get the configuration information related to the sFlow receivers, use the **show sflow receivers** Privilege command.

**Format** show sflow receivers [< rcvr- index >]

**Default** None

**Mode** Privilege Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Receiver Index** | The sFlow Receiver associated with the sampler/poller. |
| **Owner String** | The identity string for receiver, the entity making use of this sFlowRcvrTable entry. |
| **Time Out** | The time (in seconds) remaining before the receiver is released and stops sending samples to sFlow receiver. The no timeout value of this parameter means that the sFlow receiver is configured as a non-timeout entry. |
| **Max Datagram Size** | The maximum number of bytes that can be sent in a single sFlow datagram. |
| **Port** | The destination Layer4 UDP port for sFlow datagrams. |
| **IP Address** | The sFlow receiver IP address. |
| **Address Type** | The sFlow receiver IP address type. For an IPv4 address, the value is 1. |
| **Datagram Version** | The sFlow protocol version to be used while sending samples to sFlow receiver. |

### 5.4.10.4. *Show sflow samplers*

The user can go to the CLI Privilege Exec to get the sFlow sampling instances created on the switch, use the **show sflow samplers** Privilege command.

**Format** show sflow samplers

**Default** None

**Mode** Privilege Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Sampler Data Source** | The sFlowDataSrouce for this sFlow sampler. This agent supports physical ports only. |
| **Receiver Index** | The sFlowReceiver configured for this sFlow sampler. |
| **Remote Agent** | The remote agent instance index number. |
| **Ingress Sampling Rate** | The sampling rate for the ingress. |
| **Flow Sampling Rate** | The statistical sampling rate for packet sampling from this source. |
| **Egress Sampling Rate** | The sampling rate for the egress. |
| **Max Header Size** | The maximum number of bytes that should be copied from a sampled packet to form a flow sample. |

### 5.4.10.5. *Show sflow source-interface*

The user can go to the CLI Privilege Exec to get the configured source interface for sFlow, use the **show sflow source-interface** Privilege command.

**Format** show sflow source-interface

**Default** None

**Mode** Privilege Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **sFlow Client Source interface** | The interface ID of the physical or logical interface configured as the sFlow client source interface. |
| **sFlow Client Source IPv4 Address** | The IP address of the interface configured as the sFlow client source interface. |

### 5.4.10.6. *Sflow sampler maxheadersize*

The user can go to the CLI Interface Configuration Mode to set maximum header size, use the sflow maximum-header <20-256> interface configuration command.

**Format** sflow sampler maxheadersize <20-256>

**Default** None

**Mode** Interface Config

### no sflow sampler maxheadersize

Use the no sflow maximum-header return to default value 128.

**Format** no sflow sampler maxheadersize

**Mode** Interface Config

## 5.4.10.7. *Sflow receiver maximum datagram*

The user can go to the CLI Global Configuration Mode to set maximum datagram size, use the **sflow receiver <rcvr-index> maxdatagram <200-9312>** global configuration command. This specifies the maximum number of data bytes that can be sent in a single sample datagram. The management entity should set this value to avoid fragmentation of the sFlow datagrams.

**Format** sflow receiver < rcvr- index > maxdatagram <200-9312>

**Default** 1400

**Mode** Global Config

### no sflow receiver maxdatagram

Use the **no sflow receiver <rcvr-index> maxdatagram** return to default value 1400.

**Format** no sflow receiver < rcvr- index > maxdatagram

**Mode** Global Config

## 5.4.10.8. *Sflow receiver owner*

The user can go to the CLI Global Configuration Mode to create a receiver session, use the **sflow receiver <rcvr-index> owner <owner> {notimeout | timeout <timeout>}** global configuration command.

**Format** sflow receiver <rcvr- index> owner <owner> {notimeout | timeout <0 - 2147483647>}

| Parameter | Definition |
|---|---|

| | |
|---|---|
| **<owner>** | The identity string for the receiver, the entity making use of this sFlowRcvrTable entry. The range is 127 characters. The default is a null string. The empty string indicates that the entry is currently unclaimed and the receiver configuration is reset to the default values. An entity wishing to claim an sFlowRcvrTable entry must ensure that the entry is unclaimed before trying to claim it. The entry is claimed by setting the owner string to a non-null value. The entry must be claimed before assigning a receiver to a sampler or poller. |
| **notimeout** | Entries configured with a notimeout entry will be in the running config until the user explicitly removes the entry. |
| **<0 - 2147483647>** | The time, in seconds, remaining before the sampler or poller is released and stops sending samples to receiver. A management entity wanting to maintain control of the sampler is responsible for setting a new value before the old one expires. |

**Default** None

**Mode** Global Config

### no sflow receiver <rcvr-index>

Use the **no sflow receiver <rcvr-index>** to remove the session.

**Format** no sflow receiver <rcvr-index>

**Mode** Global Config

## 5.4.10.9. *Sflow receiver address*

The user can go to the CLI Global Configuration Mode to set receiver IP address, use the **sflow receiver <rcvr-index> ip <ip>** global configuration command. If set to 0.0.0.0, no sFlow datagrams will be sent. The default is 0.0.0.0.

**Format** sflow receiver <rcvr-index> ip <ip>

**Default** 0.0.0.0

**Mode** Global Config

### no sflow receiver <rcvr-index> ip

Use the **no sflow receiver <rcvr-index> ip** to clear collector ip address.

**Format** no sflow receiver <index> ip

**Mode** Global Config

### 5.4.10.10. *Sflow receiver port*

The user can go to the CLI Global Configuration Mode to set the destination Layer4 UDP port for sFlow datagrams, use the **sflow receiver <rcvr-index> port <1-65535>** global configuration command.

**Format** sflow receiver <rcvr-index> port <1-65535>

**Default** 6343

**Mode** Global Config

### no sflow receiver <rcvr-index> port

Use the **no sflow collector-port** return to default UDP port 6343.

**Format** no sflow receiver <rcvr-index> port

**Mode** Global Config

### 5.4.10.11. *Sflow poller interval*

The user can go to the CLI Interface Configuration Mode to set polling interval, use the **sflow poller interval <0-86400>** interface configuration command. A poll interval of zero (0) disables counter sampling. When set to zero (0), all the poller parameters are set to their corresponding default value. A value of N means once in N seconds a counter sample is generated.

**Format** sflow poller interval <0-86400>

**Default** 0

**Mode** Interface Config

**Note**: The sFlow task is heavily loaded when the sFlow polling interval is configured at the minimum value (i.e., one second for all the sFlow supported interfaces). In this case, the sFlow task is always busy collecting the counters on all the configured interfaces. This can cause the device to hang for some time when the user tries to configure or issue show sFlow commands. To overcome this situation, sFlow polling interval configuration on an interface or range of interfaces is controlled as mentioned below:

1. The maximum number of allowed interfaces for the polling intervals max (1, (interval – 10)) to min ((interval + 10), 86400) is: interval * 5
2. For every one second increment in the polling interval that is configured, the number of allowed interfaces that can be configured increases by 5.

### no set sflow interval

Use the **no sflow poller interval** return to default value zero.

**Format** no sflow poller interval

**Mode** Interface Config

## 5.4.10.12. *Sflow sampler index*

The user can go to the CLI Interface Configuration Mode to configure a new sFlow sampler instance associated with the specified sFlow Receiver, use the **sflow sampler <rcvr-index>** interface configuration command. A data source configured to collect flow samples is called a sampler. A value of zero (0) means that no receiver is configured, no packets will be sampled. Only active receivers can be set. If a receiver expires, then all samplers associated with the receiver will also expire.The range of <rcvr-index> is 1-8.

**Format** sflow sampler <rcvr-index>

**Default** None

**Mode** Interface Config

### no sflow sampler

Use the **no sflow sampler** return to default setting.

**Format** no sflow sampler

**Mode** Interface Config

## 5.4.10.13. *Sflow poller index*

The user can go to the CLI Interface Configuration Mode to configure a new sFlow poller instance associated with the specified sFlow Receiver, use the **sflow poller <rcvr-index>** interface configuration command. A data source configured to collect counter samples is called a poller. A value of zero (0) means that no receiver is configured. The range is 1-8.

**Format** sflow poller <rcvr-index>

**Default** 0

**Mode** Interface Config

## no sflow poller

Use the **no sflow poller** return to default setting.

**Format** no sflow poller

**Mode** Interface Config

### 5.4.10.14. *Sflow source-interface*

Use this command to specify the physical or logical routing interface to use as the sFlow client source interface. If configured, the address of source interface is used for all sFlow communications between the sFlow receiver and the sFlow client. Otherwise there is no change in behavior. If service port is configured as the source interface, sFlow packets will be transmitted via source port only. If the configured interface is down, the sFlow client falls back to normal behavior. User can go to the CLI Interface Configuration Mode to configure a new sFlow source interface, use the **sflow source-interface** global configuration command.

**Format** sflow source-interface {<slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vland-id>}

| Parameter | Definition |
|---|---|
| **<slot/port>** | Specifies the interface to use as the source interface. |
| **<loopback-id>** | Specifies the loopback interface to use as the source interface. The range of the loopback ID is 0 to 7. |
| **<tunnel-id>** | Specifies the tunnel interface to use as the source interface. The range of the tunnel ID is 0 to 7. |
| **<vlan-id>** | Specifies the VLAN interface to use as the source interface. The range of the VLAN ID is 1 to 4093. |
| **serviceport** | Specifies the service port as the outgoing interface. |

**Default** None

**Mode** Global Config

## no sflow source-interface

Use the **no sflow source-interface** remove the source interface setting

**Format** no sflow source-interface

**Mode** Global Config

### 5.4.10.15. *Sflow sampler rate*

The user can go to the CLI Interface Configuration Mode to configure the statistical sampling rate for packet sampling from this source, use the **sflow sampler rate <rate>** interface configuration command. A sampling rate of 1 counts all packets. A value of zero (0) disables sampling. A value of N means that out of N incoming packets, 1 packet will be sampled. The range is 1024-65536 and 0.

**Format** sflow sampler rate <rate>

**Default** 0

**Mode** Interface Config

### no sflow sampler rate

Use the **no sflow sampler rate** return to default setting.

**Format** no sflow sampler rate

**Mode** Interface Config

### 5.4.10.16. *Sflow sampler maxheadersize*

The user can go to the CLI Interface Configuration Mode to configure the maximum number of bytes that should be copied from the sampler packet., use the **sflow sampler maxheadersize <size>** interface configuration command. The range is 20-256. When set to zero (0), all the sampler parameters are set to their corresponding default value.

**Format** sflow sampler maxheadersize <size>

**Default** 128

**Mode** Interface Config

### no sflow sampler maxheadersize

Use the **no sflow sampler maxheadersize** return to default setting.

**Format** no sflow sampler maxheadersize

**Mode** Interface Config

## 5.4.11. Service Port Commands

### 5.4.11.1. *Show serviceport*

This command displays service port configuration information.

**Format** show serviceport

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Interface Status** | Indicates whether the interface is up or down. |
| **IP Address** | The IP address of the interface. The factory default value is 0.0.0.0. |
| **Subnet Mask** | The IP subnet mask for this interface. The factory default value is 0.0.0.0. |
| **Default Gateway** | The default gateway for this IP interface. The factory default value is 0.0.0.0. |
| **IPv6 Administrative Mode** | Whether enabled or disabled. Default value is enabled. |
| **IPv6 Prefix is** | The IPv6 address and length. Default is Link Local format. |
| **IPv6 Default Router** | The default gateway address on the service port. The factory default value is an unspecified address. |
| **Configured IPv4 Protocol** | Indicate what IPv4 network protocol was used on the last, or current power-up cycle, if any. |
| **Configured IPv6 Protocol** | Indicate what IPv6 network protocol was used on the last, or current power-up cycle, if any. |
| **IPv6 AutoConfig Mode** | Whether enabled or disabled. Default value is disabled. |
| **IPv6 Link-local Scope ID** | The scope ID for this interface |
| **Burned In MAC Address** | The burned in MAC address used for in-band connectivity. |

### 5.4.11.2. *Show serviceport ipv6 dhcp statistics*

This command displays the statistics of the DHCPv6 client running on the serviceport management interface.

**Format** show serviceport ipv6 dhcp statistics

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **DHCPv6 Advertisement Packets Received** | The number of DHCPv6 Advertisement packets received on the network. |
| **DHCPv6 Reply Packets Received** | The number of DHCPv6 Reply packets received on the network interface. |
| **Received DHCPv6 Advertisement Packets Discard** | The number of DHCPv6 Advertisement packets discarded on the network. |
| **Received DHCPv6 Reply Packets Discarded** | The number of DHCPv6 Reply packets discarded on the network interface. |
| **DHCPv6 Malformed Packets Received** | The number of DHCPv6 packets that are received malformed on the network interface. |
| **Total DHCPv6 Packets Received** | The total number of DHCPv6 packets received on the network interface. |
| **DHCPv6 Solicit Packets Transmitted** | The number of DHCPv6 Solicit packets transmitted on the network interface. |
| **DHCPv6 Request Packets Transmitted** | The number of DHCPv6 Request packets transmitted on the network interface |
| **DHCPv6 Renew Packets Transmitted** | The number of DHCPv6 Renew packets transmitted on the network interface. |
| **DHCPv6 Rebind Packets Transmitted** | The number of DHCPv6 Rebind packets transmitted on the network interface. |
| **DHCPv6 Release Packets Transmitted** | The number of DHCPv6 Release packets transmitted on the network interface. |
| **Total DHCPv6 Packets Transmitted** | The total number of DHCPv6 packets transmitted on the network interface. |

Example: The following shows example CLI display output for the command.

(QCT) #show serviceport ipv6 dhcp statistics

DHCPv6 Client Statistics

---

DHCPv6 Advertisement Packets Received..... 0

DHCPv6 Reply Packets Received..... 0

Received DHCPv6 Advertisement Packets Discard.. 0

Received DHCPv6 Reply Packets Discarded..... 0

DHCPv6 Malformed Packets Received..... 0

Total DHCPv6 Packets Received..... 0

DHCPv6 Solicit Packets Transmitted..... 0

DHCPv6 Request Packets Transmitted..... 0

DHCPv6 Renew Packets Transmitted..... 0

DHCPv6 Rebind Packets Transmitted..... 0

DHCPv6 Release Packets Transmitted..... 0

Total DHCPv6 Packets Transmitted..... 0

### 5.4.11.3. *Show serviceport ipv6 neighbors*

Use this command to display information about the IPv6 neighbor entries cached on the service port. The information is updated to show the type of the entry.

**Format** show serviceport ipv6 neighbors

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **IPv6 Address** | The IPv6 address of the neighbor. |
| **MAC Address** | The MAC Address of the neighbor. |
| **isRtr** | Shows if the neighbor is a router. If TRUE, the neighbor is a router; if FALSE, it is not a router. |

| | |
|---|---|
| **Neighbor State** | The state of the neighbor cache entry. The possible values are: Incomplete, Reachable, Stale, Delay, Probe, and Unknown. |
| **Age** | The time in seconds that has elapsed since an entry was added to the cache. |
| **Type** | The type of neighbor entry. The type is Static if the entry is manually configured and Dynamic if dynamically resolved. |

Example: The following shows example CLI display output for the command.

(QCT) #show serviceport ipv6 neighbors

| IPv6 Address | Type | MAC Address | isRtr | Neighbor State | Age (Secs) |
|---|---|---|---|---|---|
| fe80::290:e8ff:feaa:35 | Dynamic | 00:90:e8:aa:00:35 | True | Stale | 3 |
| fe80::a9e:1ff:feff:eed4 | Dynamic | 08:9e:01:ff:ee:d4 | True | Stale | 3 |

### 5.4.11.4. *Serviceport ip*

This command sets the IP address, the netmask and the gateway of the network management port.

**Format** serviceport ip {<ipaddr> <netmask> [<gateway>] | none}

| Parameter | Definition |
|---|---|
| **<ipaddr>** | user manually configures IP address for this switch. |
| **<netmask>** | The user manually configures Subnet Mask for this switch. |

**Default** None

**Mode** Global Config

### 5.4.11.5. *Serviceport protocol*

This command specifies the network management port configuration protocol. If you modify this value, the change is effective immediately. If you use the *dhcp* parameter, the switch periodically sends requests to a DHCP server until a response is received. If you use the *dhcp6* parameter, the switch periodically sends requests to a DHCPv6 server until a response is received. If you use the *none* parameter, you must configure the network information for the switch manually.

**Format** serviceport protocol {none [dhcp6] | dhcp [client-id | restart] | dhcp6 [restart]}

| Parameter | Definition |
|---|---|
| **none** | Disable the DHCP client on the sevice port. Option **dhcp6** is used to disable the DHCPv6 client on the service port. |
| **dhcp** | Periodically sends requests to a DHCP server until a response is received. Option **client-id** is used to send DHCP client messages with the client identifier option (DHCP Option 61). Option **restart** is used to restart DHCP client. |
| **dhcp6** | Periodically sends requests to a DHCPv6 server until a response is received. Option **restart** is used to restart DHCPv6 client. |

**Default** None

**Mode** Global Config

### 5.4.11.6. *Serviceport ipv6 enable*

Use this command to enable IPv6 operation on the service port.

**Format** serviceport ipv6 enable

**Default** None

**Mode** Global Config

### no serviceport ipv6 enable

command is disable IPv6 operation on the service port.

**Format** no serviceport ipv6 enable

**Mode** Global Config

### 5.4.11.7. *Serviceport ipv6 address*

Use this command to configure IPv6 global addressing (i.e. Default routers) information for the service port.

**i** Multiple IPv6 prefixes can be configured for the service port.

**Format** serviceport ipv6 address <address>/<prefix-length> [eui64]

| Parameter | Definition |
|---|---|
| **<address>** | IPv6 prefix in IPv6 global address format. |
| **<prefix-length>** | IPv6 prefix length value. |
| **[eui64]** | Formulate IPv6 address in eui64 address format. |

**Default** None

**Mode** Global Config

### no serviceport ipv6 address

This command remove all IPv6 prefixes on the service port interface.

**Format** no serviceport ipv6 address [<address>/<prefix-length>]

**Mode** Global Config

## 5.4.11.8. *Serviceport ipv6 gateway*

Use this command to configure IPv6 gateway (i.e. Default routers) information for the service port.

**i** Only a single IPv6 gateway address can be configured for the service port. There may be a combination of IPv6 prefixes and gateways that are explicitly configured and those that are set through auto-address configuration with a connected IPv6 router on their service port interface.

**Format** serviceport ipv6 gateway <gateway-address>

**Default** None

**Mode** Global Config

### no serviceport ipv6 gateway

This command removes IPv6 gateways on the service port interface.

**Format** no serviceport ipv6 gateway

**Mode** Global Config

## 5.4.12. Time Range Commands

### 5.4.12.1. *Show time-range*

Use this command to display a time range and all the absolute/periodic time entries that are defined for the time range. Use the name parameter to identify a specific time range to display. When name is not specified, all the time ranges defined in the system are displayed.

**Format** show time-range [<name>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Number of Time Ranges** | Number of time ranges configured in the system. |
| **Time Range Name** | Name of the time range. |
| **Time Range Status** | Status of the time range (active/inactive). |
| **Absolute start** | Start time and day for absolute time entry. |
| **Absolute end** | End time and day for absolute time entry. |
| **Periodic Entries** | Number of periodic entries in a time-range. |
| **Periodic start** | Start time and day for periodic entry. |
| **Periodic end** | End time and day for periodic entry. |

### 5.4.12.2. *Time-range*

Use this command to enable or disable the time range Admin mode.

**Format** time-range

**Default** None

**Mode** Global Config

### no time-range

This command sets the time-range Admin mode to disable.

**Format** no time-range

**Mode** Global Config

### 5.4.12.3. *Time-range <name>*

Use this command to create a time range identified by name, consisting of one absolute time entry and/or one or more periodic time entries. The name parameter is a case-sensitive, alphanumeric string from 1 to 31 characters that uniquely identifies the time range. An alpha-numeric string is defined as consisting of only alphabetic, numeric, dash, underscore, or space characters.

If a time range by this name already exists, this command enters Time-Range config mode to allow updating the time range entries

**Format** time-range <name>

| Parameter | Definition |
|---|---|
| **<name>** | time range name. |

**Default** None

**Mode** Global Config

### no time-range <name>

This command deletes a time-range identified by name.

**Format** no time-range <name>

**Mode** Global Config

### 5.4.12.4. *Absolute*

Use this command to add an absolute time entry to a time range. Only one absolute time entry is allowed per time-range. The time parameter is based on the currently configured time zone.

The [start time date] parameters indicate the time and date at which the configuration that referenced the time range starts going into effect. The time is expressed in a 24-hour clock, in the form of hours:minutes. For example, 8:00 is 8:00 am and 20:00 is 8:00 pm.

The date is expressed in the format day month year. If no start time and date are specified, the configuration statement is in effect immediately.

The [end time date] parameters indicate the time and date at which the configuration that referenced the time range is no longer in effect. The end time and date must be after the start time and date. If no end time and date are specified, the configuration statement is in effect indefinitely.

**Format** absolute {start <hh:mm> <1-31> <month> <1970-2035> [end <hh:mm> <1-31> <month> <1970-2035>] | end <hh:mm> <1-31> <month> <1970-2035>}

**Default** None

**Mode** Time-Range Config

### no absolute

This command deletes the absolute time entry in the time range.

**Format** no absolute

**Mode** Time-Range Config

## 5.4.12.5. *Periodic*

Use this command to add a periodic time entry to a time range. The time parameter is based off of the currently configured time zone.

The first occurrence of the days-of-the-week argument is the starting day(s) from which the configuration that referenced the time range starts going into effect. The second occurrence is the ending day or days from which the configuration that referenced the time range is no longer in effect. If the end days-of-the-week are the same as the start, they can be omitted

This argument can be any single day or combinations of days: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday. Other possible values are:

- daily — Monday through Sunday
- weekdays — Monday through Friday
- weekend — Saturday and Sunday

If the ending days of the week are the same as the starting days of the week, they can be omitted. The first occurrence of the time argument is the starting hours:minutes which the configuration that referenced the time range starts going into effect. The second occurrence is the ending hours:minutes at which the configuration that referenced the time range is no longer in effect.

The hours:minutes are expressed in a 24-hour clock. For example, 8:00 is 8:00 am and 20:00 is 8:00 pm.

**Format** periodic {days-of-the-week time} to {[days-of-the-week] time}

**Default** None

**Mode** Time-Range Config

### no periodic

This command deletes a periodic time entry from a time range.

**Format** no periodic {days-of-the-week time} to {[days-of-the-week] time}

**Mode** Time-Range Config

## 5.4.13. Command Scheduler Commands

### 5.4.13.1. *Kron Occurrences*

Kron Occurrence is defined as a scheduled event. Policy lists are configured to run after a period of time since the scheduling was set, or at a specified calendar date and time.

**Format** kron occurrence <name> {at <hh:mm> {<1-31> <month> <2000-2037>| <DAY> {oneshot | recurring}| oneshot | recurring} | in <ddd:hh:mm> {oneshot | recurring}}

| Parameter | Definition |
|---|---|
| **<name>** | Specifies a occurrence name. |
| **at** | Date of kron occurrence. |
| **<hh:mm>** | Time of day for occurrence. |
| **<1-31>** | Day of month. |
| **<month>** | Month of the year eg jan, feb, etc. |
| **<2000-2037>** | Specifies the year |
| **<DAY>** | Day of Week eg mon, tue, etc. |
| **oneshot** | Schedule kron occurrence exactly once. |
| **recurring** | Schedule kron occurrence repeatedly. |
| **in** | Delta time to kron occurrence. |
| **<ddd:hh:mm>** | Format is ddd:hh:mm. Valid Range for ddd: 0-999 hh: 0-23 mm: 0-59. |

**Default** None

**Mode** Global Config

### no kron occurrence <name>

This command deletes a scheduler event by the specific name.

**Format** no kron occurrence <name>

**Mode** Global Config

## 5.4.13.2. *Policy-list of Kron Occurrence*

This command associates a policy list with an occurrence. When the occurrence is fired, the policy-list will be executed. Maximum 16 policy-lists could be added into an occurrence.

**Format** policy-list <name>

**Default** None

**Mode** Kron Occurrence Config

### no policy-list <name>

This command dissociates the specified policy-list by name with the occurrence.

**Format** no policy-list <name>

**Mode** Kron Occurrence Config

## 5.4.13.3. *Kron Policy-list*

Policy lists consist of one or more lines of fully-qualified EXEC CLI commands. All commands in a policy list are executed when the policy list is run by Command Scheduler using the kron occurrence command.

The policy lists is run in the order in which it was configured. If an existing policy list name is used, new entries are added to the end of the policy list.

**Format** kron policy-list <name>

| Parameter | Definition |
|---|---|
| **<name>** | Specifies a occurrence name. |

**Default** None

**Mode** Global Config

### no kron policy-list <name>

This command deletes a policy list by the specific name.

**Format** no kron policy-list <name>

**Mode** Global Config

### 5.4.13.4. *CLI Command of Policy-list*

Specify the EXEC CLI commands to a policy list. Maximum 16 EXEC CLI commands could be added into a policy-list.

**Format** cli <LINE> <LINE> <LINE> ...

| Parameter | Definition |
|---|---|
| **<LINE>** | Exec level cli to be executed. |

**Default** None

**Mode** Kron Policy-list Config

### no cli <LINE> <LINE> <LINE> …

This command deletes a list of CLI command lines.

**Format** no cli <LINE> <LINE> <LINE> ...

**Mode** Kron Policy-list Config

## 5.4.14. Switch Database Management Template Commands

A Switch Database Management (SDM) template is a description of the maximum resources a switch or router can use for various features. Different SDM templates allow different combinations of scaling factors, enabling different allocations of resources depending on how the device is used. In other words, SDM templates enable you to reallocate system resources to support a different mix of features based on your network requirements.

### 5.4.14.1. *Show sdm prefer*

Use this command to display the current active SDM template and its scaling parameters, or to display the scaling parameters for an inactive template. When invoked with no optional keywords, this command lists the current active template and the template that will become active on the next reboot if it is different from the current active template. To list the scaling parameters of a specific template, use that template's keyword as an argument to the command.

**Format** show sdm prefer { dual-ipv4-and-ipv6 {alpm | data-center | dcvpn-data-center | default} | ipv4-routing {data-center {default | plus} | dcvpn-data-center | default}}

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **dual-ipv4-and-ipv6 alpm** | (Optional) Lists the scaling parameters for the alpm template. |
| **dual-ipv4-and-ipv6 data-center** | (Optional) Lists the scaling parameters for the Dual IPv4 and IPv6 template supporting more ECMP next hops. |
| **dual-ipv4-and-ipv6 dcvpn-data-center** | (Optional)Lists the scaling parameters for the Dual IPv4 and IPv6 template for the DCVPN feature. |
| **dual-ipv4-and-ipv6 default** | (Optional) Lists the scaling parameters for the template supporting IPv4 and IPv6. |
| **ipv4-routing data-center default** | (Optional) Lists the scaling parameters for the IPv4-only template supporting more ECMP next hops. |
| **ipv4-routing data-center plus** | (Optional) Lists the scaling parameters for the IPv4-only template maximizing the number of unicast routes and also supporting more ECMP next hops. |
| **ipv4-routing dcvpn-data-center** | (Optional) Lists the scaling parameters for the IPv4-only template for DCVPN feature. |
| **ipv4-routing default** | (Optional) Lists the scaling parameters for the IPv4-only template maximizing the number of unicast routes. |

### 5.4.14.2. *Sdm Prefer*

Use this command to change the template that will be active after the next reboot.

**Format** sdm perfer {dual-ipv4-and-ipv6 {alpm | data-center | dcvpn-data-center | default} | ipv4-routing {data-center {default | plus}| dcvpn-data-center | default}}

| Parameter | Definition |
|---|---|
| **dual-ipv4-and-ipv6 alpm** | Accommodate larger routes. |
| **dual-ipv4-and-ipv6 data-center** | Increase the number of ECMP next hops in each route to 32 and reduce the number of IPv4 and IPv6 unicast routes. |
| **dual-ipv4-and-ipv6 dcvpn-data-center** | Maximize the number of IPv4 and IPv6 unicast routes while supporting DCVPN feature. |
| **dual-ipv4-and-ipv6 default** | Maximize the number of IPv4 and IPv6 unicast routes while limiting the number of ECMP next hops in each route to 4. |
| **ipv4-routing data-center default** | Increase the number of ECMP next hops to 32 and reduce the number of IPv4 routes. |
| **ipv4-routing data-center plus** | Increase the number of ECMP next hops to 32 while keeping the maximum IPv4 routes. |
| **ipv4-routing dcvpn-data-center** | Maximize the number of IPv4 unicast routes while supporting DCVPN feature. |
| **ipv4-routing default** | Maximize the number of IPv4 unicast routes while limiting the number of ECMP next hops in each route to 4. |

**Default** dual-ipv4-and-ipv6 data-center

**Mode** Global Config

### no sdm prefer

This command reverts to the default template after the next reboot.

**Format** no sdm prefer

**Mode** Global Config

## 5.5. Spanning Tree Protocol Commands

This section describes the commands you use to configure Spanning Tree Protocol (STP). STP helps prevent network loops, duplicate messages, and network instability.

**Note**: STP is enabled on the switch and on all ports and LAGs by default.

**Note**: If STP is disabled, the system does not forward BPDU messages.

## 5.5.1. Show spanning-tree

This command displays spanning tree settings for the common and internal spanning tree. The following details are displayed.

**Format** show spanning-tree

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Bridge Priority** | Specifies the bridge priority for the Common and Internal Spanning tree (CST). The value lies between 0 and 61440. It is displayed in multiples of 4096. |
| **Bridge Identifier** | The bridge identifier for the CST. It is made up using the bridge priority and the base MAC address of the bridge. |
| **Time Since Topology Change** | Time in seconds. |
| **Topology Change Count** | Number of times changed. |
| **Topology Change in progress** | Boolean value of the Topology Change parameter for the switch indicating if a topology change is in progress on any port assigned to the common and internal spanning tree. |
| **Designated Root** | The bridge identifier of the root bridge. It is made up from the bridge priority and the base MAC address of the bridge. |
| **Root Path Cost** | Value of the Root Path Cost parameter for the common and internal spanning tree. |
| **Parameter** | **Definition** |
| **Root Port Identifier** | Identifier of the port to access the Designated Root for the CST |
| **Bridge Max Age** | Maximum message age. |
| **Bridge Max Hops** | The maximum number of hops for the spanning tree. |
| **Max Tx Hold Count** | The max value of bridge tx hold count for the spanning tree. |
| **Bridge Forwarding Delay** | A timeout value to be used by all Bridges in the Bridged LAN. The value of Forward Delay is set by the Root. |
| **Hello Time** | Configured value of the parameter for the CST. |
| **Bridge Hold Time** | Minimum time between transmission of Configuration Bridge Protocol Data Units (BPDUs). |
| **CST Regional Root** | Bridge Identifier of the CST Regional Root. It is made up using the bridge priority and the base MAC address of the bridge. |
| **Regional Root Path Cost** | Path Cost to the CST Regional Root. |

## 5.5.2. Show spanning-tree interface

This command displays the settings and parameters for a specific switch port within the common and internal spanning tree. The <slot/port> is the desired switch port. The following details are displayed on execution of the command.

**Format** show spanning-tree interface {<slot/port> | port-channel <portchannel-id>}

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Hello Time** | Admin hello time for this port. |
| **Port Mode** | Enabled or disabled. |
| **Auto Edge** | To enable or disable the feature that causes a port that has not seen a BPDU for edge delay time, to become an edge port and transition to forwarding faster. |
| **Port Up Time Since Counters Last Cleared** | Time since port was reset, displayed in days, hours, minutes, and seconds. |
| **STP BPDUs Transmitted** | Spanning Tree Protocol Bridge Protocol Data Units sent. |
| **STP BPDUs Received** | Spanning Tree Protocol Bridge Protocol Data Units received. |
| **RSTP BPDUs Transmitted** | Rapid Spanning Tree Protocol Bridge Protocol Data Units sent. |
| **RSTP BPDUs Received** | Rapid Spanning Tree Protocol Bridge Protocol Data Units received. |
| **MSTP BPDUs Transmitted** | Multiple Spanning Tree Protocol Bridge Protocol Data Units sent. |
| **MSTP BPDUs Received** | Multiple Spanning Tree Protocol Bridge Protocol Data Units received. |

## 5.5.3. Show spanning-tree vlan

This command displays the association between a VLAN and a multiple tree instance. The <vlan-id> corresponds to an existing VLAN ID. The <vlan-id> range is 1 to 4093.

**Format** show spanning-tree vlan <vlan-id>

**Default** None

**Mode** Privileged EXEC

User EXEC

Example: The following example shows the CLI display output for the command *show spanning-tree vlan1*.

(QCT) #show spanning-tree vlan 1

VLAN Identifier..... 1

Associated Instance..... CST

## 5.5.4. Show spanning-tree mst detailed

This command displays the detailed settings for an MST instance. The instance <0-4094> is a number that corresponds to the desired existing multiple spanning tree instance ID. The following details are displayed.

**Format** show spanning-tree mst detailed <mstid>

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **MST Instance ID** | The multiple spanning tree instance ID. |
| **MST Bridge Priority** | The bridge priority of current MST. |
| **MST Bridge Identifier** | The bridge ID of current MST. |
| **Time Since Topology Change** | In seconds. |
| **Topology Change Count** | Number of times the topology has changed for this multiple spanning tree instance. |
| **Topology Change in progress** | Value of the Topology Change parameter for the multiple spanning tree instance. |
| **Designated Root** | Identifier of the Regional Root for this multiple spanning tree instance. |
| **Root Path Cost** | Path Cost to the Designated Root for this multiple spanning tree instance. |
| **Root Port Identifier** | Port to access the Designated Root for this multiple spanning tree instance. |
| **Associated FIDs** | List of forwarding database identifiers associated with this instance. |
| **Associated VLANs** | List of VLAN IDs associated with this instance. |

## 5.5.5. Show spanning-tree mst summary

This command displays summary information about all multiple spanning tree instances in the switch. On execution, the following details are displayed.

**Format** show spanning-tree mst summary

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **MST Instance ID List** | List of multiple spanning trees IDs currently configured. |
| **For each MSTID:**<br>• **Associated FIDs**<br>• **Associated VLANs** | • List of forwarding database identifiers associated with this instance.<br>• List of VLAN IDs associated with this instance. |

## 5.5.6. Show spanning-tree mst port detailed

This command displays the detailed settings and parameters for a specific switch port within a particular multiple spanning tree instance. The parameter <mstid> is a number that corresponds to the desired existing multiple spanning tree instance. The <slot/port> is the desired switch port.

**Format** show spanning-tree mst port detailed <mstid> {<slot/port> | port-channel <portchannel-id>}

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **MST Instance ID** | The ID of the existing MST instance. |
| **Port Identifier** | The port identifier for the specified port within the selected MST instance. It is made up from the port priority and the interface number of the port. |
| **Port Priority** | The priority for a particular port within the selected MST instance. The port priority is displayed in multiples of 16. |
| **Port Forwarding State** | Current spanning tree state of this port. |
| **Port Role** | Each enabled MST Bridge Port receives a Port Role for each spanning tree. The port role is one of the following values: Root Port, Designated Port, Alternate Port, Backup Port, Master Port or Disabled Port. |
| **Auto-Calculate Port Path Cost** | Indicates whether auto calculation for port path cost is enabled. |
| **Port Path Cost** | Configured value of the Internal Port Path Cost parameter. |
| **Designated Root** | The Identifier of the designated root for this port. |
| **Designated Port Cost** | Path Cost offered to the LAN by the Designated Port. |
| **Designated Bridge** | Bridge Identifier of the bridge with the Designated Port. |
| **Designated Port Identifier** | Port on the Designated Bridge that offers the lowest cost to the LAN. |

If you specify 0 (defined as the default CIST ID) as the mstid, this command displays the settings and parameters for a specific switch port within the common and internal spanning tree. The slot/port is the desired switch port. In this case, the following are displayed.

| Parameter | Definition |
|---|---|
| **Port Identifier** | The port identifier for this port within the CST. |
| **Port Priority** | The priority of the port within the CST. |
| **Port Forwarding State** | The forwarding state of the port within the CST. |
| **Port Role** | The role of the specified interface within the CST. |
| **Auto-Calculate Port Path Cost** | Indicates whether auto calculation for port path cost is enabled or not (disabled). |
| **Port Path Cost** | The configured path cost for the specified interface. |
| **Auto-Calculate External Port Path Cost** | Indicates whether auto calculation for external port path cost is enabled. |
| **External Port Path Cost** | The cost to get to the root bridge of the CIST across the boundary of the region. This means that if the port is a boundary port for an MSTP region, then the external path cost is used. |
| **Designated Root** | Identifier of the designated root for this port within the CST. |
| **Designated Port Cost** | Path Cost offered to the LAN by the Designated Port. |
| **Designated Bridge** | The bridge containing the designated port. |

| | |
|---|---|
| **Designated Port Identifier** | Port on the Designated Bridge that offers the lowest cost to the LAN. |
| **Topology Change Acknowledgement** | Value of flag in next Configuration Bridge Protocol Data Unit (BPDU) transmission indicating if a topology change is in progress for this port. |
| **Hello Time** | The hello time in use for this port. |
| **Edge Port** | The configured value indicating if this port is an edge port. |
| **Edge Port Status** | The derived value of the edge port status. True if operating as an edge port; false otherwise. |
| **Point To Point MAC Status** | Derived value indicating if this port is part of a point to point link. |
| **CST Regional Root** | The regional root identifier in use for this port. |
| **CST Internal Root Path Cost** | The internal root path cost to the LAN by the designated external port. |

## 5.5.7. Show spanning-tree mst port summary

This command displays the settings of one or all ports within the specified multiple spanning tree instance. The parameter <mstid> indicates a particular MST instance. The <misted> range is 0 to 4096. The parameter <slot/port> indicates the desired switch port.

If you specify 0 (defined as the default CIST ID) as the mstid, the status summary displays for one or all ports within the common and internal spanning tree.

**Format** show spanning-tree mst port summary <mstid> [{<slot/port> | active | port-channel <portchannel-id>}]

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **MST Instance ID** | The MST instance associated with this port. |
| **Interface** | slot/port |
| **STP Mode** | Indicates whether spanning tree is enabled or disabled on the port. |
| **Type** | Currently not used. |
| **STP State** | The forwarding state of the port in the specified spanning tree instance. |
| **Port Role** | The role of the specified port within the spanning tree. |
| **Desc** | Indicates whether the port is in loop inconsistent state or not. |

## 5.5.8. Show spanning-tree summary

This command displays spanning tree settings and parameters for the switch. The following details are displayed on execution of the command.

**Format** show spanning-tree summary

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Spanning Tree Admin mode** | Enabled or disabled. |
| **Spanning Tree Version** | Version of 802.1 currently supported (IEEE 802.1s, IEEE 802.1w, or IEEE 802.1d) based upon the Force Protocol Version parameter. |
| **Configuration Name** | Identifier used to identify the configuration currently being used. |
| **Configuration Revision Level** | Identifier used to identify the configuration currently being used. |
| **Configuration Digest Key** | A generated Key used in the exchange of the BPDUs. |
| **Configuration Format Selector** | Specifies the version of the configuration format being used in the exchange of BPDUs. The default value is zero. |
| **MST Instances** | List of all multiple spanning tree instances configured on the switch. |

## 5.5.9. Show spanning-tree brief

This command displays spanning tree settings for the bridge. The following information appears.

**Format** show spanning-tree brief

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Bridge Priority** | Configured value. |
| **Bridge Identifier** | The bridge identifier for the selected MST instance. It is made up using the bridge priority and the base MAC address of the bridge. |
| **Bridge Max Age** | Configured value. |
| **Bridge Max Hops** | Bridge max-hops count for the device. |
| **Bridge Hello Time** | Configured value. |
| **Bridge Forward Delay** | Configured value. |
| **Bridge Hold Time** | Minimum time between transmission of Configuration Bridge Protocol Data Units (BPDUs). |

## 5.5.10. Spanning-tree

This command sets the spanning-tree operational mode to enabled.

**Note**: **If the MST is enabled with MLAG, MST must be enabled on both MLAG peer devices.**

**Format** spanning-tree

**Default** Enabled

**Mode** Global Config

### no spanning-tree

This command sets the spanning-tree operational mode to disabled. While disabled, the spanning-tree configuration is retained and can be changed, but is not activated.

**Format** no spanning-tree

**Mode** Global Config

## 5.5.11. Spanning-tree bpdu-forwarding

This command sets the BPDU forwarding mode.

**Format** spanning-tree bpdu-forwarding

**Default** Enabled

**Mode** Global Config

### no spanning-tree bpdu-forwarding

This command sets the BPDU forwarding mode to disabled.

**Format** no spanning-tree bpdu-forwarding

**Mode** Global Config

## 5.5.12. Spanning-tree protocol-migration

This command enables BPDU migration check on a given interface. The all option enables BPDU migration check on all interfaces.

**Format** spanning-tree protocol-migration {<slot/port> | port-channel <portchannel-id> | all}

**Default** None

**Mode** Global Config

## 5.5.13. Spanning-tree configuration name

This command sets the Configuration Identifier Name for use in identifying the configuration that this switch is currently using. The name is a string of up to 32 characters.

**Note**: **If the MST is enabled with MLAG, the Configuration Identifier Name must be the same on both MLAG peer devices.**

**Format** spanning-tree configuration name <name>

**Default** Base MAC address in hexadecimal notation

**Mode** Global Config

### no spanning-tree configuration name

This command sets the Configuration Identifier Name to “DEFAULT”.

**Format** no spanning-tree configuration name

**Mode** Global Config

## 5.5.14. Spanning-tree configuration revision

This command sets the Configuration Identifier Revision Level for use in identifying the configuration that this switch is currently using. The Configuration Identifier Revision Level is a number in the range of 0 to 65535.

**Format** spanning-tree configuration revision <0-65535>

**Default** 0

**Mode** Global Config

### no spanning-tree configuration revision

This command sets the Configuration Identifier Revision Level for use in identifying the configuration that this switch is currently using to the default value.

**Format** no spanning-tree configuration revision

**Mode** Global Config

## 5.5.15. Spanning-tree mode

This command configures global spanning tree mode per VLAN spanning tree. On a switch, only one mode can be enabled at a time.

**Note: Both RSTP and MSTP can be enabled with MLAG. The configuration of RSTP and MSTP on peers of MLAG must be the same to guarantee that MLAG can work correctly. If you configure one peer of MLAG as RSTP, the other peer must be RSTP. The same as MSTP.**

**Format** spanning-tree mode {mstp | rstp}

**Default** mstp

**Mode** Global Config

### no spanning-tree mode

This command globally configures the switch to the default spanning-tree mode, MSTP.

**Format** no spanning-tree mode

**Mode** Global Config

## 5.5.16. Spanning-tree forward-time

This command sets the Bridge Forward Delay parameter to a new value for the common and internal spanning tree. The forward-time value is in seconds within a range of 4 to 30, with the value being greater than or equal to “(Bridge Max Age / 2) + 1”.

**Format** spanning-tree forward-time <4-30>

**Default** 15

**Mode** Global Config

### no spanning-tree forward-time

This command sets the Bridge Forward Delay parameter for the common and internal spanning tree to the default value.

**Format** no spanning-tree forward-time

**Mode** Global Config

## 5.5.17. Spanning-tree max-age

This command sets the Bridge Max Age parameter to a new value for the common and internal spanning tree. The max-age value is in seconds within a range of 6 to 40, with the value being less than or equal to “2 times (Bridge Forward Delay - 1)” and greater than or equal to “2 times (Bridge Hello Time + 1)”.

**Format** spanning-tree max-age <6-40>

**Default** 20

**Mode** Global Config

### no spanning-tree max-age

This command sets the Bridge Max Age parameter for the common and internal spanning tree to the default value.

**Format** no spanning-tree max-age

**Mode** Global Config

## 5.5.18. Spanning-tree forward-time max-age

This command sets the Bridge Forward Delay and Max Age parameter to a new value for the common and internal spanning tree.

**Format** spanning-tree forward-time <4-30> max-age <6-40>

**Default** forward-time: 15

max-age: 20

**Mode** Global Config

## 5.5.19. Spanning-tree max-hops

This command sets the MSTP Max Hops parameter to a new value for the common and internal spanning tree. The max-hops value is a range from 6 to 40.

**Format** spanning-tree max-hops <6-40>

**Default** 20

**Mode** Global Config

### no spanning-tree max-hops

This command sets the Bridge Max Hops parameter for the common and internal spanning tree to the default value.

**Format** no spanning-tree max-hops

**Mode** Global Config

## 5.5.20. Spanning-tree hold-count

This command sets the Bridge Tx Hold Count parameter to a new value for the common and internal spanning tree. The Tx Hold Count value is in a range of 1 to 10.

**Format** spanning-tree hold-count <1-10>

**Default** 6

**Mode** Global Config

### no spanning-tree hold-count

This command sets the Bridge Tx Hold Count parameter for the common and internal spanning tree to the default value.

**Format** no spanning-tree hold-count

**Mode** Global Config

## 5.5.21. Spanning-tree mst instance

This command adds a multiple spanning tree instance to the switch. The parameter mstid is a number within a range of 1 to 4094 that corresponds to the new instance ID to be added. The maximum number of multiple instances supported by the switch is 4.

**Format** spanning-tree mst instance <mstid>

**Default** None

**Mode** Global Config

### no spanning-tree mst instance

This command removes a multiple spanning tree instance from the switch and reallocates all VLANs allocated to the deleted instance to the common and internal spanning tree. The parameter mstid is a number that corresponds to the desired existing multiple spanning tree instance to be removed.

**Format** no spanning-tree mst instance <mstid>

**Mode** Global Config

## 5.5.22. Spanning-tree mst priority

This command sets the bridge priority for a specific multiple spanning tree instance. The parameter mstid <0-4094> is a number that corresponds to the desired existing multiple spanning tree instance. The priority value is a number within a range of 0 to 61440 in increments of 4096.

If you specify 0 (defined as the default CIST ID) as the mstid, this command sets the Bridge Priority parameter to a new value for the common and internal spanning tree. The bridge priority value is a number within a range of 0 to 61440. The twelve least significant bits are masked according to the 802.1s specification. This causes the priority to be rounded down to the next lower valid priority.

**Format** spanning-tree mst priority <mstid> <0-61440>

**Default** 32768

**Mode** Global Config

### no spanning-tree mst priority

This command sets the bridge priority for a specific multiple spanning tree instance to the default value. The parameter mstid <0-4094> is a number that corresponds to the desired existing multiple spanning tree instance.

If 0 (defined as the default CIST ID) is passed as the mstid, this command sets the Bridge Priority parameter for the common and internal spanning tree to the default value.

**Format** no spanning-tree mst priority <mstid>

**Mode** Global Config

## 5.5.23. Spanning-tree mst vlan

This command adds an association between a multiple spanning tree instance and one or more VLANs so that the VLAN(s) are no longer associated with the common and internal spanning tree. The parameter mstid <0-4094> is a number that corresponds to the desired existing multiple spanning tree instance. The vlan-list can be specified as a single VLAN, a list, or a range of values. To specify a list of VLANs, enter a list of VLAN IDs, each separated by a comma with no spaces in between. To specify a range of VLANs, separate the beginning and ending VLAN ID with a dash (-). The VLAN IDs may or may not exist in the system.

**Format** spanning-tree mst vlan <mstid> <vlan-list>

**Mode** Global Config

### no spanning-tree mst vlan

This command removes an association between a multiple spanning tree instance and one or more VLANs so that the VLAN(s) are again associated with the common and internal spanning tree.

**Format** no spanning-tree mst vlan <mstid> <vlan-list>

**Mode** Global Config

## 5.5.24. Spanning-tree mst

This command sets the Path Cost or Port Priority for this port within the multiple spanning tree instance or in the common and internal spanning tree. If you specify an mstid <0-4094> parameter that corresponds to an existing multiple spanning tree instance, the configurations are done for that multiple spanning tree instance. If you specify 0 (defined as the default CIST ID) as the mstid, the configurations are done for the common and internal spanning tree instance.

If you specify the cost option, the command sets the path cost for this port within a multiple spanning tree instance or the common and internal spanning tree instance, depending on the mstid parameter. You can set the path cost as a number in the range of 1 to 200000000 or auto. If you select auto the path cost value is set based on Link Speed.

If you specify the port-priority option, this command sets the priority for this port within a specific multiple spanning tree instance or the common and internal spanning tree instance, depending on the mstid parameter. The port-priority value is a number in the range of 0 to 240 in increments of 16.

**Note**: **If the MST is enabled with MLAG, the path cost of the MLAG peer-link cannot be modified.**

**Format** spanning-tree mst <mstid> {{cost <1-200000000> | auto} | port-priority <0-240>}

**Default** cost: auto

port-priority: 128

**Mode** Interface Config

### no spanning-tree mst

This command sets the Path Cost or Port Priority for this port within the multiple spanning tree instance, or in the common and internal spanning tree to the respective default values. If you specify an mstid parameter that corresponds to an existing multiple spanning tree instance, you are configuring that multiple spanning tree instance. If you specify 0 (defined as the default CIST ID) as the mstid, you are configuring the common and internal spanning tree instance.

If you specify cost, this command sets the path cost for this port within a multiple spanning tree instance or the common and internal spanning tree instance, depending on the mstid parameter, to the default value, i.e., a path cost value based on the Link Speed.

If you specify port-priority, this command sets the priority for this port within a specific multiple spanning tree instance or the common and internal spanning tree instance, depending on the mstid parameter, to the default value.

**Format** no spanning-tree mst <mstid> {cost | port-priority}

**Mode** Interface Config

## 5.5.25. Spanning-tree port mode

This command sets the Administrative Switch Port State for this port to enabled.

**Format** spanning-tree port mode

**Default** Enabled

**Mode** Interface Config

### no spanning-tree port mode

This command sets the Administrative Switch Port State for this port to disabled.

**Format** no spanning-tree port mode

**Mode** Interface Config

## 5.5.26. Spanning-tree port model all

This command sets the Administrative Switch Port State for all ports to enabled.

**Format** spanning-tree port mode all

**Default** Enabled

**Mode** Global Config

### no spanning-tree port mode all

This command sets the Administrative Switch Port State for all ports to disabled.

**Format** no spanning-tree port mode all

**Mode** Global Config

## 5.5.27. Spaning-tree auot-edge

Use this command to allow the interface to become an edge port if it does not receive any BPDUs within a given amount of time.

**Format** spanning-tree auto-edge

**Default** Enabled

**Mode** Interface Config

### no spanning-tree auto-edge

This command resets the auto-edge status of the port to the default value.

**Format** no spanning-tree auto-edge

**Mode** Interface Config

## 5.5.28. Spanning-tree cost

Use this command to configure the external path cost for port used by a MST instance. When the auto keyword is used, the path cost from the port to the root bridge is automatically determined by the speed of the interface. To configure the cost manually, specify a cost value from 1 – 200000000.

**Note**: **If the MST is enabled with MLAG, the path cost of the MLAG peer-link cannot be modified.**

**Format** spanning-tree cost {<cost> | auto}

**Default** Auto

**Mode** Interface Config

### no spanning-tree cost

This command resets the path cost to the default value.

**Format** no spanning-tree cost

**Mode** Interface Config

## 5.5.29. Spanning-tree edgeport

This command specifies that an interface is an Edge Port within the common and internal spanning tree. This allows this port to transition to Forwarding State without delay.

**Format** spanning-tree edgeport

**Mode** Interface Config

### no spanning-tree edgeport

This command specifies that this port is not an Edge Port within the common and internal spanning tree.

**Format** no spanning-tree edgeport

**Mode** Interface Config

## 5.5.30. Spanning-tree edgeport bpduguard

This command sets the Edgeport BPDU Guard enable/disable parameter on this switch.

**Format** spanning-tree edgeport bpduguard

**Default** Disabled

**Mode** Global Config

### no spanning-tree edgeport bpduguard

This command sets the Edgeport BPDU Guard to the default value that is disabled.

**Format** no spanning-tree edgeport bpduguard

**Mode** Global Config

## 5.5.31. Spanning-tree bpduguard

Use this command to enable BPDU Guard on an interface.

**Format** spanning-tree bpduguard

**Default** Disabled

**Mode** Interface Config

### no spanning-tree bpduguard

Use this command to disable BPDU Guard on the interface.

**Format** no spanning-tree bpduguard

**Mode** Interface Config

## 5.5.32. Spanning-tree guard

Use this command to select whether loop guard or root guard is enabled on an interface or range of interfaces.

**Format** spanning-tree guard {loop | root}

| Parameter | Definition |
|---|---|
| **loop** | This command sets the Guard Mode to loop guard on this interface. |
| **root** | This command sets the Guard Mode to root guard on this interface. |

**Default** Disabled

**Mode** Interface Config

### no spanning-tree guard

Use this command to disable loop guard or root guard on the interface.

**Format** no spanning-tree guard

**Mode** Interface Config

## 5.5.33. Spanning-tree tcnguard

Use this command to enable TCN guard on the interface. When enabled, TCN guard restricts the interface from propagating any topology change information received through that interface.

**Format** spanning-tree tcnguard

**Default** Enabled

**Mode** Interface Config

### no spanning-tree tcnguard

Use this command to reset the TCN guard status of the port to the default value.

**Format** no spanning-tree tcnguard

**Mode** Interface Config

## 5.6. System Log Commands

### 5.6.1. Show logging

This command displays configurations of logging application.

**Format** show logging

**Default** None

**Mode** Privileged Exec

Example:

```
(QCT) #show logging

Logging Client Local Port          : 514
Logging Client Source Interface    : (not configured)
CLI Command Logging                : disabled
Console Logging                    : enabled
Console Logging Severity Filter    : error
Buffered Logging                   : enabled
Buffered Logging Severity Filter   : info
Persistent Logging                 : disabled
Persistent Logging Severity Filter : alert

Syslog Logging                     : disabled
Syslog Logging Facility            : user

Terminal Monitor                   : disabled
Terminal Logging Severity Filter   : warning

Log Messages Received              : 139
Log Messages Dropped               : 0
Log Messages Relayed               : 0

Log Command Messages Received      : 2

(QCT) #
```

### 5.6.2. Show logging buffered

This command displays the log messages which record system operating and tracing information. The log buffered messages store in memory, therefore, it isn't retained across a switch reset.

**Format** show logging buffered

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show logging buffered

Buffered (In-Memory) Logging : enabled
Buffered Logging Wrapping Behavior : On
Buffered Log Count : 33

Apr 28 19:35:09: %1-6-NIM: [396203556] nim_rif.c(352) 117 %% Set expandable port 0/50 count set to 1
Apr 28 19:35:09: %1-6-NIM: [396203556] nim_rif.c(352) 116 %% Set expandable port 0/49 count set to 1
Apr 28 19:35:05: %1-5-TRAPMGR: [397164180] traputil.c(797) 115 %% Temperature state change alarm: Unit Number: 1 Current: Normal, Previous: None
Apr 28 19:34:59: %1-5-TRAPMGR: [396792620] traputil.c(755) 114 %% Succeeded User Login: Console started for user admin connected from EIA-232.
Apr 28 19:34:57: %1-5-TRAPMGR: [396792620] traputil.c(755) 113 %% Entity Database: Configuration Changed
Apr 28 19:34:52: %1-2-General: [1212183788] Boot!(0) 112 %% Event(0xaaaaaaaa)
Apr 28 19:34:52: %1-6-AUTO_INST: [1212183788] auto_install_control.c(1374) 111 %% AutoInstall is stopped.
Apr 28 19:34:52: %1-5-SIM: [1212183788] sim_util.c(3841) 110 %% Switch firmware operational: LY8, Runtime Code 5.4.01.10, Linux 3.8.13-rt9, U-Boot 2010.12 (Oct 03 2014 - 14:38:07) - ONIE 2014.05.03-7
Apr 28 19:34:52: %1-5-TRAPMGR: [396792620] traputil.c(755) 109 %% Link Down: VLAN- 1
Apr 28 19:34:52: %1-5-SIM: [1212183788] sim_svc_port.c(334) 108 %% Service port IPv4 address has been set to 192.168.2.10.
Apr 28 19:34:52: %1-5-SIM: [1212183788] sim_svc_port.c(334) 107 %% Service port IPv4 address has been set to 0.0.0.0.
Apr 28 19:34:52: %1-6-CLI_WEB: [1212183788] sysapi.c(2844) 106 %% Configuration file <startup-config> read from flash!
Apr 28 19:34:51: %1-5-IP: [396819460] openr_policy.c(1438) 99 %% Added RPPI routing policy client ospf:0.
Apr 28 19:34:51: %1-6-CLI_WEB: [1212183788] cli_txtcfg.c(542) 98 %% Configuration applied from file <startup-config>
Apr 28 19:34:51: %1-6-CLI_WEB: [1212183788] sysapi.c(2844) 97 %% Configuration file <startup-config> read from flash!

Apr 28 19:34:50: %1-6-General: [1209039980] procmgr.c(800) 94 %% Application Started (opensshd, ID = 8, PID = 936
Apr 28 19:34:50: %1-5-General: [1209039980] procmgr.c(2436) 93 %% Administrative Command:app-start opensshd
Apr 28 11:34:49: %1-6-DOT3AD: [396784740] dot3ad_cnfgr.c(1192) 20 %% Tech Support Registration failed for DOT3AD related commands
Apr 28 11:34:45: %1-6-General: [1209039980] procmgr.c(800) 19 %% Application Started (traceroute-0, ID = 12, PID = 916
Apr 28 11:34:45: %1-5-General: [1209039980] procmgr.c(2436) 18 %% Administrative Command:app-start traceroute-0
Apr 28 11:34:45: %1-6-General: [1209039980] procmgr.c(800) 17 %% Application Started (ping-0, ID = 11, PID = 909
Apr 28 11:34:45: %1-5-General: [1209039980] procmgr.c(2436) 16 %% Administrative Command:app-start ping-0
Apr 28 11:34:44: %1-5-OSAPI: [1289614252] osapi_monitor.c(145) 15 %% Watchdog timer is started.
Apr 28 11:34:44: %1-6-General: [1209039980] procmgr.c(800) 14 %% Application Started (ospf-00, ID = 10, PID = 851
Apr 28 11:34:44: %1-5-General: [1209039980] procmgr.c(2436) 13 %% Administrative Command:app-start ospf-00 0
Apr 28 11:34:44: %1-6-General: [1209039980] procmgr.c(800) 12 %% Application Started (vr-agent-0, ID = 9, PID = 845
Apr 28 11:34:44: %1-5-General: [1209039980] procmgr.c(2436) 10 %% Administrative Command:app-start vr-agent-0
Apr 28 11:34:44: %1-6-VR_AGENT: [1289691836] vr_agent_api.c(73) 7 %% initialized the clnt addr:/tmp/fpcvragent.00,family:1
Apr 28 11:34:43: %1-1-SIM: [1289691836] sim_util.c(3877) 5 %% Switch was reset due to operator intervention.
Apr 28 11:34:43: %1-5-BSP: [396148460] bootos.c(178) 4 %% BSP initialization complete, starting switch firmware.
Apr 28 11:34:35: %1-5-General: [396148460] sdm_template_mgr.c(494) 3 %% Booting with default SDM template Data Center - IPv4 and IPv6.
Apr 28 11:34:34: %1-6-General: [1209039980] procmgr.c(3677) 2 %% Application Terminated (user.start, ID = 7, PID = 686
Apr 28 11:34:33: %1-1-General: [396148460] usmdb_sim.c(3921) 1 %% Reboot 1 (0x1)

(QCT) #

### 5.6.3. Logging buffered

This command is used to enable or disable logging to in-memory log.

**Format** [no] logging buffered

**Default** Enabled

**Mode** Global Config

## 5.6.4. Logging buffered severity level

This command sets logging severity level. The logging buffered only records the messages which of level is equal or above severity level.

The parameters “severitylevel” could be specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

**Format** logging buffered [<severitylevel keyword> | <0 ~ 7>]

**Default** Info

**Mode** Global Config

Example: Below two examples are some configurations, it sets severity level of logging buffered to warning.

(QCT) #logging buffered 4

(QCT) #logging buffered warning

## 5.6.5. Logging buffered wrap

This command enables wrapping of in-memory logging, it will overwrite old log records when full capacity reached. Otherwise when full capacity is reached, logging stops.

**Format** [no] logging buffered wrap

**Default** Enabled

**Mode** Global Config

## 5.6.6. Clear logging buffered

This command clears all in-memory logs.

**Format** clear logging buffered

**Default** None

**Mode** Privilege EXEC

## 5.6.7. Show logging traplogs

This command displays the trap log maintained by the switch. Trap log is not retained across a switch reset.

**Format** show logging traplogs

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show logging traplogs

Number of Traps Since Last Reset..... 5

Trap Log Capacity..... 256

Number of Traps Since Log Last Viewed..... 5

Log System Up Time Trap

--- ---------- ----------

0 Apr 28 19:35:51 2000 Cold Start: Unit: 0

1 Apr 28 19:35:05 2000 Temperature state change alarm: Unit Number: 1

Current: Normal, Previous: None

2 Apr 28 19:34:59 2000 Succeeded User Login: Console started for user

admin connected from EIA-232.

3 Apr 28 19:34:57 2000 Entity Database: Configuration Changed

4 Apr 28 19:34:52 2000 Link Down: VLAN- 1

(QCT) #

## 5.6.8. Show logging hosts

This command displays the configuration of logging hosts.

**Format** show logging hosts

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show logging hosts

Index IP Address/Hostname Type Severity Port Status

----- ---------- ---------- ---------- ------ -------------

1 10.1.1.100 ipv4 critical 514 Active

2 logging-server.test.dep dns critical 514 Active

(QCT) #

## 5.6.9. Logging host

This command is used to add addresses of remote log hosts.

The parameter “<hostaddress|hostname>” could be IPv4 address, or IPv6 address, or domain name. This parameter needs to match next parameter {dns | ipv4 | ipv6} to clarify its format.

The parameter “<port>” means the service port number of remote log host.

The parameters “severitylevel” could be specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

**Format** logging host <hostaddress|hostname> {{dns | ipv4 | ipv6} [<port>] [<severitylevel>]}

**Default** <port> is 514
<severitylevel> is critical

**Mode** Global Config

Example: Adds two logging hosts: first one uses the format of IPv4 address, default port and, default severity level; second one uses the format of domain name, assigns server port to 514 and severity level to critical (2).

(QCT) #configure

(QCT) (Config)#logging host 10.1.1.100 ipv4

(QCT) (Config)#logging host logging-server.test.dep dns 514 2

## 5.6.10. Logging host remove

This command is used to remove a remote log host.

The parameter “<hostindex>” means logging host Index which could be found in the output of “show logging hosts".

**Format** logging host remove <hostindex>

**Default** None

**Mode** Global Config

Example: Remove an existing log host which of index is 1.

(QCT) #configure

(QCT) (Config)#logging host remove 1

## 5.6.11. Logging host reconfigure

This command is used to reconfigure the setting of existing log host.

The parameter “<hostindex>” means logging host Index which could be found in the output of “show logging hosts".

The parameter “<hostaddress|hostname>” could be IPv4 address, or IPv6 address, or domain name.

The parameter “<port>” means the service port number of remote log host.

The parameters “severitylevel” could be specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

**Format** logging host reconfigure <hostindex> {<hostaddress|hostname> | port <port> | severitylevel <severitylevel>}

**Default** None

**Mode** Global Config

Example: Changes the address of index 1 logging host to IPv4 address 2.2.2.2.

(QCT) #configure

(QCT) (Config)# logging host reconfigure 1 2.2.2.2

## 5.6.12. Logging syslog

This command enables or disables syslog logging.

**Format** [no] logging syslog

**Default** Disabled

**Mode** Global Config

## 5.6.13. Logging syslog port

This command sets the local port number of the log client for logging messages.

**Format** [no] logging syslog port <portid>

**Default** 514

**Mode** Global Config

## 5.6.14. Logging syslog facility

This command sets the default facility used in syslog messages for components that do not have an internally assigned facility.

The parameter “<facility>” can be one of the following keywords: kernel, user, mail, system, security, syslog, lpr, nntp, uucp, cron, auth, ftp, ntp, audit, alert, clock, local0, local1, local2, local3, local4, local5, local6, local7, all.

**Format** logging syslog facility <facility>

**Default** user

**Mode** Global Config

## 5.6.15. Logging syslog source-interface

This command is used to specify the physical or logical interface to use as the Syslog client source interface. If configured, the address of source interface is used for all Syslog communications between the Syslog server and the Syslog client. Otherwise there is no change in behavior. If the configured interface is down, the Syslog client falls back to normal behavior.

**Format** logging syslog source-interface {<slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}

no logging syslog source-interface

**Default** not configure

**Mode** Global Config

## 5.6.16. Logging console

This command enables or disables to print log message to console.

**Format** [no] logging console

**Default** Enabled

**Mode** Global Config

## 5.6.17. Logging console severity level

This command sets the severity level of logging console. The logging console only prints the messages which of level is equal or above severity level.

The parameters “severitylevel” could be specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

**Format** logging console [<severitylevel keyword> | <0 ~ 7>]

**Default** Info

**Mode** Global Config

Example: Below two examples are some configurations, it sets severity level of logging console to warning.

(QCT) #logging console 4

(QCT) #logging console warning

## 5.6.18. Logging monitor

This command is used to enable or disable global configuration of terminal monitor. When logging monitor is enabled and terminal session (e.g. Telnet or SSH session) enables configuration of “terminal monitor”, the log messages will print to terminal session.

**Format** [no] logging monitor

**Default** Disabled

**Mode** Global Config

## 5.6.19. Logging monitory severity level

This command sets the severity level of logging monitor. The logging monitor only prints the messages which of level is equal or above severity level.

The parameters “severitylevel” could be specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

**Format** logging monitor [<severitylevel keyword> | <0 ~ 7>]

**Default** Info

**Mode** Global Config

Example: Below two examples are some configurations, it sets severity level of logging monitor to warning.

(QCT) #logging monitor 4

(QCT) #logging monitor warning

## 5.6.20. Show logging cli-command-log

This command displays the logging configuration and the received cli command messages.

The log may not show in time order since QNOS only keeps the last 5000 logs in file and the new log entries overwrite the old ones when the logs number is more than 5000.

**Format** show logging cli-command-log

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show logging cli-command-log

CLI Command Logging : enabled

CLI Command Log Maximum : 5000

CLI Command Log Current Count : 8

Jun 22 18:44:26: %Switch-1-LOG: [0xf7800754] 1 %% CLI:EIA-232:admin:clear cli-command-log

Jun 22 18:50:15: %Switch-1-LOG: [0xdf956804] 2 %% CLI:EIA-232:admin:Disconnected due to Idle Timeout

Jun 22 18:57:18: %Switch-1-LOG: [0xf7800754] 3 %% CLI:EIA-232:admin:User admin logged in

Jun 22 19:05:36: %Switch-1-LOG: [0xf7800754] 4 %% CLI:EIA-232:admin:show logging cli-command-log

Jun 22 19:06:28: %Switch-1-LOG: [0xf7800754] 5 %% CLI:EIA-232:admin:configure

Jun 22 19:06:34: %DUT-1-LOG: [0xf7800754] 6 %% CLI:EIA-232:admin:hostname DUT

Jun 22 19:06:40: %DUT-1-LOG: [0xf7800754] 7 %% CLI:EIA-232:admin:hostname DUT

Jun 22 19:06:59: %Test-1-LOG: [0xf7800754] 8 %% CLI:EIA-232:admin:hostname Test

(QCT) #

## 5.6.21. Logging cli-command

This command is used to enable or disable system logs the cli-command history to a file in global configuration mode.

QNOS supports up to 5000 entries in cli-command history log. If the logs are more than 5000 entries, QNOS removes the oldest log and writes the new entry. All the entries have the time stamp for reference.

**Format** [no] logging cli-command

**Default** Enabled

**Mode** Global Config

### 5.6.22. Clear cli-command-log

This command is used to reset the CLI command log file and the count of received commands.

QNOS only clears and resets the cli-command history log by this command. No matter the logging cli-command function is enabled or not, users can clear the history log file.

**Format** clear cli-command-log

**Default** None

**Mode** Privileged Exec

## 5.7. Email Alert and Mail Server Commands

Email Alert is an extension of the logging system. This feature can immediately send urgent log messages to a specified mail address by email. It also can send non-urgent log messages created in a specified interval to a specified address. If there is no buffer to keep non-urgent log messages in the specified interval, the log messages will be sent and cleared.

### 5.7.1. Show logging email config

This command displays the configurations of email alert.

**Format** show logging email config

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show logging email config

Email Alert Logging..... enabled

Email Alert From Address..... support@quantaqct.com

Email Alert Urgent Severity Level..... alert

Email Alert Non Urgent Severity Level..... warning

Email Alert Trap Severity Level..... info

Email Alert Notification Period..... 30 min

Email Alert To Address Table:

For Msg Type ..... urgent

Address1 ..... test01@email.com

For Msg Type ..... non-urgent

Address1 ..... test02@email.com

Email Alert Subject Table:

For Msg Type urgent, subject is..... Urgent Log Messages

For Msg Type non-urgent, subject is..... Non Urgent Log Messages

(QCT) #

## 5.7.2. Show logging email statistics

This command displays the statistics of email alert.

**Format** show logging email statistics

**Default** None

**Mode** Privileged Exec

Example:

(QCT) (Config)#show logging email statistics

Email Alert operation status..... enabled

Email Alert Statistics:

No of email Failures so far..... 1

No of email sent so far..... 3

Time since last email Sent..... 00 days 00 hours 00 mins 29 secs

(QCT) (Config)#

## 5.7.3. Show mail-server config

This command displays information about email server configuration.

**Format** show mail-server {<ip-address | hostname> | all} config

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show mail-server all config

Mail Servers Configuration:

No of mail servers configured..... 1

Email Alert Mail Server Address..... smtp.gmail.com

Email Alert Mail Server Port..... 465

Email Alert Security Protocol..... tlsv1

Email Alert Username..... mailServerUser01

Email Alert Password.....
0a77c48805905753daf5bc3a0586f3d0c85a6b8eef530a5a03abde19cf116847b01b9950a2cedc3d0e0b33db8b1c5
eec8a5dab6cc70d5052893934d53af97a8a

(QCT) (Config)#

## 5.7.4. Logging mail

This command enables or disables email alerting function.

**Format** [no] logging email

**Default** Disabled

**Mode** Global Config

## 5.7.5. Logging email urgent and non-urgent

This command sets the lowest serverity level for which log messages are emailed. If you specify a severity level, log messages at or above this severity level, but below the urgent severity level, are emailed in a non-urgent manner by collecting them together until the log time expires. You can specify the *severitylevel* value as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency(0), alert(1), critical(2), error(3), warning(4), notice(5), info(6), or debug(7).

**Format** logging email {urgent | non-urgent} {<severity> | none}

no logging email {urgent | non-urgent}

**Default** Urgent severity level is alert(1)

Non-Urgent severity level is warning (4)

**Mode** Global Config

Example: Set severity level of urgent mail to critical(2), and set severity level of non-urgent mail to notice(5).

(QCT) #configure

(QCT) (Config)#logging email urgent 2

(QCT) (Config)# logging email non-urgent 5

## 5.7.6. Logging email logtime

This command is used to configure how frequently non-urgent email messages are sent. Non-urgent messages are collected and sent in a batch email at the specified interval.

The parameter “<interval>“ uses to Specify how frequently non-urgent email messages are sent. The valid interval is 30 to 1440 minutes.

**Format** logging email logtime <interval>

no logging email logtime

**Default** 30

**Mode** Global Config

## 5.7.7. Logging email message-type and subject

This command is used to configure the subject line of the email for the specified type.

The parameter “<subject>“ sets the subject line of the email.

**Format** logging email message-type {both | urgent | non-urgent} subject <subject>

no logging email message-type {both | urgent | non-urgent} subject

**Default** type urgent is “Urgent Log Messages”

type non-urgent is “Non Urgent Log Messages”

**Mode** Global Config

## 5.7.8. Logging email message-type and to-addr

This command is used to configure the destination email address to which messages are sent. The message types supported are urgent, non-urgent, and both. For each supported severity level, multiple email addresses can be configured.

The parameter “<to-addr>“ specifies a standard email address to be the destination address of urgent or non-urgent message.

**Format** [no] logging email message-type {both | urgent | non-urgent} to-addr <to-addr>

**Default** None

**Mode** Global Config

Example: Add an email address “toAddr01@email.com” to the destination address of urgent message, and add another email address “toAddr02@email.com” to the destination address of both urgent and non-urgent message.

(QCT) #configure

(QCT) (Config)# logging email message-type urgent to-addr toAddr01@email.com

(QCT) (Config)# logging email message-type both to-addr toAddr02@email.com

## 5.7.9. Logging email from-addr

This command is used to configure the email source address (the address of the sender, i.e., switch) to which messages are sent.

The parameter “<from-addr>“ specifies a standard email address to be the source address of both urgent and non-urgent message.

**Format** logging email from-addr <from-address>

no logging email from-addr

**Default** support@quantaqct.com

**Mode** Global Config

Example: Set an email address “fromAddr@email.com” to the source address of both urgent and non-urgent message.

(QCT) #configure

(QCT) (Config)# logging email from-addr fromAddr@email.com

## 5.7.10. Mail-server configuration

This command configures the parameters of SMTP server which is used to send email alert messages. This command changes CLI mode from Global Config Mode  to Mail Server Config mode.

**Format** [no] mail-server <ipaddress|ipv6address|host-name>

**Default** None

**Mode** Global Config

Example: Set mail server address to hostname “smtp.gmail.com” and change to Mail Server Config mode.

(QCT) #configure

(QCT) (Config)#mail-server smtp.gmail.com

(QCT) (Mail-Server)#

## 5.7.11. Mail-server security

This command sets the email alerting security protocol by enabling the switch to use TLSv1/STARTTLS authentication with the SMTP Server. If the TLSv1/STARTTLS mode is enabled on the switch but the SMTP sever does not support TLSv1/STARTTLS mode, no email is sent to the SMTP server.

The parameter “none” means email server doesn’t use security protocol.

The parameter “starttls” means to use STARTTLS security protocol.

The parameter “tlsv1” means to use TLSv1 security protocol.

**Format** security [none | starttls | tlsv1]

**Default** none

**Mode** Mail Server Config

## 5.7.12. Mail-server port

This command configures the TCP port to use for communication with the SMTP server. The recommended port for TLSv1 is 465, STARTTLS is 587, and for no security (i.e. none) is 25. However, any nonstandard port in the range 1 to 65535 is also allowed.

**Format** [no] port <465 | 25 | 1 to 65535>

**Default** 25

**Mode** Mail Server Config

## 5.7.13. Mail-server username

This command configures the username (or login ID) which is used to authenticate with the SMTP server.

**Format** [no] username <username>

**Default** None

**Mode** Mail Server Config

## 5.7.14. Mail-server password

This command configures the password which is used to authenticate with the SMTP server.

There're two types of password formats:

- The type "passwd 0" specifies password in plain text, and following <password> could use alphanumeric characters with maximum length is 64 characters.
- The type "passwd 7" specifies password in encrypted form, and following <password> must be hexadecimal digitals with length of 128 characters.

**Format** [no] password {0 | 7} <password>

**Default** None

**Mode** Mail Server Config

First Example sets the password of mail server to plain text "testPassword", and second one set the password to encrypted string which is fixed 128 characters of hexadecimal digitals.

Example:

(QCT) #configure

(QCT) (Config)# mail-server smtp.gmail.com

(QCT) (Mail-Server)# password 0 testPassword

(QCT) (Mail-Server)# password 7
0fdd841c8a524979e5ba47893efcf48b12a08619953e1b6e42cde0931198ca717cb5ff8b49795a3497e283990827c5ba1ce32855ced76a505726dfb1ee222c4b

## 5.7.15. Clear logging email statistics

This command is used to clear the statistics of logging email.

**Format** clear logging email statistics

**Default** None

**Mode** Privilege EXEC

## 5.8. Script Management Commands

### 5.8.1. Script apply

This command applies the commands in the script to the switch.

**Format** script apply <scriptname>

**Default** None

**Mode** Privilege EXEC

### 5.8.2. Script delete

This command deletes a specified script or all scripts on the switch.

**Format** script delete {<scriptname> | all}

**Default** None

**Mode** Privilege EXEC

### 5.8.3. Script list

This command lists all scripts on the switch as well as the remaining available space.

**Format** script list

**Default** None

**Mode** Privilege EXEC

Example:

(QCT) #script list

Configuration Script Name Size(Bytes)

-------------------------------- -----------

1.scr 1092

t.scr 1092

2 configuration script(s) found.

5117 Kbytes free.

(QCT) #

## 5.8.4. Script show

This command displays the content of a script file.

**Format** script show <scriptname>

**Default** None

**Mode** Privilege EXEC

Example:

(Switch) #script show test.scr

1 : !Current Configuration:

2 : !

3 : !System Description " Quanta IX8D - 48x25G SFP 8x100G QSFP, Runtime Code 19.12.00.14, Linux 4.14.4, 0"

4 : !System Software Version "19.12.00.14"

5 : !System Up Time "0 days 0 hrs 1 mins 45 secs"

6 : !Additional Packages BGP-4,QOS,Multicast,IPv6,Routing,Data Center

7 : !Current System Time: Aug 5 08:22:08 2019

8 : !

9 : configure

10 : hostname "Switch"

11 : serviceport protocol dhcp6

12 : vlan database

13 : exit

14 : time-range

15 : kron policy-list p1

16 : cli show version | redirect tftp://172.20.0.28/kr-t6.txt

17 : exit

18 : username "admin" passwd 7 d32036926a456949a1dd05f3768212c089add94bccd752314f0c05fedf66f52c407256118c62e4617101230004dff4e e69c4e4d4eaed9590cfd5fe318b39dac3 level 15

19 : username "admin" role "network-admin"

20 : username "guest" role "network-operator"

21 : aaa authentication login "networkList" radius

22 : radius server host auth "172.20.0.107" name "Default-RADIUS-Server"

23 : line console

24 : exec-timeout 0

25 : exit

26 : line vty

27 : exit

28 : line ssh

29 : exit

30 : interface vlan 1

31 : exit

32 : snmp-server sysname "Switch"

33 : !

34 : interface control-plane

35 : exit

36 : application install orig_restful_api

37 : router ospf

38 : exit

39 : ipv6 router ospf

40 : exit

41 : exit

(Switch) #

### 5.8.5. Script validate

This command validates an assigned script by parsing each line. The validate option is intended to be used as a tool for script development.

**Format** script validate <scriptname>

**Default** None

**Mode** Privilege EXEC

Example:

(Switch) #script validate test.scr

configure

hostname "Switch"

serviceport protocol dhcp6

vlan database

exit

time-range

kron policy-list p1

cli show version | redirect tftp://172.20.0.28/kr-t6.txt

exit

username "admin" passwd 7 d32036926a456949a1dd05f3768212c089add94bccd752314f0c05fedf66f52c407256118c62e4617101230004dff4ee69c4e4d4eaed9590cfd5fe318b39dac3 level 15

username "admin" role "network-admin"

username "guest" role "network-operator"

aaa authentication login "networkList" radius

radius server host auth "172.20.0.107" name "Default-RADIUS-Server"

line console

exec-timeout 0

exit

line vty

exit

line ssh

exit

interface vlan 1

exit

snmp-server sysname "Switch"

interface control-plane

exit

application install orig_restful_api

router ospf

exit

ipv6 router ospf

exit

exit

Configuration script 'new-script.scr' validated.

(Switch) #

# 5.9. User Account Management Commands

This section describes the commands you use to configure port-based network access control (IEEE 802.1X). Port-based network access control allows you to permit access to network services only to and devices that are authorized and authenticated.

## 5.9.1. Show users

This command displays the configured user names and their settings.

**Format** show users

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **User Name** | The name the user will use to login using the serial port, Telnet. A new user may be added to the switch by entering a name in a blank entry. The user name may be up to 64 characters, and is case sensitive. Two users are included as the factory default, admin, and guest. |
| **User Access Mode** | Shows whether the operator is able to change parameters on the switch (Privilege-15) or is only able to view them (Privilege-1). As a factory default, admin has Privilege-15 access and guest has Privilege-1 access. There can only be one Privilege-15 user and up to five Privilege-1 users. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show users

| | User |
|---|---|
| User Name | Access Mode |
| --- | --- |
| admin | Privilege-15 |
| guest | Privilege-1 |

## 5.9.2. Show users accounts

The user can go to the CLI Privilege Exec to get all of user information, use the show users accounts Privilege command.

**Format** show users accounts [detail]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **User Name** | The local user account's user name. |
| **Privilege** | The user's privilege level. The range of privilege level is 1 and 15. Access mode for privilege level 15 is read/write, the others is read-only. |
| **Password Aging** | Indicates number of days, since the password was configured, until the password expires. |
| **Password Expiration Date** | The current password expiration date in date format. |
| **Lockout** | Indicates whether the user account is locked out (true or false). |
| **Roles** | Indicates RBAC roles which belong to this user. This field is present, only if RBAC function is enabled. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show users accounts

| UserName | Privilege | Password Aging | Password Expiry date | Lockout |
|---|---|---|---|---|
| admin | 15 | --- | --- | False |
| guest | 1 | --- | --- | False |

(QCT) (Config)#show users accounts detail

UserName..... admin

Privilege..... 15

Password Aging..... ---

Password Expiry..... ---

Lockout..... False

Override Complexity Check..... Disable

Password Strength..... ---

Roles..... network-admin

UserName..... guest

Privilege..... 1

Password Aging..... ---

Password Expiry..... ---

Lockout..... False

Override Complexity Check..... Disable

Password Strength..... ---

Roles..... network-operator

## 5.9.3. Show passwords configuration

Use this command to display the configured password management settings.

**Format** show passwords configuration

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Minimum Password Length** | Minimum number of characters required when changing passwords. |
| **Password Aging** | Length in days that a password is valid. |
| **Password History** | Number of passwords to store for reuse prevention. |
| **Lockout Attempts** | Number of failed password login attempts before lockout. |

| | |
|---|---|
| **Password Strength Check** | The user to configure passwords that comply with the strong password configuration. |
| **Minimum Password Uppercase Letters** | Minimum number of uppercase characters required when changing passwords. |
| **Minimum Password Lowercase Letters** | Minimum number of lowercase characters required when changing passwords. |
| **Minimum Password Numeric Characters** | Minimum number of numeric characters required when changing passwords. |
| **Minimum Password Special Characters** | Minimum number of special characters required when changing passwords. |
| **Maximum Password Repeated Characters** | Maximum number of characters cannot repeated when changing passwords. |
| **Maximum Password Consecutive Characters** | Maximum number of characters cannot consecutive when changing passwords. |
| **Minimum Password Character Classes** | Valid range for user passwords. |
| **Password Exclude Keywords** | The password to be configured should not contain the keyword mentioned in this field. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show passwords configuration

Passwords Configuration

---

Minimum Password Length..... 0

Password Aging (days)..... 0

Password History..... 0

Lockout Attempts..... 0

Password Strength Check..... Disable

Minimum Password Uppercase Letters..... 2

Minimum Password Lowercase Letters..... 2

Minimum Password Numeric Characters..... 2

Minimum Password Special Characters..... 2

Maximum Password Repeated Characters..... 0

Maximum Password Consecutive Characters..... 0

Minimum Password Character Classes..... 4

Password Exclude Keywords..... <none>

## 5.9.4. Show passwords result

Use this command to display the last password set result information.

**Format** show passwords result

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Last User Whose Password Is Set** | The local user account's user name. |
| **Password Strength Check** | The user's privilege level. The range of privilege level is 1 and 15. Access mode for privilege level 15 is read/write, the others is read-only. |
| **Last Password Set Result** | Indicates number of days, since the password was configured, until the password expires. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show passwords result

Last User whose password is set ..... guest

Password strength check ..... Disable

Last Password Set Result:

==========

Password Successfully Configured for User 'guest'.

## 5.9.5. Username

This command adds a new user (account) if space permits. The default privilege level is 1. The account <username> can be up to 64 characters in length. The name may be comprised of alphanumeric characters as well as the dash (‘-’) and underscore (‘_’). The <username> is case-sensitive. Six user names can be defined.

This command changes the password of an existing operator. User password should not be more than 64 characters in length. If a user is authorized for authentication or encryption is enabled, the password must be 64 alphanumeric characters in length. The username and password are case-sensitive. When a password is changed, a prompt will ask for the operator’s former password. If none, press enter.

**Note**: The admin user account cannot be deleted. The special characters allowed in the password include # $ % & ‘ ( ) * + , - / ; < = > @ [ \ ] ^ _ ` { | } ~

**Format** username <username> { level <level> | passwd <0|7> <password>}

| Parameter | Definition |
|---|---|
| **<username>** | A new user name (Range: up to 64 characters). |
| **<0|7>** | 0 means the password is plain-text. 7 means the password is encrypted. When 7 is used, the password must be exactly 128 hexadeciaml characters in length. Maximum plain-text password length is 64 characters. |
| **<level>** | The user level. Level 0 can be assigned by a level 15 user to another user to suspend that user’s access. Range 0-15. Enter access level 1 for Read Access or 15 for Read/Write Access. If not specified where it is optional, the privilege level is 1. |

**Default** None

**Mode** Global Config

### no username

This command removes a user name created before.

**Format** no username <username>

**Mode** Global Config

## 5.9.6. Username <username> unlock

The user can go to the CLI Global Configuration Mode to unlock a locked user account, use the username <name> unlock global configuration command.

**Format** username <username> unlock

| Parameter | Definition |
|---|---|
| **<username>** | A username. |

**Default** None

**Mode** Global Config

## 5.9.7. Passwords aging

If the passwords aging is set, the local user will be prompted to change it before logging in again when the local user's password expires.

**Format** passwords aging <1-365>

| Parameter | Definition |
|---|---|
| **<1-365>** | Number of days until password expires. |

**Default** 0, no aging

**Mode** Global Config

### no passwords aging

Use the no passwords aging return to default value 0.

**Format** no passwords aging

**Mode** Global Config

## 5.9.8. Passwords history

Use this command to set the number of previous passwords that shall be stored for each user account. If password history is set, the local user will not be able to reuse any password stored in password history when the local user changes his or her password.

**Format** passwords aging history <0-10>

| Parameter | Definition |
|---|---|
| **<0-10>** | Number of passwords to be used in password history check. |

**Default** 0, no aging

**Mode** Global Config

### no passwords history

Use the no passwords history return to default value 0.

**Format** no passwords history

**Mode** Global Config

## 5.9.9. Passwords lock-out

Use this command to strengthen the security of the switch by locking user accounts that have failed login due to wrong passwords. When a lockout count is configured, a user that is logged in must enter the correct password within that count. Otherwise the user will be locked out from further switch access. Only a user with read/write access can re-activate a locked user account. The user can go to the CLI Global Configuration Mode to set the password lock-out count.

**Format** passwords lock-out <1-5>

| Parameter | Definition |
|---|---|
| **<1-5>** | The number of password failures before account lock. |

**Default** 0

**Mode** Global Config

### no passwords lock-out

Use the no passwords lock-out to return to default value 0.

**Format** no passwords lock-out

**Mode** Global Config

## 5.9.10. Passwords min-length

The user can go to the CLI Global Configuration Mode to set the minimum password length.

**Format** passwords min-length <8-64>

| Parameter | Definition |
|---|---|
| **<0-64>** | The length of password. |

**Default** 8

**Mode** Global Config

### no passwords min-length

Use the no passwords min-length return to default value 0.

**Format** no passwords min-length

**Mode** Global Config

## 5.9.11. Passwords strength-check

The user can go to the CLI Global Configuration Mode to set the password strength policy enforcement, use the passwords strength-check Global configuration command.

**Format** passwords strength-check

**Default** Disable

**Mode** Global Config

### no passwords strength-check

Use the no passwords strength-check return to default disable.

**Format** no passwords strength-check

**Mode** Global Config

## 5.9.12. Passwords strength maximum

The user can go to the CLI Global Configuration Mode to set the password strength.

**Format** passwords strength maximum {consecutive-characters | repeated-characters} [<0-15>]

**Default** 0

**Mode** Global Config

### no passwords strength maximum

Use the no passwords strength maximum {consecutive-characters | repeated-characters} return to default value 0.

**Format** no passwords strength maximum {consecutive-characters | repeated-characters}

**Mode** Global Config

## 5.9.13. Passwords strength minimum

The user can go to the CLI Global Configuration Mode to set the password strength.

**Format** passwords strength minimum {character-classes <0-4> | lowercase-letters <0-16> | numeric-characters <0-16> | special-characters <0-16> | uppercase-letters <0-16>}

**Default** uppercase-letters 2
lowercase-letters 2
numeric-characters 2
special-characters 2
character-classes 4

**Mode** Global Config

### no passwords strength minimum

Use the no passwords strength minimum {character-classes | lowercase-letters | numeric-characters | special-characters | uppercase-letters} return to default value 2.

**Format** no passwords strength minimum {character-classes | lowercase-letters | numeric-characters | special-characters | uppercase-letters}

**Mode** Global Config

## 5.9.14. Passwords strength exclude-keyword

The user can go to the CLI Global Configuration Mode to set the password strength, use the passwords strength exclude-keyword <keyword> Global configuration command.

**Format** passwords strength exclude-keyword <keyword>

**Default** None

**Mode** Global Config

### no passwords strength exclude-keyword

Use the no passwords strength exclude-keyword <keyword> return to default none.

**Format** no passwords strength exclude-keyword <keyword>

**Mode** Global Config

# 5.10. Port-based Network Access Control Commands

This section describes the commands you use to configure port-based network access control (IEEE 802.1X). Port-based network access control allows you to permit access to network services only to and devices that are authorized and authenticated.

## 5.10.1. Show authentication methods

This command displays the ordered authentication methods for all authentication login lists.

**Format** show authentication methods

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Authentication Login List** | The authentication login listname. |
| **Method 1** | The first method in the specified authentication login list, if any. |
| **Method 2** | The second method in the specified authentication login list, if any. |
| **Method 3** | The third method in the specified authentication login list, if any. |

Example: The following example displays the authentication configuration.

(Quanta) #show authentication methods

Login Authentication Method Lists

---

defaultList : local

networkList : local

Enable Authentication Method Lists

---

enableList : enable none

enableNetList : enable deny

| Line | Login Method List | Enable Method List |
|---|---|---|
| Console | defaultList | enableList |
| Telnet | networkList | enableList |
| SSH | networkList | enableList |

DOT1X :

## 5.10.2. Show dot1x

This command is used to show a summary of the global dot1x configuration, summary information of the dot1x configuration for a specified port or all ports, the detailed dot1x configuration for a specified port and the dot1x statistics for a specified port - depending on the tokens used.

**Format** show dot1x [summary [<slot/port>] | detail <slot/port> | statistics <slot/port>]

**Mode** Privileged EXEC

**Display Message**

If you do not use the optional parameters slot/port or vlanid, the command displays the global dot1x mode, the VLAN Assignment mode, and the Dynamic VLAN Creation mode.

| Parameter | Definition |
|---|---|
| **Administrative Mode** | Indicates whether authentication control on the switch is enabled or disabled. |
| **VLAN Assignment Mode** | Indicates whether assignment of an authorized port to a RADIUS-assigned VLAN is allowed (enabled) or not (disabled). |
| **Dynamic VLAN Creation Mode** | Indicates whether the switch can dynamically create a RADIUS-assigned VLAN if it does not currently exist on the switch. |
| **Monitor Mode** | Indicates whether the Dot1x Monitor mode on the switch is enabled or disabled. |
| **EAPOL Flood Mode** | Indicates whether the Dot1x EAPOL Flood mode on the switch is enabled or disabled. |

If you use the optional parameter summary [<slot/port>], the dot1x configurations for the specified port or all ports are displayed.

| Parameter | Definition |
|---|---|
| **Interface** | The interface whose configuration is displayed. |
| **Control Mode** | The configured control mode for this port. Possible values are force-unauthorized \| forceauthorized \| auto \| mac-based \| authorized \| unauthorized. |
| **Operating Control Mode** | The control mode under which this port is operating. Possible values are authorized \| unauthorized. |
| **Reauthentication Enabled** | Indicates whether reauthentication is enabled on this port. |
| **Port Status** | Indicates whether the port is authorized or unauthorized. Possible values are authorized \| unauthorized. |

Example: The following shows example CLI display output for the command show dot1x summary 0/1.

(Quanta) #show dot1x summary 0/1

| Interface | Control Mode | Operating Control Mode | Reauthentication Enabled | Port Status |
|---|---|---|---|---|
| 0/1 | auto | N/A | False | N/A |

If you use the optional parameter 'detail <slot/port>', the detailed dot1x configuration for the specified port is displayed.

| Parameter | Definition |
|---|---|
| **Port** | The interface whose configuration is displayed. |
| **Protocol Version** | The protocol version associated with this port. The only possible value is 1, corresponding to the first version of the dot1x specification. |
| **PAE Capabilities** | The port access entity (PAE) functionality of this port. |
| **Control Mode** | The configured control mode for this port. Possible values are force-unauthorized \| forceauthorized \| auto \| mac-based. |
| **Authenticator PAE State** | Current state of the authenticator PAE state machine. Possible values are Initialize, Disconnected, Connecting, Authenticating, Authenticated, Aborting, |

| | |
|---|---|
| | Held, ForceAuthorized, and ForceUnauthorized. When MAC-based authentication is enabled on the port, this parameter is deprecated. |
| **Backend Authentication State** | Current state of the backend authentication state machine. Possible values are Request, Response, Success, Fail, Timeout, Idle, and Initialize. When MAC-based authentication is enabled on the port, this parameter is deprecated. |
| **Quiet Period** | The timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The value is expressed in seconds and will be in the range 0 and 65535. |
| **Transmit Period** | The timer used by the authenticator state machine on the specified port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The value is expressed in seconds and will be in the range of 1 and 65535. |
| **Guest-VLAN ID** | The guest VLAN identifier configured on the interface. |
| **Guest VLAN Period** | The time in seconds for which the authenticator waits before authorizing and placing the port in the Guest VLAN, if no EAPOL packets are detected on that port. |
| **Supplicant Timeout** | The timer used by the authenticator state machine on this port to timeout the supplicant. The value is expressed in seconds and will be in the range of 1 and 65535. |
| **Server Timeout** | The timer used by the authenticator on this port to timeout the authentication server. The value is expressed in seconds and will be in the range of 1 and 65535. |

| Parameter | Definition |
|---|---|
| **Maximum Requests** | The maximum number of times the authenticator state machine on this port will retransmit an EAPOL EAP Request/Identity before timing out the supplicant. The value will be in the range of 1 and 10. |
| **Configured MAB mode** | The dot1x MAC Authentication Bypass configuration status. |
| **Operational MAB mode** | The dot1x MAC Authentication Bypass operational status. |
| **VLAN ID** | The VLAN assigned to the port by the radius server. This is only valid when the port control mode is not Mac-based. |
| **VLAN Assigned Reason** | The reason the VLAN identified in the VLAN-assigned field has been assigned to the port. Possible values are RADIUS, Unauthenticated VLAN, Guest VLAN, default, and Not Assigned. When the VLAN Assigned Reason is Not Assigned, it means that the port has not been assigned to any VLAN by dot1x. This only |

| | |
|---|---|
| | valid when the port control mode is not MAC-based. |
| **Reauthentication Period** | The timer used by the authenticator state machine on this port to determine when reauthentication of the supplicant takes place. The value is expressed in seconds and will be in the range of 1 and 65535. |
| **Reauthentication Enabled** | Indicates if reauthentication is enabled on this port. Possible values are 'True" or "False". |
| **Key Transmission Enabled** | Indicates if the key is transmitted to the supplicant for the specified port. Possible values are True or False. |
| **Control Direction** | The control direction for the specified port or ports. Possible values are both or in. |
| **Maximum Users** | The maximum number of clients that can get authenticated on the port in the MAC-based dot1x authentication mode. This value is used only when the port control mode is not MACbased. |
| **Unauthenticated VLAN ID** | Indicates the unauthenticated VLAN configured for this port. This value is valid for the port only when the port control mode is not MAC-based. |
| **Session Timeout** | Indicates the time for which the given session is valid. The time period in seconds is returned by the RADIUS server on authentication of the port. This value is valid for the port only when the port control mode is not MAC-based. |
| **Session Termination Action** | This value indicates the action to be taken once the session timeout expires. Possible values are Default, Radius-Request. If the value is Default, the session is terminated the port goes into unauthorized state. If the value is Radius-Request, then a reauthentication of the client authenticated on the port is performed. This value is valid for the port only when the port control mode is not MAC-based. |

Example: The following shows example CLI display output for the command.

(Quanta) #show dot1x detail 0/1

Port..... 0/1

Protocol Version..... 1

PAE Capabilities..... Authenticator

Control Mode..... auto

Authenticator PAE State..... Initialize

Backend authentication state..... Initialize

Quiet Period (secs)..... 60

Transmit Period (secs)..... 30

Guest VLAN ID..... 0

Guest VLAN Period (secs)..... 90

Supplicant Timeout (secs)..... 30

Server Timeout (secs)..... 30

Maximum Requests..... 2

Configured MAB Mode..... Disabled

Operational MAB Mode..... Disabled

VLAN Id..... 0

VLAN Assigned Reason..... Not Assigned

Reauthentication Period (secs)..... 3600

Reauthentication Enabled..... False

Key Transmission Enabled..... False

Control Direction..... both

Maximum Users..... 48

Unauthenticated VLAN ID..... 0

Session Timeout..... 0

Session Termination Action..... Default

For each client authenticated on the port, the **show dot1x detail <slot/port>** command will display the following MAC-based dot1x parameters if the port-control mode for that specific port is MAC-based.

| Parameter | Definition |
|---|---|
| **Supplicant MAC-Address** | The MAC-address of the supplicant. |
| **Authenticator PAE State** | Current state of the authenticator PAE state machine. Possible values are Initialize, Disconnected, Connecting, Authenticating, Authenticated, Aborting, Held, ForceAuthorized, and ForceUnauthorized. |
| **Backend Authentication State** | Current state of the backend authentication state machine. Possible values are Request, Response, Success, Fail, Timeout, Idle, and Initialize. |
| **VLAN-Assigned** | The VLAN assigned to the client by the radius server. |
| **Logical Port** | The logical port number associated with the client. |

If you use the optional parameter statistics <slot/port>, the following dot1x statistics for the specified port appear.

| Parameter | Definition |
|---|---|
| **Port** | The interface whose statistics are displayed. |
| **PAE Capabilities** | The port access entity (PAE) functionality of this port. |
| **EAPOL Frames Received** | The number of valid EAPOL frames of any type that have been received by this authenticator. |
| **EAPOL Frames Transmitted** | The number of EAPOL frames of any type that have been transmitted by this authenticator. |
| **EAPOL Start Frames Received** | The number of EAPOL start frames that have been received by this authenticator. |
| **EAPOL Logoff Frames Received** | The number of EAPOL logoff frames that have been received by this authenticator. |
| **Last EAPOL Frame Version** | The protocol version number carried in the most recently received EAPOL frame. |
| **Last EAPOL Frame Source** | The source MAC address carried in the most recently received EAPOL frame. |
| **EAP Response/Id Frames Received** | The number of EAP response/identity frames that have been received by this authenticator. |
| **EAP Response Frames** | The number of valid EAP response frames (other than resp/id frames) that |

| | |
|---|---|
| **Received** | have been received by this authenticator. |
| **EAP Request/Id Frames Transmitted** | The number of EAP request/identity frames that have been transmitted by this authenticator. |
| **EAP Request Frames Transmitted** | The number of EAP request frames (other than request/identity frames) that have been transmitted by this authenticator. |
| **Invalid EAPOL Frames Received** | The number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized. |
| **EAP Length Error Frames Received** | The number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized. |

## 5.10.3. Show dot1x authentication-history

This command is used to display the Dot1x Authentication History Log for the specified port or all ports. Use the optional keywords to display only failure authentication events in summary or in detail

**Format** show dot1x authentication-history {<slot/port> | all} [failed-auth-only] [detail]

**Mode** Privileged EXEC

**Display Message**

If you use the optional parameter detail, the following information for the specified port or all ports appears.

| Parameter | Definition |
|---|---|
| **Time Stamp** | The exact time at which the event occurs. |
| **Interface** | Physical Port on which the event occurs. |
| **MAC-Address** | The supplicant/client MAC address. |
| **VLAN assigned** | The VLAN assigned to the client/port on authentication. |
| **VLAN assigned Reason** | The type of VLAN ID assigned, which can be Guest VLAN, Unauth, Default, RADIUS Assigned, or Monitor Mode VLAN ID. |
| **Filter Name** | Filter Name returned by RADIUS server when the client was authenticated. This is a configured DiffServ policy name on switch. |
| **Auth Status** | The authentication status. |
| **Reason** | The actual reason behind the successful or failed authentication. |

If you do not use the optional parameter, the following information for the specified port or all ports appears.

| Parameter | Definition |
|---|---|
| **Time Stamp** | The exact time at which the event occurs. |
| **Interface** | Physical Port on which the event occurs. |
| **MAC-Address** | The supplicant/client MAC address. |
| **VLAN ID** | The VLAN assigned to the client/port on authentication. |
| **Auth Status** | The authentication status. |

## 5.10.4. Show dot1x clients

This command is used to display the Dot1x client information. This command also displays information about the number of clients that are authenticated using Monitor mode and using Dot1x

**Format** show dot1x clients [<slot/port>]

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Clients Authenticated using Monitor Mode** | Indicates the number of the Dot1x clients authenticated using Monitor mode. |
| **Clients Authenticated using Dot1x** | Indicates the number of Dot1x clients authenticated using 802.1x authentication process. |
| **Logical Interface** | The logical port number associated with a client. |
| **Interface** | The physical port to which the supplicant is associated. |
| **User Name** | The user name used by the client to authenticate to the server. |
| **Supp MAC Address** | The supplicant device MAC address. |
| **Session Time** | The time since the supplicant is logged on. |
| **Filter Id** | Identifies the Filter ID returned by RADIUS server when the client was authenticated. This is a configured DiffServ policy name on switch. |
| **VLAN ID** | The VLAN assigned to the port. |

| | |
|---|---|
| **VLAN Assigned** | The reason the VLAN identified in the VLAN ID field has been assigned to the port. Possible values are RADIUS, Unauthenticated VLAN, Monitor Mode, or Default. When the VLAN Assigned reason is Default, it means that the VLAN was assigned to the port because the P-VID of the port was that VLAN ID. |
| **Session Timeout** | This value indicates the time for which the given session is valid. The time period in seconds is returned by the RADIUS server on authentication of the port. This value is valid for the port only when the port-control mode is not MAC-based. |
| **Session Termination Action** | This value indicates the action to be taken once the session timeout expires. Possible values are Default and Radius-Request. If the value is Default, the session is terminated and client details are cleared. If the value is Radius-Request, then a reauthentication of the client is performed. |

## 5.10.5. Show dot1x users

This command is used to display the Dot1x port security user information for logically configured users

**Format** show dot1x users <slot/port>

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Users** | Users configured locally to have access to the specified port. |

## 5.10.6. AAA authentication dot1x default

Use this command to configure the authentication method for port-based access to the switch. The additional methods of authentication are used only if the previous method returns an error, not if there is an authentication failure. The possible methods are as follows:

- local. Uses the local username database for authentication.
- none. Uses no authentication.
- radius. Uses the list of all RADIUS servers for authentication.

**Format** aaa authentication dot1x default {local | none | radius}

**Mode** Global Config

## 5.10.7. Clear dot1x statistics

This command resets the 802.1X statistics for the specified port or for all ports.

**Format** clear dot1x statistics {<slot/port> | all}

**Mode** Privileged EXEC

## 5.10.8. Clear dot1x authentication-history

This command clears the authentication history table captured during successful and unsuccessful authentication on all interface or the specified interface.

**Format** clear dot1x authentication-history [slot/port]

**Mode** Privileged EXEC

## 5.10.9. Clear RADIUS statistics

This command is used to clear all RADIUS statistics.

**Format** clear radius statistics

**Mode** Privileged EXEC

## 5.10.10. Dot1x eapolflood

Use this command to enable EAPOL flood support on the switch.

**Format** dot1x eapolflood

**Default** Disable

**Mode** Global Config

### no dot1x eapolflood

This command disables EAPOL flooding on the switch.

**Format** no dot1x eapolflood

**Mode** Global Config

## 5.10.11. Dot1x dynamic-vlan enable

Use this command to enable the switch to create VLANs dynamically when a RADIUS-assigned VLAN does not exist in the switch.

**Format** dot1x dynamic-vlan enable

**Default** Disable

**Mode** Global Config

### no dot1x dynamic-vlan enable

Use this command to prevent the switch from creating VLANs dynamically when a RADIUS-assigned VLAN does not exist in the switch.

**Format** no dot1x dynamic-vlan enable

**Mode** Global Config

## 5.10.12. Dot1x guest-vlan

This command configures VLAN as guest vlan on an interface. The command specifies an active VLAN as an IEEE 802.1X guest VLAN. The range is 1 to the maximum VLAN ID supported by the platform.

**Format** dot1x guest-vlan <vlan-id>

**Default** Disable

**Mode** Interface Config

### no dot1x guest-vlan

This command disables Guest VLAN on the interface.

**Format** no dot1x guest-vlan

**Mode** Interface Config

## 5.10.13. Dot1x initialize

This command begins the initialization sequence on the specified port. This command is only valid if the control mode for the specified port is auto or mac-based. If the control mode is not auto or mac-based, an error will be returned.

**Format** dot1x initialize <slot/port>

**Mode** Privileged EXEC

## 5.10.14. Dot1x mac-auth-bypass

This command enables dot1x MAC authentication bypass on an interface.

**Format** dot1x mac-auth-bypass

**Default** Disable

**Mode** Interface Config

### no dot1x mac-auth-bypass

This command disables dot1x MAC authentication bypass on an interface.

**Format** no dot1x mac-auth-bypass

**Default** Disable

**Mode** Interface Config

## 5.10.15. Dot1x max-req

This command sets the maximum number of times the authenticator state machine on an interface will transmit an EAPOL EAP Request/Identity frame before timing out the supplicant.

**Format** dot1x max-req <1-10>

**Default** 2

**Mode** Interface Config

### no dot1x max-req

This command sets the maximum number of times the authenticator state machine on this port will transmit an EAPOL EAP Request/Identity frame before timing out the supplicant.

**Format** no dot1x max-req

**Mode** Interface Config

## 5.10.16. Dot1x max-users

Use this command to set the maximum number of clients supported on an interface when MAC-based dot1x authentication is enabled on the port. The *count* value is in the range 1 - 48.

**Format** dot1x max-users <1-48>

**Default** 48

**Mode** Interface Config

### no dot1x max-users

This command resets the maximum number of clients allowed per port to its default value.

**Format** no dot1x max-users

**Mode** Interface Config

## 5.10.17. Dot1x port-control

This command sets the authentication mode to use on the specified interface. Use the force-unauthorized parameter to specify that the authenticator PAE unconditionally sets the controlled port to unauthorized. Use the force-authorized parameter to specify that the authenticator PAE unconditionally sets the controlled port to authorized. Use the auto parameter to specify that the authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator and the authentication server. If the mac-based option is specified, then MAC-based dot1x authentication is enabled on the port.

**Format** dot1x port-control {force-unauthorized | force-authorized | auto | mac-based}

**Default** Auto

**Mode** Interface Config

### no dot1x port-control

This command sets the 802.1X port control mode on the specified port to the default value.

**Format** no dot1x port-control

**Mode** Interface Config

## 5.10.18. Dot1x port-control all

This command sets the authentication mode to use on all ports. Select force-unauthorized to specify that the authenticator PAE unconditionally sets the controlled port to unauthorized. Select force-authorized to specify that the authenticator PAE unconditionally sets the controlled port to authorized. Select auto to specify that the authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator and the authentication server. If the mac-based option is specified, then MAC-based dot1x authentication is enabled on the port.

**Format** dot1x port-control all {force-unauthorized | force-authorized | auto | mac-based}

**Default** Auto

**Mode** Global Config

### no dot1x port-control all

This command sets the authentication mode on all ports to the default value.

**Format** no dot1x port-control all

**Mode** Global Config

## 5.10.19. Dot1x re-authenticate

This command begins the re-authentication sequence on the specified port. This command is only valid if the control mode for the specified port is auto or mac-based. If the control mode is not auto or mac-based, an error will be returned.

**Format** dot1x re-authenticate <slot/port>

**Mode** Privileged EXEC

## 5.10.20. Dot1x re-authentication

This command enables re-authentication of the supplicant for the specified interface.

**Format** dot1x re-authentication

**Default** Disable

**Mode** Interface Config

### no dot1x re-authentication

This command disables re-authentication of the supplicant for the specified port.

**Format** no dot1x re-authentication

**Mode** Interface Config

## 5.10.21. Dot1x system-auth-control

Use this command to enable the dot1x authentication support on the switch. While disabled, the dot1x configuration is retained and can be changed, but is not activated.

**Format** dot1x system-auth-control

**Default** Disable

**Mode** Global Config

### no dot1x system-auth-control

This command is used to disable the dot1x authentication support on the switch.

**Format** no dot1x system-auth-control

**Mode** Global Config

## 5.10.22. Dot1x timeout

This command sets the value, in seconds, of the timer used by the authenticator state machine on an interface. Depending on the token used and the value (in seconds) passed, various timeout configurable parameters are set. The following tokens are supported:

**Format** dot1x timeout {{guest-vlan-period <seconds>} | {reauth-period <seconds>} | {quiet-period <seconds>} | {tx-period <seconds>} | {supp-timeout <seconds>} | {server-timeout <seconds>}}

| Tokens | Definition |
|---|---|
| **guest-vlan-period** | The time, in seconds, for which the authenticator waits to see if any EAPOL packets are received on a port before authorizing the port and placing the port in the guest vlan (if configured). The guest vlan timer is only relevant when guest vlan has been configured on that specific port. The reauth-period must be a value in the range 1 - 300. |
| **reauth-period** | The value, in seconds, of the timer used by the authenticator state machine on this port to determine when reauthentication of the supplicant takes place. The reauth-period must be a value in the range 1 - 65535. |
| **quiet-period** | The value, in seconds, of the timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The quiet-period must be a value in the range 0 - 65535. |
| **tx-period** | The value, in seconds, of the timer used by the authenticator state machine on this port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The quiet-period must be a value in the range 1 - 65535. |
| **supp-timeout** | The value, in seconds, of the timer used by the authenticator state machine on this port to timeout the supplicant. The supp-timeout must be a value in the range 1 - 65535. |
| **server-timeout** | The value, in seconds, of the timer used by the authenticator state machine on this port to timeout the authentication server. The supp-timeout must be a value in the range 1 - 65535. |

**Default** guest-vlan-period: 90 seconds
reauth-period: 3600 seconds
quiet-period: 60 seconds
tx-period: 30 seconds
supp-timeout: 30 seconds

server-timeout: 30 seconds

**Mode** Interface Config

### no dot1x timeout

This command sets the value, in seconds, of the timer used by the authenticator state machine on this port to the default values. Depending on the token used, the corresponding default values are set.

**Format** no dot1x timeout {guest-vlan-period | reauth-period | quiet-period | tx-period | supptimeout | server-timeout}

**Mode** Interface Config

## 5.10.23. Dot1x unauthenticated-vlan

Use this command to configure the unauthenticated VLAN associated with the specified interface. The unauthenticated VLAN ID can be a valid VLAN ID from 0-Maximum supported VLAN ID (4093). The unauthenticated VLAN must be statically configured in the VLAN database to be operational. By default, the unauthenticated VLAN is 0, i.e. invalid and not operational.

**Format** dot1x unauthenticated-vlan <vlan-id>

**Default** 0

**Mode** Interface Config

### no dot1x unauthenticated-vlan

This command resets the unauthenticated-vlan associated with the port to its default value.

**Format** no dot1x unauthenticated-vlan

**Mode** Interface Config

## 5.10.24. Dot1x user

This command adds the specified user to the list of users with access to the specified port or all ports. The user parameter must be a configured user.

**Format** dot1x user <user> {<slot/port> | all}

**Mode** Global Config

## no dot1x user

This command removes the user from the list of users with access to the specified port or all ports.

**Format** no dot1x user <user> {<slot/port> | all}

**Mode** Global Config

# 5.11. AAA Commands

This section describes the commands you use to add, manage, and delete system users. Software has two default users: admin and guest. The admin user can view and configure system settings, and the guest user can view settings.

**Note**: You cannot delete the admin user. There is only one user allowed with read/write privileges. You can configure up to five read-only users on the system.

## 5.11.1. Show accounting

This command displays ordered methods for accounting lists.

**Format** show accounting

**Mode** Privileged EXEC
User EXEC

Example: The following shows example CLI display output for this command.

(QCT) #show accounting

Number of Accounting Notifications sent at beginning of an EXEC session: 0

Errors when sending Accounting Notifications beginning of an EXEC session: 0

Number of Accounting Notifications sent at end of an EXEC session: 0

Errors when sending Accounting Notifications at end of an EXEC session: 0

Number of Accounting Notifications sent at beginning of a command execution: 0

Errors when sending Accounting Notifications at beginning of a command execution: 0

Number of Accounting Notifications sent at end of a command execution: 0

Errors when sending Accounting Notifications at end of a command execution: 0

## 5.11.2. Show accounting methods

This command displays configured accounting method lists.

**Format** show accounting methods

**Mode** Privileged EXEC
User EXEC

Example: The following shows example CLI display output for this command.

(QCT) #show accounting methods

AcctType MethodName MethodType Method1 Method2

---------- ---------- ---------- ---------- ----------

Exec dfltExecList none tacacs

Commands dfltCmdList none tacacs

DOT1X dfltDot1xList start-stop radius

Line EXEC Method List Command Method List

---------- ---------- ----------

Console dfltExecList dfltCmdList

Telnet dfltExecList dfltCmdList

SSH dfltExecList dfltCmdList

## 5.11.3. AAA authentication login

This command creates an authentication login list. The <listname> is up to 12 alphanumeric characters and is not case sensitive. Up to 5 authentication login lists can be configured on the switch.

If the authentication login list does not exist, a new authentication login list is first created and then the authentication methods are set in the authentication login list. The possible method values are enable, line, local, none, radius and tacacs.

To authenticate a user, the authentication methods in the user's login will be attempted in order until an authentication attempt succeeds or fails.

**Note**: The default login list included with the default configuration cannot be changed

**Format** aaa authentication login {<listname> | default | network} *method1 [method2…]*

| Parameter | Definition |
|---|---|
| **default** | Uses the listed authentication methods that follow this argument as the default list of methods when a user logs in. |
| **listname** | Character string of up to 15 characters used to name the list of authentication methods activated when a user logs in. |
| **method1…**<br>***[method2…]*** | At least one from the following:<br>enable. Uses the enable password for authentication.<br>line. Uses the line password for authentication.<br>local. Uses the local username database for authentication.<br>none. Uses no authentication.<br>radius. Uses the list of all RADIUS servers for authentication.<br>tacacs. Uses the list of all TACACS servers for authentication. |

**Default** · defaultList. Used by the console and only contains the method none.
· networkList. Used by telnet and SSH and only contains the method local.

**Mode** Global Config

Example: The following shows an example of the command.

(QCT) (Config)#aaa authentication login default radius local enable none

### no aaa authentication login

This command returns to the default.

**Format** no aaa authentication login {<listname> | default | network}

**Mode** Global Config

## 5.11.4. AAA accounting

Use this command in Global config mode to create an accounting method list for either user EXEC sessions or for user-executed commands. This list is identified by **default** or a user-specified **listname**. Accounting records, when enabled for a line-mode, can be sent at both the beginning and at the end (**start-stop**) or only at the end (**stop-only**). If **none** is specified, then accounting is disabled for the specified list. If **tacacs** is specified as the accounting method, accounting records are notified to a TACACS+ server. If **radius** is the specified accounting method, accounting records are notified to a RADIUS server.

**Note**: Please note the following:

- A maximum of five Accounting Method lists can be created for each exec and command type.
- The same list-name can be used for both exec and commands accounting type.
- AAA Accounting for commands with RADIUS as the accounting method is not supported.
- Only the default Accounting Method list can be created for DOT1X. There is no provision to create mode.
- Start-stop or None are the only supported record types for DOT1X accounting. Start-stop enables accounting and None disables accounting.
- RADIUS is the only accounting method type supported for DOT1X accounting.

**Format** aaa accounting {exec | commands | dot1x} {default | <listname>} {start-stop | stop-only | none} *method1 [method2…]*

| Parameter | Definition |
|---|---|
| **exec** | Provides accounting for a user EXEC terminal sessions. |
| **commands** | Provides accounting for all user executed commands. |
| **dot1x** | Provides accounting for DOT1X user commands. |
| **default** | The default list of methods for accounting services. |
| ***listname*** | Character string used to name the list of accounting methods. |
| **start-stop** | Sends a start accounting notice at the beginning of a process and a stop accounting notice at the beginning of a process and a stop accounting notice at the end of a process. |
| **stop-only** | Sends a stop accounting notice at the end of the requested user process. |
| **none** | Disables accounting services on this line. |
| **method** | Use either TACACS or the radius server for accounting purposes. |

**Mode** Global Config

## no aaa accounting

This command deletes the accounting method list.

**Format** no aaa accounting {exec | commands | dot1x} {default | <listname>}

**Mode** Global Config

Example: The following shows an example of the command.

(QCT) (Config)#aaa accounting commands userCmdAudit stop-only tacacs

(QCT) (Config)#no aaa accounting commands userCmdAudit

## 5.11.5. Accounting

Use this command in Line Configuration mode to apply the accounting method list to a line config (console/telnet/ssh).

**Format** accounting {exec | commands} {default | <listname>}

| Parameter | Definition |
|---|---|
| **exec** | Causes accounting for an EXEC session. |
| **commands** | This causes accounting for each command execution attempt. If a user is enabling accounting for exec mode for the current line-configuration type, the user will be logged out. |
| **default** | The default list of methods for accounting services. |
| ***listname*** | Enter a string of not more than 15 characters. |

**Mode** Line Config

Example: The following shows an example of the command.

(QCT) (Config)#line console

(QCT) (Config-line)#accounting exec default

(QCT) (Config-line)#exit

### no aaa accounting

Use this command to remove accounting from a Line Configuration mode.

**Format** no accounting {exec | commands}

**Mode** Line Config

## 5.12. RADIUS Commands

This section describes the commands you use to use a Remote Authentication Dial-In User Service (RADIUS) server on your network for authentication and accounting.

### 5.12.1. Show radius

This command displays the various RADIUS configuration items for the switch.

**Format** show radius

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Number of Configured Authentication Servers** | The number of RADIUS Authentication servers that have been configured. |
| **Number of Configured Accounting Servers** | The number of RADIUS Accounting servers that have been configured. |
| **Number of Named Authentication Server Groups** | The number of configured named RADIUS server groups. |
| **Number of Named Accounting Server Groups** | The number of configured named RADIUS server groups. |
| **Number of Retransmits** | The configured value of the maximum number of times a request packet is retransmitted. |
| **Timeout Duration** | The configured timeout value, in seconds, for request retransmissions. |
| **Dead Time (mins)** | The configured timeout value, in seconds, for request re-transmissions. |
| **RADIUS Accounting Mode** | A global parameter to indicate whether the accounting mode for all the servers is enabled or not. |
| **RADIUS Attribute 4 Mode** | A global parameter to indicate whether the NAS-IP-Address attribute has been enabled to use in RADIUS requests. |
| **RADIUS Attribute 4 Value** | A global parameter that specifies the IP address to be used in the NAS-IP-Address attribute to be used in RADIUS requests. |
| **RADIUS Attribute 95 Mode** | A global parameter to indicate whether the NAS-IPv6-Address attribute has been enabled to use in RADIUS requests. |
| **RADIUS Attribute 95 Value** | A global parameter that specifies the IPv6 address to be used in the NAS- |

| | |
|---|---|
| | IPv6-Address attributes to be used in RADIUS requests. |
| **RADIUS Attribute MS-CHAPv2 Mode** | A global parameter to indicate whether the MS-CHAPv2 attributes have been enabled to use at RADIUS authentication. |

Example: The following shows an example of the command.

(QCT) #show radius

Number of Configured Authentication Servers.... 1

Number of Configured Accounting Servers..... 1

Number of Named Authentication Server Groups... 1

Number of Named Accounting Server Groups..... 1

Number of Retransmits..... 4

Timeout Duration..... 5

Dead Time (mins)..... 0

RADIUS Accounting Mode..... Disable

RADIUS Attribute 4 Mode..... Disable

RADIUS Attribute 4 Value..... 0.0.0.0

RADIUS Attribute 95 Mode..... Disable

RADIUS Attribute 95 Value..... ::

RADIUS Attribute MS-CHAPv2 Mode..... Disable

## 5.12.2. Show radius accounting

This command is used to display the configured RADIUS accounting mode, accounting server, and the statistics for the configured accounting server.

**Format** show radius accounting [<ip-address | ipv6-address | hostname> | name [<servername>] | statistics {<ip-address | ipv6-address | hostname> | name <servername>}]

**Mode** Privileged EXEC

**Display Message**

If you do not specify any parameters, then only the accounting mode and the RADIUS accounting server details are displayed.

| Parameter | Definition |
|---|---|
| **RADIUS Accounting Mode** | A global parameter to indicate whether the accounting mode for all the servers is enabled or not. |
| **Host Address** | The IP address of the host. |
| **Port** | The port used for communication with the accounting server. |
| **Secret Configured** | Yes or No Boolean value indicating whether this server is configured with a secret. |

If the optional token '<ip-address | ipv6-address | hostname>' or 'name <servername>' is included.

| Parameter | Definition |
|---|---|
| **RADIUS Accounting Server IP Address** | IP Address of the configured RADIUS accounting server. |
| **RADIUS Accounting Server Name** | The name of the configured RADIUS accounting server. |
| **RADIUS Accounting Mode** | A global parameter to indicate whether the accounting mode for all the servers is enabled or not. |
| **Link local interface** | Indicate the outgoing interface for link local address |
| **Port** | The port used for communication with the accounting server. |
| **Secret Configured** | Yes or No Boolean value indicating whether this server is configured with a secret. |

If the optional token 'statistics <ip-address | ipv6-address | hostname>' is included, the statistics for the configured RADIUS accounting server are displayed. The IP address parameter must match that of a previously configured RADIUS accounting server. The following information regarding the statistics of the RADIUS accounting server is displayed.

| Parameter | Definition |
|---|---|
| **RADIUS Accounting Server Host Address** | IP Address of the configured RADIUS accounting server. |
| **Round Trip Time** | The time interval in centiseconds, between the most recent Accounting-Response and the Accounting-Request that matched it from the RADIUS |

| | |
|---|---|
| | accounting server. |
| **Requests** | The number of RADIUS Accounting-Request packets sent to this accounting server. This number does not include retransmissions. |
| **Retransmissions** | The number of RADIUS Accounting-Request packets retransmitted to this RADIUS accounting server. |
| **Responses** | The number of RADIUS packets received on the accounting port from this server. |
| **Malformed Responses** | The number of malformed RADIUS Accounting-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators and unknown types are not included as malformed accounting responses. |
| **Bad Authenticators** | The number of RADIUS Accounting-Response packets containing invalid authenticators received from this accounting server. |
| **Pending Requests** | The number of RADIUS Accounting-Request packets sent to this server that have not yet timed out or received a response. |
| **Timeouts** | The number of accounting timeouts to this server. |
| **Unknown Types** | The number of RADIUS packets of unknown types, which were received from this server on the accounting port. |
| **Packets Dropped** | The number of RADIUS packets received from this server on the accounting port and dropped for some other reason. |

Example: The following shows an example of the command.

(QCT) #show radius accounting

RADIUS Accounting Mode..... Disable

Host Address..... 10.0.0.1

Port..... 1813

Secret Configured..... No

(QCT) #show radius accounting 10.0.0.1

RADIUS Accounting Server IP Address..... 10.0.0.1

RADIUS Accounting Server Name..... Default-RADIUS-Server

RADIUS Accounting Mode..... Disable

Port..... 1813

Secret Configured..... No

(QCT) #show radius accounting name

| Server Name | Host Address | Port | Secret Configured |
|---|---|---|---|
| Default-RADIUS-Server | 10.0.0.1 | 1813 | No |

(QCT) #show radius accounting statistics 10.0.0.1

RADIUS Accounting Server Host Address..... 10.0.0.1

Round Trip Time..... 0.00

Requests..... 0

Retransmissions..... 0

Responses..... 0

Malformed Responses..... 0

Bad Authenticators..... 0

Pending Requests..... 0

Timeouts..... 0

Unknown Types..... 0

Packets Dropped..... 0

## 5.12.3. Show radius servers

This command is used to display items of the configured RADIUS servers.

**Format** show radius servers [<ip-address | ipv6-address | hostname> | name <servername>]

**Mode** Privileged EXEC

**Display Message**

If you do not specify any parameters, then only the accounting mode and the RADIUS accounting server details are displayed.

| Parameter | Definition |
|---|---|
| **current** | The '*' symbol preceding the server host address specifies that the server is currently active. |
| **ipaddr \| ipv6addr \| host Address** | The IP address or host name of the authenticating server. |
| **Server Name** | The Name of the authenticating server. |
| **Port** | The port used for communication with the accounting server. |
| **Type** | Specifies whether this server is a primary or secondary type. |
| **Usage** | Specifies the server usage type is Login, Dot1x or All. |

If the optional token '<ip-address | ipv6-address | hostname>' or 'name <servername>' is included.

| Parameter | Definition |
|---|---|
| **RADIUS Server IP Address** | The IP address or host name of the authenticating server. |
| **RADIUS Server Name** | The Name of the authenticating server. |
| **Number of Retransmits** | The configured value of the maximum number of times a request packet is retransmitted. |
| **Timeout Duration** | The configured timeout value, in seconds, for request re-transmissions. |
| **Dead Time (mins)** | The configured timeout value, in mins, for the time duration after a RADIUS sever is found non-responsive or dead. |
| **RADIUS Accounting Mode** | Indicates whether the accounting mode for the server is enabled or not. |
| **RADIUS Attribute 4 Mode** | Indicate whether the NAS-IP-Address attribute has been enabled to use in RADIUS requests. |

| | |
|---|---|
| **RADIUS Attribute 4 Value** | Specifies the IP address to be used in the NAS-IP-Address attribute to be used in RADIUS requests. |
| **RADIUS Attribute 95 Mode** | Indicate whether the NAS-IPv6-Address attribute has been enabled to use in RADIUS requests. |
| **RADIUS Attribute 95 Value** | Specifies the IPv6 address to be used in the NAS-IPv6-Address attribute to be used in RADIUS requests. |
| **RADIUS Attribute MS-CHAPv2 Mode** | Indicate whether the MS-CHAPv2 attributes have been enabled to use at RADIUS authentication. |
| **Link local interface** | Indicate the outgoing interface for link local address |
| **Port** | The port used for communication with the accounting server. |
| **Type** | Specifies whether this server is a primary or secondary type. |
| **Usage Type** | Specifies the server usage type is Login, Dot1x or All. |
| **Secret Configured** | Yes or No Boolean value indicating whether this server is configured with a secret. |
| **Message Authenticator** | The message authenticator attribute configured for the radius server. |
| **Number of CoA Requests Received** | Specifies the number of CoA Requests Received |
| **Number of CoA ACK Responses Sent** | Specifies the number of CoA ACK Responses Sent |
| **Number of CoA NAK Responses Sent** | Specifies the number of CoA NACK Responses Sent |
| **Number of CoA Requests Ignored** | Specifies the number of CoA Requests Ignored |
| **Number of CoA Missing/Unsupported Attribute R** | Specifies the number of CoA Missing/Unsupported Attribute Requests |
| **Number of CoA Session Context Not Found Reque** | Specifies the number of CoA Session Context Not Found Requests |
| **Number of CoA Invalid Attribute Value Request** | Specifies the number of CoA Invalid Attribute Value Requests |
| **Number of Administratively Prohibited Request** | Specifies the number of Administratively Prohibited Requests |

Example: The following shows an example of the command.

(QCT) # show radius servers

Cur

rent Host Address Server Name Port Type Usage

----- ---------- ---------- ------- ---------- --------

* 192.168.100.1 Default-RADIUS-Server 1812 Secondary Both

10.0.0.1 Default-RADIUS-Server 1812 Secondary Both

(QCT) #show radius servers name

Server Name Host Address Port Secret

Configured

---------- ---------- ------- ----------

Default-RADIUS-Server 192.168.100.1 1812 No

(QCT) #show radius servers 192.168.100.1

RADIUS Server IP Address..... 192.168.100.1

RADIUS Server Name..... Default-RADIUS-Server

Number of Retransmits..... 4

Timeout Duration..... 5

Dead Time (mins)..... 0

RADIUS Accounting Mode..... Disable

RADIUS Attribute 4 Mode..... Disable

RADIUS Attribute 4 Value..... 0.0.0.0

RADIUS Attribute 95 Mode..... Disable

RADIUS Attribute 95 Value..... ::

Port..... 1812

Type..... Secondary

Usage Type..... both

Secret Configured..... No

Message Authenticator..... Enable

Number of CoA Requests Received..... 0

Number of CoA ACK Responses Sent..... 0

Number of CoA NAK Responses Sent..... 0

Number of CoA Requests Ignored..... 0

Number of CoA Missing/Unsupported Attribute R.. 0

Number of CoA Session Context Not Found Reque.. 0

Number of CoA Invalid Attribute Value Request.. 0

Number of Administratively Prohibited Request.. 0

## 5.12.4. Show radius statistics

This command is used to display the statistics for RADIUS or configured server. To show the configured RADIUS server statistic, the IP Address specified must match that of a previously configured RADIUS server. On execution, the following fields are displayed.

**Format** show radius statistics {<ipaddr | hostname> | name <servername>}

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **RADIUS Server Name** | The Name of the authenticating server. |
| **Server Host Address** | The IP address or host name of the authenticating server. |
| **Round Trip Time** | The time interval, in hundredths of a second, between the most recent Access-Reply, Access - Challenge and the Access-Request that matched it from the RADIUS authentication server. |

| | |
|---|---|
| **Access Requests** | The number of RADIUS Access-Request packets sent to this server. This number does not include retransmissions. |
| **Access Retransmissions** | The number of RADIUS Access-Request packets retransmitted to this RADIUS authentication server. |
| **Access Accepts** | The number of RADIUS Access-Accept packets, including both valid and invalid packets, which were received from this server. |
| **Access Rejects** | The number of RADIUS Access-Reject packets, including both valid and invalid packets, which were received from this server. |
| **Access Challenges** | The number of RADIUS Access-Challenge packets, including both valid and invalid packets, which were received from this server. |
| **Malformed Access Responses** | The number of malformed RADIUS Access-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators or signature attributes or unknown types are not included as malformed access responses. |
| **Bad Authenticators** | The number of RADIUS Access-Response packets containing invalid authenticators or signature attributes received from this server. |
| **Pending Requests** | The number of RADIUS Access-Request packets destined for this server that have not yet timed out or received a response. |
| **Timeouts** | The number of authentication timeouts to this server. |
| **Unknown Types** | The number of RADIUS packets of unknown types, which were received from this server on the authentication port. |
| **Packets Dropped** | The number of RADIUS packets received from this server on the authentication port and dropped for some other reason. |

Example: The following shows an example of the command.

(QCT) #show radius statistics 192.168.100.1

RADIUS Server Name..... Default-RADIUS-Server

Server Host Address..... 192.168.100.1

Round Trip Time..... 0.00

Access Requests..... 0

Access Retransmissions..... 0

Access Accepts..... 0

Access Rejects..... 0

Access Challenges..... 0

Malformed Access Responses..... 0

Bad Authenticators..... 0

Pending Requests..... 0

Timeouts..... 0

Unknown Types..... 0

Packets Dropped..... 0

## 5.12.5. Show radius source-interface

This command is used to display the configured global source interface details used for a RADIUS client. The IP address of the selected interface is used as source IP for all communications with the server.

**Format** show radius source-interface

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **RADIUS Client Source Interface** | The interface to use as the source interface for RADIUS client. |
| **RADIUS Client Source IPv4 Address** | The IP address of the interface configured as the RADIUS client source interface. |

## 5.12.6. Authentication network radius

This command enables the switch to accept VLAN assignment by the radius server.

**Format** authorization network radius

**Default** Disable

**Mode** Global Config

### no authorization network radius

This command disables the switch to accept VLAN assignment by the radius server.

**Format** no authorization network radius

**Mode** Global Config

## 5.12.7. Clear radius dynamic-author statistics

This command clear radius dynamic authorization counters.

**Format** clear radius dynamic-author statistics

**Mode** Privileged EXEC

Example:

(QCT) #clear radius dynamic-author statistics

Are you sure you want to clear statistics? (y/n) y

Statistics cleared.

## 5.12.8. Radius accounting mode

This command is used to enable RADIUS accounting function.

**Format** radius accounting mode

**Default** Disable

**Mode** Global Config

### no radius accounting mode

This command is used to set the RADIUS accounting function to the default value.

**Format** no radius accounting mode

**Mode** Global Config

## 5.12.9. Radius server attribute 4

This command specifies the RADIUS client to use the NAS-IP Address attribute in the RADIUS requests. If the specific IP address is configured while enabling this attribute, the RADIUS client uses that IP address while sending NAS-IP-Address attribute in RADIUS communication.

**Format** radius server attribute 4 [<ipaddr>]

| Parameter | Definition |
|---|---|
| **4** | NAS-IP-Address attribute to be used in RADIUS requests. |
| **ipaddr** | The IP address of the server. |

**Default** None

**Mode** Global Config

### no radius server attribute 4

This command disables the NAS-IP-Address attribute global parameter for RADIUS client. When this parameter is disabled, the RADIUS client does not send the NAS-IP-Address attribute in RADIUS requests.

**Format** no radius server attribute 4

**Mode** Global Config

## 5.12.10. Radius server attribute 95

This command specifies the RADIUS client to use the NAS-IPv6 Address attribute in the RADIUS requests. If the specific IPv6 address is configured while enabling this attribute, the RADIUS client uses that IPv6 address while sending NAS-IPv6-Address attribute in RADIUS communication.

**Format** radius server attribute 95 [<ipv6-address>]

| Parameter | Definition |
|---|---|
| **95** | NAS-IPv6-Address attribute to be used in RADIUS requests. |
| **ipv6-address** | The IPv6 address of the server. |

**Default** None

**Mode** Global Config

### no radius server attribute 95

This command disables the NAS-IPv6-Address attribute global parameter for RADIUS client. When this parameter is disabled, the RADIUS client does not send the NAS-IP-Address attribute in RADIUS requests.

**Format** no radius server attribute 95

**Mode** Global Config

## 5.12.11. Radius server attribute mschapv2

This command is used to enable switch to support the version two of Microsoft Challenge-Handshake Authentication Protocol (MS-CHAPv2). When this parameter is enabled, the RADIUS client will use MS-CHAPv2 attributes at user login authentication.

**Format** RADIUS server attribute mschapv2

| Parameter | Definition |
|---|---|
| **machapv2** | MS-CHAPv2 attributes to be used at RADIUS authenticaton. |

**Default** None

**Mode** Global Config

### no radius server attribute mschapv2

This command disables the MS-CHAPv2 attributes for RADIUS authentication.

**Format** no radius server attribute mschapv2

**Mode** Global Config

## 5.12.12. Radius server deadtime

This command configures radius server dead time.

**Format** radius server deadtime <minutes>

**Default** 0

**Mode** Global Config

### no radius server deadtime

This command is used to set dead time to the default value.

**Format** no radius server deadtime

**Mode** Global Config

## 5.12.13. Radius server host

This command configures the IP address or DNS name to use for communicating with the RADIUS server of a selected server type. While configuring the IP address or DNS name for the authenticating or accounting servers, you can also configure the port number and server name. If the authenticating and accounting servers are configured without a name, the command uses the 'Default-RADIUS-Server' as the default names, respectively. The same name can be configured for more than one authenticating servers and the name should be unique for accounting servers.

If the '**auth**' token is used, the command configures the IP address to use to connect to a RADIUS authentication server. Up to 3 servers can be configured per RADIUS client. If the maximum number of configured servers is reached, the command will fail until one of the servers is removed by executing the no form of the command. If the optional *port* parameter is used, the command will configure the UDP port number to use to connect to the configured RADIUS server. In order to configure the UDP port number, the IP address must match that of a previously configured RADIUS authentication server. The *port* number range is 1 - 65535, with 1812 being the default value.

**Note**: To reconfigure a RADIUS authentication server to use the default UDP *port*, set the *port* parameter to 1812.

If the '**acct**' token is used, the command configures the IP address to use for the RADIUS accounting server. Only a single accounting server can be configured. If an accounting server is currently configured, it must be removed from the configuration using the no form of the command before this command succeeds. If the optional *port* parameter is used, the command will configure the UDP port to use to connect to the RADIUS accounting server. The IP address specified must match that of a previously configured accounting server. If a port is already configured for the accounting server then the new port will replace the previously configured value. The port must be a value in the range 1 - 65535, with 1813 being the default value.

**Note**: To reconfigure a RADIUS accounting server to use the default UDP *port*, set the *port* parameter to 1813.

**Format** radius server host auth <ip-addr| ipv6-address | hostname> [name <servername>] [port <port>] [usage-type <8021x|login|both>]

radius server host acct <ip-addr| ipv6-address | hostname> [name <servername>] [port <port>]

| Parameter | Definition |
|---|---|
| **ip-addr \| ipv6-address \| hohstname** | This field is an IPv4 or IPv6 address or a hostname |
| **servername** | Server name |
| **port** | Port number in the range 1-65535 |
| **usage-type** | Configure the Radius server usage type. The type could be – 802.1x, login, or both |

**Default** None

**Mode** Global Config

## no radius server host

The no version of this command deletes the configured server entry from the list of configured RADIUS servers. If the RADIUS authenticating server being removed is the active server in the servers that are identified by the same server name, then the RADIUS client selects another server for making RADIUS transactions. If the '**auth**' token is used, the previously configured RADIUS authentication server is removed from the configuration. Similarly, if the '**acct**' token is used, the previously configured RADIUS accounting server is removed from the configuration. The *ipaddr|hostname* parameter must match the IP address or hostname of the previously configured RADIUS authentication / accounting server.

**Format** no radius server host {acct | auth} <ip-addr| ipv6-address | hostname>

**Mode** Global Config

Example: The following shows an example of the command.

(QCT) (Config) #radius server host acct 192.168.37.60

(QCT) (Config) #radius server host acct 192.168.37.60 port 1813

(QCT) (Config) #radius server host auth 192.168.37.60 name Network1_RS port 1813

(QCT) (Config) #radius server host acct 192.168.37.60 name Network2_RS

(QCT) (Config) #no radius server host acct 192.168.37.60

## 5.12.14. Radius server host link-local

This command configures the link-local-address of the RADIUS server and the outgoing interface to be used by the RADIUS client to communicate with the RADIUS server. The outgoing interface can be any physical interface or service port.

**Format** radius server host auth link-local <link-local-address> interface {<slot/port> | serviceport} [name <servername>] [port <port>] [usage-type <8021x|login|both>]

radius server host acct link-local <link-local-address> interface {<slot/port> | serviceport} [name <servername>] [port <port>]

| Parameter | Definition |
|---|---|
| **link-local** | Specify the link local address |
| **interface** | Specify the outgoing interface for link local address |
| **servername** | Server name |
| **port** | Port number in the range 1-65535 |
| **usage-type** | Configure the Radius server usage type. The type could be – 802.1x, login, or both |

**Default** None

**Mode** Global Config

### no radius server host link-local

This command removes the configured radius server link-local-address.

**Format** no radius server host {acct | auth} link-local <link-local-address>

**Mode** Global Config

## 5.12.15. Radius server key

This command is used to configure the shared secret between the RADIUS client and the RADIUS accounting / authentication server. Depending on whether the **'auth'** or **'acct'** token is used, the shared secret will be configured for the RADIUS authentication or RADIUS accounting server. The IP address provided must match a previously configured server. When this command is executed, the secret will be prompted. The secret must be an alphanumeric value not exceeding 20 characters.

**Format** radius server key {acct | auth} <ipaddr| hostname> [encrypted <password>]

**Default** None

**Mode** Global Config

Example: The following shows an example of the command.

(QCT) (Config) # radius server key auth 192.168.37.60

Enter secret (64 characters max):******

Re-enter secret:******

## 5.12.16. Radius server primary

This command is used to configure the primary RADIUS authentication server for this RADIUS client. The primary server is the one that is used by default for handling RADIUS requests. The remaining configured servers are only used if the primary server cannot be reached. A maximum of three servers can be configured on each client. Only one of these servers can be configured as the primary. If a primary server is already configured prior to this command being executed, the server specified by the IP address specified used in this command will become the new primary server. The IP address must match that of a previously configured RADIUS authentication server.

**Format** radius server primary <ipaddr| hostname>

**Default** None

**Mode** Global Config

## 5.12.17. Radius server retransmit

This command sets the maximum number of times a request packet is re-transmitted when no response is received from the RADIUS server. The retries value is an integer in the range of 1 to 15.

**Format** radius server retransmit <retries>

**Default** 4

**Mode** Global Config

### no radius server retransmit

This command is used to set the maximum number of retries to the default value.

**Format** no radius server retransmit

**Mode** Global Config

## 5.12.18. Radius server timeout

This command configures the global parameter for the RADIUS client that specifies the timeout value (in seconds) after which a request must be retransmitted to the RADIUS server if no response is received. The timeout value is an integer in the range of 1 to 30.

**Format** radius server timeout <seconds>

**Default** 5

**Mode** Global Config

### no radius server timeout

This command is used to set the timeout value to the default value.

**Format** no radius server timeout

**Mode** Global Config

## 5.12.19. Radius source-interface

Use this command to specify the physical or logical interface to use as the RADIUS client source interface (Source IP address). If configured, the address of source Interface is used for all RADIUS communications between the RADIUS server and the RADIUS client. The selected source-interface IP address is used for filling the IP header of RADIUS management protocol packets. This allows security devices (firewalls) to identify the source packets coming from the specific switch.

If a source-interface is not specified, the primary IP address of the originating (outbound) interface is used as the source address. If the configured interface is down, the RADIUS client falls back to its default behavior.

**Format** radius source-interface {<slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}

| Parameter | Definition |
|---|---|
| **slot/port** | Specifies the interface to use as the source interface. |

| | |
|---|---|
| **loopback-id** | Specifies the loopback interface to use as the source interface. The range of the loopback ID is 0 to 7 |
| **tunnel-id** | Specifies the tunnel interfaces. The range of the tunnel ID is 0 to 7. |
| **vlan-id** | Specifies the VLAN interface to use as the source interface. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Global Config

## no radius source-interface

Use this command to reset the RADIUS source interface to the default settings.

**Format** no radius source-interface

**Mode** Global Config

## 5.13. TACACS+ Commands

TACACS+ provides access control for networked devices via one or more centralized servers. Similar to RADIUS, this protocol simplifies authentication by making use of a single database that can be shared by many clients on a large network. TACACS+ is based on the TACACS protocol (described in RFC1492) but additionally provides for separate authentication, authorization, and accounting services. The original protocol was UDP based with messages passed in clear text over the network; TACACS+ uses TCP to ensure reliable delivery and a shared key configured on the client and daemon server to encrypt all messages.

### 5.13.1. Show tacacs

This command displays configured information and statistics of a TACACS+ server.

**Format** show tacacs [<ip-address | hostname>]

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Host address** | The IP address or hostname of the configured TACACS+ server. |
| **Port** | Shows the configured TACACS+ server port number. |
| **Timeout** | Shows the timeout in seconds for establishing a TCP connection. |
| **Priority** | Shows the preference order in which TACACS+ servers are contacted. If a server connection fails, the next highest priority server is contacted. |
| **Link Local Interface** | Shows the outgoing interface used by the link-local address |

Example: The following shows an example of the command.

(QCT) (Config)#show tacacs

Global Timeout: 10

Host address Port Timeout Priority

---------- ------ --------- --------

10.0.0.1 49 Global 0

## 5.13.2. Show tacacs source-interface

Use the `show tacacs source-interface` command in Global Config mode to display the configured global source interface details used for a TACACS+ client. The IP address of the selected interface is used as source IP for all communications with the server.

**Format** show tacacs source-interface

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **TACACS Client Source Interface** | The interface to use as the source interface for TACACS client. |
| **TACACS Client Source IPv4 Address** | The IP address of the interface configured as the TACACS client source interface. |

## 5.13.3. Tacacs-server host

Use the **tacacs-server host** command in Global Configuration mode to configure a TACACS+ server. This command enters into the TACACS+ configuration mode. The *ipaddr|hostname* parameter is the IPv4 or IPv6 address or hostname of the TACACS+ server. To specify multiple hosts, multiple **tacacs-server host** commands can be used.

**Format** tacacs-server host <ipAddr | hostname>

**Mode** Global Config

### no tacacs-server host

This command deletes the specified hostname or IP address.

**Format** no tacacs-server host <ipAddr | hostname>

**Mode** Global Config

## 5.13.4. Tacacs-server host link-local

Use the **tacacs-server host link-local** command in Global Configuration mode to configure the link-local-address of the TACACS+ server and the outgoing interface to be used by the TACACS+ client

to communicate with the TACACS+ server. The outgoing interface can be any physical interface or the service port.

**Format** tacacs-server host link-local <link-local-address> interface {serviceport | <slot/port>}

**Mode** Global Config

### no tacacs-server host link-local

This command revmoes the configured TACACS+ server link-local address.

**Format** no tacacs-server host link-local

**Mode** Global Config

## 5.13.5. Tacacs-server key

This command is used to configure the TACACS+ authentication and encryption key.

Note: The length of the secret key is up to 128 characters.

**Format** tacacs-server key [<key-string> | encrypted <key-string>]

**Mode** Global Config

### no tacacs-server key

This command removes the TACACS+ server secret key.

**Format** no tacacs-server host <ipAddr | hostname>

**Mode** Global Config

## 5.13.6. Tacacs-server keystring

This command is used to set the global authentication encryption key used for all TACACS+ communications between the TACACS+ server and the client.

Note: The length of the secret key is up to 128 characters.

**Format** tacacs-server keysting

**Mode** Global Config

Example: The following shows an example of the command.

(QCT) # tacacs-server keystring

Enter key:**********

Re-enter key:**********

## 5.13.7. Tacacs-server timeout

This command is used to configure the timeout value for communication with the TACACS+ servers. The *timeout* parameter has a range of 1 to 30 seconds. If you do not specify a timeout value, the command sets the global timeout to the default value. TACACS+ servers that do not use the global timeout will retain their configured timeout values.

**Format** tacacs-server timeout [<timeout>]

**Default** 10

**Mode** Global Config

### no tacacs-server timeout

This command restores the default timeout value for all TACACS+ servers.

**Format** no tacacs-server timeout

**Mode** Global Config

## 5.13.8. Key

This command is used to configure the TACACS+ authentication and encryption key.

**Note**: The length of the secret key is up to 128 characters.

**Format** key [<key-string> | encrypted <key-string>]

**Mode** TACACS server Config

## 5.13.9. Keystring

This command is used to set the TACACS+ server-specific authentication encryption key used for all TACACS+ communications between the TACACS+ server and the client.

**Note**: The length of the secret key is up to 128 characters.

**Format** keysting

**Mode** TACACS server Config

## 5.13.10. Port

This command is used to set the TACACS+ server-specific port number. The server *port-number* range is 0 to 65535.

**Format** port [<port-number>]

**Default** 49

**Mode** TACACS server Config

## 5.13.11. Priority

This command is used to set the TACACS+ server-specific authentication host priority. The server priority range is 0 to 65535.

**Format** priority [<priority>]

**Default** 0

**Mode** TACACS server Config

## 5.13.12. Timeout

This command is used to configure the timeout value for communication with the TACACS+ servers. The *timeout* parameter has a range of 1 to 30 seconds.

**Format** timeout [<timeout>]

**Default** 10

**Mode** TACACS server Config

## 5.13.13. Tacacs-server source-interface

Use this command in Global config mode to configure the source interface (Source IP address) for TACACS+ server configuration. The selected source-interface IP address is used for filling the IP header of management protocol packets. This allows security devices (firewalls) to identify the source packets coming from the specific switch.

If a source-interface is not specified, the primary IP address of the originating (outbound) interface is used as the source address.

**Format** tacacs-server source-interface {<slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}

| Parameter | Definition |
|---|---|
| **slot/port** | Specifies the interface to use as the source interface. |
| **loopback-id** | Specifies the loopback interface to use as the source interface. The range of the loopback ID is 0 to 7 |
| **tunnel-id** | Specifies the tunnel interface to use as the source interface. The range of the tunnel ID is 0 to 7. |
| **vlan-id** | Specifies the VLAN interface to use as the source interface. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Global Config

### no tacacs-server source-interface

Use this command in Global Configuration mode to remove the global source interface (Source IP selection) for all TACACS+ communications between the TACACS+ client and the server.

**Format** no tacacs-server source-interface

**Mode** Global Config

# 5.14. Security Commands

This section describes the commands you use to configure Port Security, which is also known as port MAC locking, allows you to secure the network by locking allowable MAC addresses on a given port. Packets with a matching source MAC address are forwarded normally, and all other packets are discards.

**Note**: To enable the SNMP trap specific to port security, see “snmp-server enable traps violation”.

## 5.14.1. Show port-security

This command displays the port-security settings for the port(s). If you do not use a parameter, the command displays the Port Security Administrative mode. Use the optional parameters to display the settings on a specific interface, port-channel, or on all interfaces.

**Format** show port-security [{<slot/port> | all | port-channel <portchannel-id>}]

**Mode** Privileged EXEC

User EXEC

**Display Message**

If you do not use the optional parameters *slot/port*, all, or port-channel <id>, then the command displays following information.

| Parameter | Definition |
|---|---|
| **Administrative Mode** | Port Locking mode for the entire system. The field displays if you do not support any parameters. |

For each interface, or for the interface you specify, the following information appears:

| Parameter | Definition |
|---|---|
| **Admin Mode** | Port Locking mode for the interface. |
| **Dynamic Limit** | Maximum dynamically allocated MAC addresses. |
| **Static Limit** | Maximum statically allocated MAC addresses. |
| **Violation Trap Mode** | Whether violation traps are enabled. |
| **Violation Shutdown** | Whether violation shutdown mode are enabled. |
| **Sticky Mode** | Whether sticky mode are enabled. |

Example: The following shows example CLI display output for the command.

(QCT) #show port-security

Port Security Administration Mode: Disabled

(QCT) #show port-security 0/1

| Intf | Admin Mode | Dynamic Limit | Static Limit | Violation Trap Mode | Violation Shutdown | Sticky Mode |
|---|---|---|---|---|---|---|
| 0/1 | Disabled | 600 | 20 | Disabled | Disabled | Disabled |

## 5.14.2. Show port-security dynamic

This command displays the dynamically locked MAC address for the port.

**Format** show port-security dynamic {<slot/port> | port-channel <portchannel-id>}

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **MAC Address** | MAC Address of dynamically locked MAC |
| **VLAN ID** | VLAN ID on which the MAC address was learnt |

## 5.14.3. Show port-security static

This command displays the statically locked MAC address for port.

**Format** show port-security static {<slot/port> | port-channel <portchannel-id>}

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Number of static MAC addresses configured** | The number of static MAC addresses configured |
| **Statically Configured MAC Address** | The statically configured MAC address. |
| **VLAN ID** | The ID of the VLAN that includes the host with the specified MAC address. |
| **Sticky** | Indicates whether the static MAC address entry is added in sticky mode. |

Example: The following shows example CLI display output for the command.

(QCT) #show port-security static 0/1

Number of static MAC addresses configured: 1

| Statically configured MAC Address | VLAN ID | Sticky |
|---|---|---|
| 00:00:01:01:00:00 | 2 | No |

## 5.14.4. Show port-security violation

This command displays the source MAC address of the last packet discarded on a locked port.

**Format** show port-security violation {<slot/port> | port-channel <portchannel-id>}

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **MAC Address** | The source MAC Address of the last frame that was discarded at a locked port. |
| **VLAN ID** | The VLAN ID, if applicable, associated with the MAC address of the last frame that was discarded at a locked port. |

## 5.14.5. Port-security

This command enables port locking at the system level (Global Config) or port level (Interface Config) on an interface, a range of interfaces.

**Format** port-security

**Default** Disabled

**Mode** Global Config
Interface Config

### no port-security

This command disables port locking for one or a range of ports (Interface Config) or all (Global Config) ports.

**Format** no port-security

**Mode** Global Config
Interface Config

## 5.14.6. Port-security max-dynamic

This command sets the maximum number of dynamically locked MAC addresses allowed on a specific port.

**Format** port-security max-dynamic <0-600>

**Default** 600

**Mode** Interface Config

### no port-security max-dynamic

This command resets the maximum number of dynamically locked MAC addresses allowed on a specific port to its default value.

**Format** no port-security max-dynamic

**Mode** Interface Config

## 5.14.7. Port-security max-static

This command sets the maximum of statically locked MAC addresses allowed on a specific port.

**Format** port-security max- static <0-20>

**Default** 20

**Mode** Interface Config

### no port-security max-static

This command resets the maximum number of statically locked MAC addresses allowed on a specific port to its default value.

**Format** no port-security max- static

**Mode** Interface Config

## 5.14.8. Port-security mac-address

This command adds a MAC address to the list of statically locked MAC addresses

**Format** port-security mac-address <mac-address> <vlan-id>

**Default** None

**Mode** Interface Config

### no port-security mac-address

This command removes a MAC address from the list of statically locked MAC addresses.

**Format** no port-security mac-address <mac-address> <vlan-id>

**Mode** Interface Config

## 5.14.9. Port-security mac-address move

This command converts dynamically locked MAC addresses to statically locked MAC addresses for an interface or a range of interfaces

**Format** port-security mac-address move

**Default** None

**Mode** Interface Config

## 5.14.10. Port-security mac-address sticky

This command enables sticky mode Port MAC Locking on a port. If accompanied by a MAC address and a VLAN id (for interface config mode only), it adds a sticky MAC address to the list of statically locked MAC addresses. These sticky addresses are converted back to dynamically locked addresses if sticky mode is disabled on the port. The Global command applies the "sticky" mode to all valid interfaces (physical and port-channel). There is no global sticky mode as such.

Sticky addresses that are dynamically learned will appear in show running-config as "**port-security mac-address sticky <mac-address> <vid>**" entries. This distinguishes them from the static entries.

**Format** port-security mac-address sticky [<mac-address> <vlan-id>]

**Default** None

**Mode** Global Config
Interface Config

### no port-security mac-address sticky

This command removes the sticky mode. The sticky MAC address can be deleted by using the command "**no port-security mac-address <mac-address> <vlan-id>**".

**Format** no port-security mac-address sticky

**Mode** Global Config
Interface Config

Example: The following shows an example of the command.

(QCT) (Config)#port-security mac-address sticky

(QCT) (Interface 0/1)#port-security mac-address sticky

(QCT) (Interface 0/1)#port-security mac-address sticky 00:00:00:00:00:01 2

## 5.14.11. Port-security violation shutdown

This command configures the port violation shutdown mode. Once the violation happens, the interface will be shutdown

**Format** port-security violation shutdown

**Default** Disabled

**Mode** Interface Config

## no port-security violation

This command restores violation mode to the default value.

**Format** no port-security violation

**Mode** Interface Config

# 5.15. SNTP (Simple Network Time Protocol) Commands

This section describes the commands you use to automatically configure the system time and date by using Simple Network Time Protocol (SNTP).

i The x86 platforms rely on the Linux NTP to manage the time zone and the time of day. The NTP is configured outside of QNOS. QNOS for x86 does not include the internal SNTP client and does not support SNTP commands and Time Zone clock commands.

## 5.15.1. Show sntp

This command displays the current time and configuration settings for the SNTP client, and indicates whether the local time has been properly updated.

**Format** show sntp

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Last Update Time** | Time of last clock update. |
| **Last Unicast Attempt Time** | Time of last transmit query (in unicast mode). |
| **Last Attempt Status** | Status of the last SNTP request (in unicast mode) or unsolicited message (in broadcast mode). |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show sntp

Last Update Time: Jan 1 08:00:00 1970 Taipei(UTC+8:00)

Last Unicast Attempt Time: Jan 1 08:00:00 1970 Taipei(UTC+8:00)

Last Attempt Status: Other

## 5.15.2. Show sntp client

This command displays SNTP client settings.

**Format** show sntp client

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Client Supported Modes** | Supported SNTP Modes (Broadcast, Unicast, or Multicast). |
| **SNTP Version** | The highest SNTP version the client supports. |
| **Port** | SNTP Client Port . |
| **Client Mode** | Configured SNTP Client Mode. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show sntp client

Client Supported Modes: unicast

SNTP Version: 4

Port: 123 (Not Configured)

Client Mode: disabled

## 5.15.3. Show sntp server

**This command displays configured SNTP servers and SNTP server settings.**

**Format** show sntp server

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Server Host Address** | Host Address of configured SNTP Server . |
| **Server Type** | Address Type of Server. |

| | |
|---|---|
| **Server Stratum** | Claimed stratum of the server for the last received valid packet. |
| **Server Reference Id** | Reference clock identifier of the server for the last received valid packet. |
| **Server Mode** | SNTP Server mode. |
| **Server Maximum Entries** | Total number of SNTP Servers allowed. |
| **Server Current Entries** | Total number of SNTP configured. |
| **Host Address** | Host Address of configured SNTP Server. |
| **Address Type** | Address Type of configured SNTP server. |
| **Priority** | IP priority type of the configured server. |
| **Version** | SNTP Version number of the server. The protocol version used to query the server in unicast mode. |
| **Port** | Server Port Number |
| **Last Attempt Time** | Last server attempt time for the specified server. |
| **Last Update Status** | Last server attempt status for the server. |
| **Total Unicast Requests** | Number of requests to the server. |
| **Failed Unicast Requests** | Number of failed requests from server. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show sntp server

Server Host Address:

Server Type: unknown

Server Stratum: 0

Server Reference Id:

Server Mode: Reserved

Server Maximum Entries: 3

Server Current Entries: 1

SNTP Servers

---

Host Address: 10.1.1.1

Address Type: IPv4

Priority: 1

Version: 1

Port: 123

Last Attempt Time: Jan  1 08:00:00 1970 Taipei(UTC+8:00)

Last Update Status: Other

Total Unicast Requests: 0

Failed Unicast Requests: 0

## 5.15.4. Show sntp source-interface

Use this command to display the SNTP client source interface configured on the switch.

**Format** show sntp source-interface

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **SNTP Client source Interface** | The interface ID of the physical or logical interface configured as the SNTP client source interface. |
| **SNTP Client Source IPv4 Address** | The IP address of the interface configured as the SNTP client source interface. |

Example: The following shows examples of the CLI display output for the commands.

## 5.15.5. Sntp client mode unicast

This command will enable Simple Network Time Protocol (SNTP) client mode.

**Format** sntp client mode unicast

**Default** None

**Mode** Global Config

### no sntp client mode

This command will disable Simple Network Time Protocol (SNTP) client mode.

**Format** no sntp client mode

**Mode** Global Config

## 5.15.6. Sntp client port

This command will set the SNTP client port id and polling interval in seconds.

**Format** sntp client port <portid>

| Parameter | Definition |
|---|---|
| **<portid>** | SNTP client port id. |

**Default** 123

**Mode** Global Config

### no sntp client port

Resets the SNTP client port id.

**Format** no sntp client port

**Mode** Global Config

## 5.15.7. Sntp unicast client poll-interval

This command will set the poll interval for SNTP unicast clients in seconds.

**Format** sntp unicast client poll-interval <6-10>

| Parameter | Definition |
| --- | --- |
| **<6-10>** | Polling interval. It's 2^(value) seconds where value is 6 to 10. |

**Default** 6

**Mode** Global Config

### no sntp unicast client poll-interval

This command will set the poll interval for SNTP unicast clients in seconds.

**Format** sntp unicast client poll-interval <6-10>

**Mode** Global Config

## 5.15.8. Sntp unicast client poll-timeout

This command will set the poll timeout for SNTP unicast clients in seconds.

**Format** sntp unicast client poll-timeout <poll-timeout>

| Parameter | Definition |
| --- | --- |
| **<poll-timeout>** | Polling timeout in seconds. The range is 1 to 30. |

**Default** 5

**Mode** Global Config

### no sntp unicast client poll-timeout

This command will set the poll timeout for SNTP unicast clients in seconds.

**Format** no sntp unicast client poll-timeout

**Mode** Global Config

## 5.15.9. Sntp unicast client poll-retry

This command will set the poll retry for SNTP unicast clients in seconds.

**Format** sntp unicast client poll-retry <poll-retry>

| Parameter | Definition |
|---|---|
| **<poll-retry>** | Polling retry in seconds. The range is 0 to 10. |

**Default** 1

**Mode** Global Config

### no sntp unicast client poll-retry

This command will set the poll retry for SNTP unicast clients in seconds.

**Format** no sntp unicast client poll-retry

**Mode** Global Config

## 5.15.10. Sntp server

This command configures an SNTP server (with a maximum of three) where the server address can be an ip address or a domain name. The optional priority can be a value of 1-3, the version is a value of 1-4, and the port id is a value of 1-65535.

**Format** sntp server <ipaddress/ipv6address/domain-name> [<1-3> [<version> [<portid>]]]

| Parameter | Definition |
|---|---|
| **<ipaddress/ipv6address/domain-name>** | IPv4 or IPv6 address or domain name of the SNTP server. |
| **<1-3>** | The range is 1 to 3. |
| **<version>** | The range is 1 to 4. |
| **<portid>** | The range is 1 to 65535. |

**Default** None

**Mode** Global Config

### no sntp server

This command deletes an server from the configured SNTP servers.

**Format** no sntp server <ipaddress/ipv6address/host-name> <addresstype>

**Mode** Global Config

## 5.15.11. Sntp clock timezone

This command sets the time zone for the switch's internal clock.

**Format** sntp clock timezone <name> <0-12> <0-59> {before-utc | after-utc}

| Parameter | Definition |
|---|---|
| **<name>** | Name of the time zone, usually an acronym. (Range: 1-15 characters) |
| **<0-12>** | Number of hours before/after UTC. (Range: 0-12 hours) |
| **<0-59>** | Number of minutes before/after UTC. (Range: 0-59 minutes) |
| **before-utc** | Sets the local time zone before (east) of UTC. |
| **after-utc** | Sets the local time zone after (west) of UTC. |

**Default** Taipei 08:00 Before UTC

**Mode** Global Config

## 5.15.12. Sntp source-interface

Use this command to specify the physical or logical interface to use as the SNTP client source interface. If configured, the address of source interface is used for all SNTP communications between the SNTP server and the SNTP client. Otherwise, there is no change in behavior. If the configured interface is down, the SNTP client falls back to its default behavior.

**Format** sntp source-interface {<slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}

| Parameter | Definition |
|---|---|
| **<slot/port>** | Specifies the port to use as the source interface. |
| **<0-63>** | Specifies the loopback interface to use as the source interface. The range of the loopback ID is 0 to 63. |
| **serviceport** | Specifies the serviceport interface to use as the source interface. |
| **<0-7>** | Specifies the tunnel interface to use as the source interface. The range of the tunnel ID is 0 to 7. |

| | |
|---|---|
| **<1-4093>** | Specifies the VLAN interface to use as the source interface. The range of the VLAN ID is 1 to 4093. |

**Default** None

**Mode** Global Config

## no sntp source-interface

This command will reset the SNTP source interface to its default settings.

**Format** no sntp source-interface

**Mode** Global Config

# 5.16. LLDP (Link Layer Discovery Protocol) Commands

## 5.16.1. Show lldp

This command is used to display a summary of the current LLDP configuration.

**Format** show lldp

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Transmit Interval** | Shows how frequently the system transmits local data LLDPDUs, in seconds. |
| **Transmit Hold Multiplier** | Shows the multiplier on the transmit interval that sets the TTL in local data LLDPDUs. |
| **Reinit Delay** | Shows the delay before re-initialization, in seconds. |
| **Notification Interval** | Shows how frequently the system sends remote data change notifications, in seconds. |
| **Transmit Delay** | Shows how frequently the system transmits local data LLDPDUs after a change is made in a TLV (type, length, or value) element in LLDP, in seconds. |
| **Management-address Source Interface** | Shows the source of the management interface |

## 5.16.2. Show lldp interface

This command is used to display a summary of the current LLDP configuration for a specific interface or for all interfaces.

**Format** show lldp interface [<slot/port>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|

| | |
|---|---|
| **Interface** | Shows the interface in a slot/port format. |
| **Link** | Shows whether the link is up or down. |
| **Transmit** | Shows whether the interface transmits LLDPDUs. |
| **Receive** | Shows whether the interface receives LLDPDUs. |
| **Notify** | Shows whether the interface sends remote data change notifications. |
| **TLVs** | Shows whether the interface sends optional TLVs in the LLDPDUs. The TLV codes can be 0 (Port Description), 1 (System Name), 2 (System Description), or 3 (System Capability). |
| **Mgmt** | Shows whether the interface transmits system management address information in the LLDPDUs. |

## 5.16.3. Show lldp statistics

This command is used to display the current LLDP traffic and remote table statistics for a specific interface or for all interfaces.

**Format** show lldp statistics [<slot/port>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Last Update** | Shows the amount of time since the last update to the remote table in days, hours, minutes, and seconds. |
| **Total Inserts** | Total number of inserts to the remote data table. |
| **Total Deletes** | Total number of deletes from the remote data table. |
| **Total Drops** | Total number of times the complete remote data received was not inserted due to insufficient resources. |
| **Total Ageouts** | Total number of times a complete remote data entry was deleted because the Time to Live interval expired. |
| **Interface** | Shows the interface in slot/port format. |
| **Tx Total** | Total number of LLDP packets transmitted on the port. |

| | |
|---|---|
| **Rx Total** | Total number of LLDP packets received on the port. |
| **Discards** | Total number of LLDP frames discarded on the port for any reason. |
| **Errors** | The number of invalid LLDP frames received on the port. |
| **Ageout** | Total number of times a complete remote data entry was deleted for the port because the Time to Live interval expired. |
| **TLV Discards** | Shows the number of TLVs discarded. |
| **TLV Unknowns** | Total number of LLDP TLVs received on the port where the type value is in the reserved range, and not recognized. |
| **TLV 802.1** | Total number of LLDP TLVs received on the port where the type value is 127 and OUI type is 00-80-C2. |
| **TLV 802.3** | Total number of LLDP TLVs received on the port where the type value is 127 and OUI type is 00-12-0F. |

## 5.16.4. Show lldp remote-device

This command is used to display summary information about remote devices that transmit current LLDP data to the system. You can show information about LLDP remote data received on all ports or on a specific port.

**Format** show lldp remote-device [<slot/port>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Local Interface** | Identifies the interface that received the LLDPDU from the remote device. |
| **Rem ID** | Shows the ID of the remote device. |
| **Chassis ID** | The ID that is sent by a remote device as part of the LLDP message, it is usually a MAC address of the device. |
| **Port ID** | Shows the port number that transmitted the LLDPDU. |
| **System Name** | Shows the system name of the remote device |

## 5.16.5. Show lldp remote-device detail

This command is used to display detailed information about remote devices that transmit current LLDP data to an interface on the system.

**Format** show lldp remote-deveice detail <slot/port>

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Local Interface** | Identifies the interface that received the LLDPDU from the remote device. |
| **Remote Identifier** | An internal identifier to the switch to mark each remote device to the system. |
| **Chassis ID Subtype** | Shows the type of identification used in the Chassis ID field. |
| **Chassis ID** | Identifies the chassis of the remote device. |
| **Port ID Subtype** | Identifies the type of port on the remote device. |
| **Port ID** | Shows the port number that transmitted the LLDPDU. |
| **System Name** | Shows the system name of the remote device. |
| **System Description** | Describes the remote system by identifying the system name and versions of hardware, operating system, and networking software supported in the device. |
| **Port Description** | Describes the port in an alpha-numeric format. The port description is configurable. |
| **System Capabilities Supported** | Indicates the primary function(s) of the device. |
| **System Capabilities Enabled** | Shows which of the supported system capabilities are enabled. |
| **Management Address** | For each interface on the remote device with an LLDP agent, lists the type of address the remote LLDP agent uses and specifies the address used to obtain information related to the device. |
| **Time To Live** | Shows the amount of time (in seconds) the remote device's information received in the LLDPDU should be treated as valid information. |

| | |
|---|---|
| **MAC/PHY Configuration/Status** | **Auto-Negetitation:** Identifies the auto-negotiation support and current status of the remote device.<br><br>**PMD Auto-Negetitation Advertised Capabilities:** The duplex and bit-rate capability of the port of the remote device.<br><br>**Operational MAU Type:** Displays the MAU type. The MAU performs physical layer functions, including digital data conversion from the Ethernet interfaces' collision detection and bit injection into the network. |
| **Power Via MDI** | **MDI Power Support:** The MDI power capabilities and status.<br><br>**PSE Power Pair:** Indicates the way of feeding the voltage to the data cable.<br><br>**Power Class:** PoE power class. |
| **Link Aggregation** | **Aggregation Status:** Indicates the link aggregation capabilities and the current aggregation status.<br><br>**Aggregation Port Id:** Aggregated port identifier. |
| **Maximum Frame Size** | Shows the maximum frame size capability of the implemented MAC and PHY of the remote device. |
| **Port VLAN Identity** | Shows the PVID of the connected port of the remote device. |
| **Protocol VLAN** | **Status:** Indicates the port and protocol VLAN capability and status.<br><br>**ID:** The PPVID number for the port of the remote device. |
| **VLAN Name** | Shows the name of the VLAN which the connected port is in. |
| **Protocol Identity** | Shows the particular protocols that are accessible through the port of the remote device. |

## 5.16.6. Show lldp local-device

This command is used to display summary information about the advertised LLDP local data. This command can display summary information or detail for each interface.

**Format** show lldp local-device [<slot/port>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Identifies the interface in a slot/port format. |
| **Port ID** | Shows the port ID associated with this interface. |
| **Port Description** | Shows the port description associated with the interface. |

## 5.16.7. Show lldp local-device detail

This command is used to display detailed information about the LLDP data a specific interface transmits.

**Format** show lldp local-deveice detail <slot/port>

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Identifies the interface that sends the LLDPDU. |
| **Chassis ID Subtype** | Shows the type of identification used in the Chassis ID field. |
| **Chassis ID** | Identifies the chassis of the local device |
| **Port ID Subtype** | Identifies the type of port on the local device. |
| **Port ID** | Shows the port number that transmitted the LLDPDU. |
| **System Name** | Shows the system name of the local device. |
| **System Description** | Describes the local system by identifying the system name and versions of hardware, operating system, and networking software supported in the device. |
| **Port Description** | Describes the port in an alpha-numeric format. The port description is configurable. |
| **System Capabilities Supported** | Indicates the primary function(s) of the device. |
| **System Capabilities Enabled** | Shows which of the supported system capabilities are enabled. |

| | |
|---|---|
| **Management Address** | The type of address and the specific address the local LLDP agent uses to send and receive information. |
| **MAC/PHY Configuration/Status** | **Auto-Negetitation:** Identifies the auto-negotiation support and current status of the local device.<br><br>**PMD Auto-Negetitation Advertised Capabilities:** The duplex and bit-rate capability of the port of the local device.<br><br>**Operational MAU Type:** Displays the MAU type. The MAU performs physical layer functions, including digital data conversion from the Ethernet interfaces' collision detection and bit injection into the network. |
| **Power Via MDI** | **MDI Power Support:** The MDI power capabilities and status.<br><br>**PSE Power Pair:** Indicates the way of feeding the voltage to the data cable.<br><br>**Power Class:** PoE power class. |
| **Link Aggregation** | **Aggregation Status:** Indicates the link aggregation capabilities and the current aggregation status.<br><br>**Aggregation Port Id:** Aggregated port identifier. |
| **Maximum Frame Size** | Shows the maximum frame size capability of the implemented MAC and PHY of the local device. |
| **Port VLAN Identity** | Shows the PVID of the port. |
| **VLAN Name** | Shows the name of the VLAN which the port is in. |
| **Protocol Identity** | Shows the particular protocols that are accessible through the port. |

## 5.16.8. Show lldp dcbx interface

This command is used to display the local Data Center Bridging Capability Exchange (DCBX) control status of an interface on the system.

**Format** show lldp dcbx interface [<slot/port> [detail]]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|

| | |
|---|---|
| **Is configuration source selected** | Is any interface configured configuration source or not. |
| **Configuration source port** | The interface which is configured as configuration source. |
| **Interface** | Specifies all the ports on which DCBX can be configured. |
| **Status** | Specifies the DCBX status of the interfaces. |
| **Role** | Specifies the DCBX role on the interfaces. |
| **Version** | Specifies the DCBX version on the interfaces. |
| **DCBX Tx** | Total number of transmitted DCBX TLV(s) on the interfaces. |
| **DCBX Rx** | Total number of received DCBX TLV(s) on the interfaces. |
| **DCBX Error** | Total number of error DCBX TLV(s) on the interfaces. |
| **uknown TLV** | Total number of unknown DCBX TLV(s) on the interfaces. |
| **DCBX operational status** | Specifies the DCBX status of the interface. |
| **Configured DCBX version** | Specifies the DCBX version on this interface. |
| **Peer DCBX version** | Specifies the DCBX version of the peer device. |
| **Peer MAC** | Specifies the MAC address of the peer device. |
| **Peer Description** | Specifies the description of the peer device. |
| **Auto-configuration Port Role** | Specifies the DCBX role on this interface. |
| **Peer Is configuration Source** | Is peer device configured configuration source or not. |
| **Error counters** | Total number of error DCBX TLV(s) on this interface as following. |
| **PFC incompatible configuration** | Total number of PFC incompatible configuration on this interface. |
| **Disappearing neighbor** | Total number of Disappearing neighbor on this interface. |
| **Multiple neighbors detected** | Total number of Multiple neighbors detected on this interface. |

| | |
|---|---|
| **Local configuration** | Specifies the configuration of the local device. |
| **PFC configuration** | Specifies the PFC configuration of the local device. |
| **Application priority (Tx enabled/disabled)** | Specifies the mapping of the specific application to the priority of the local device. |
| **Peer configuration** | Specifies the configuration of the peer device. |
| **PFC configuration** | Specifies the PFC configuration of the peer device. |
| **Application priority (Tx enabled/disabled)** | Specifies the mapping of the specific application to the priority of the peer device. |

**Note**: Local DCBX configuration shown is configured according to:

(1) Configuration set by user via PFC commands (priority-flow-control) for manual ports. (Note: We currently do not provide command to manually configure local application priority)

(2) Configuration propagated internally by the configuration source for auto-down ports and auto-up ports not selected as configuration source.

(3) Configuration received from peer for manually selected or auto-detected configuration source.

## 5.16.9. Show lldp tlv-select interface

This command is used to display the DCBX TLV configuration of an interface on the system.

**Format** show lldp tlv-select interface [<slot/port>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Specifies all the ports on which DCBX TLV can be configured. |
| **PFC** | Specifies the DCBX priority flow control TLV on the interfaces. |
| **App priority** | Specifies the DCBX application-priority TLV on the interfaces. |

## 5.16.10. Show lldp remote-comparison

This command is used to display LLDP comparison between remote & local interface on the system.

**Format** show lldp remote-comparison [<slot/port>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **LLDP Comparison** | Specifies all the difference of TLVs between remote interface & local interface. |

## 5.16.11. Show lldp dcbx app-pri-map

This command is used to display configuration of an application priority map. Configuration of all application priority maps is displayed when a specific map-id is not entered.

**Format** show lldp dcbx app-pri-map [<map-id>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **map-id** | The ID of the application priority map. |

## 5.16.12. Lldp notification

This command is used to enable remote data change notifications.

**Format** lldp notification

**Default** Disabled

**Mode** Interface Config

### no lldp notification

This command is used to disable notifications.

**Format** no lldp notification

**Mode** Interface Config

## 5.16.13. Lldp notification-interval

This command is used to configure how frequently the system sends remote data change notifications. The <interval-seconds> parameter is the number of seconds to wait between sending notifications. The valid interval range is 5-3600 seconds.

**Format** lldp notification-interval <interval-seconds>

**Default** 5

**Mode** Global Config

### no lldp notification-interval

This command is used to return the notification interval to the default value.

**Format** no lldp notification-interval

**Mode** Global Config

## 5.16.14. Lldp receive

This command is used to enable the LLDP receive capability.

**Format** lldp receive

**Default** Enable

**Mode** Interface Config

### no lldp receive

This command is used to return the reception of LLDPDUs to the default value.

**Format** no lldp receive

**Mode** Interface Config

## 5.16.15. Lldp transmit

This command is used to enable the LLDP advertise capability.

**Format** lldp transmit

**Default** Enable

**Mode** Interface Config

### no lldp transmit

This command is used to return the local data transmission capability to the default.

**Format** no lldp transmit

**Mode** Interface Config

## 5.16.16. Lldp transmit-mgmt

This command is used to include transmission of the local system management address information in the LLDPDUs.

**Format** lldp transmit-mgmt

**Default** None

**Mode** Interface Config

### no lldp transmit-mgmt

This command is used to cancel inclusion of the management information in LLDPDUs.

**Format** no lldp transmit-mgmt

**Mode** Interface Config

## 5.16.17. Lldp transmit-tlv

This command is used to specify which optional type length values (TLVs) in the 802.1AB basic management set are transmitted in the LLDPDUs. Use sys-name to transmit the system name TLV. To configure the system name, please refer to “snmp-server” command. Use sys-descto transmit the system description TLV. Use sys-cap to transmit the system capabilities TLV. Use port-desc to transmit the port description TLV. To configure the port description, please refer to “description” command. Use org-spec to transmit the organization specific TLV.

**Format** lldp transmit-tlv [sys-desc] [sys-name] [sys-cap] [port-desc] [org-spec]

**Default** None

**Mode** Interface Config

### no lldp transmit-tlv

This command is used to remove an optional TLV from the LLDPDUs. Use the command without parameters to remove all optional TLVs from the LLDPDU.

**Format** no lldp transmit-tlv [sys-desc] [sys-name] [sys-cap] [port-desc] [org-spec]

**Mode** Interface Config

## 5.16.18. Lldp timers

This command is used to set the timing parameters for local data transmission on ports enabled for LLDP. The <interval-seconds> determines the number of seconds to wait between transmitting local data LLDPDUs. The range is 5-32768 seconds. The <hold-value> is the multiplier on the transmit interval that sets the TTL in local data LLDPDUs. The multiplier range is 2-10. The <reinit-seconds> is the delay before re-initialization, and the range is 1-10 seconds.

**Format** lldp timers [interval <interval-seconds>] [hold <hold-value>] [reinit <reinit-seconds>]

**Default** Interval-seconds 30
Hold-value 4
Reinit-seconds 2

**Mode** Global Config

### no lldp timers

This command is used to return any or all timing parameters for local data transmission on ports enabled for LLDP to the default values.

**Format** no lldp timers [interval] [hold] [reinit]

**Mode** Global Config

## 5.16.19. Lldp tx-delay

This command is used to set the timing parameters for data transmission delay on ports enabled for LLDP. The <delay-seconds> determines the number of seconds to wait between transmitting local data LLDPDUs. The range is 1-8192 seconds.

**Format** lldp tx-delay <delay-seconds>

**Default** 2

**Mode** Global Config

## no lldp tx-delay

This command is used to return the transmit delay to the default value.

**Format** no lldp tx-delay

**Mode** Global Config

## 5.16.20. Lldp dcbx version

This command is used to support a specific version of the DCBX protocol or to detect the peer version and match it. DCBX can be configured to operate in IEEE mode or CEE mode or CIN. In auto mode, version detection is based on the peer device DCBX version. The switch operates in either IEEE or one of the legacy modes on each interface.
In **auto** mode, the switch will attempt to jump start the exchange by sending an IEEE frame, followed by a CEE frame followed by a CIN frame. The switch will parse the received response and immediately switch to the peer version.

**Format** lldp dcbx version <auto | cee | cin | ieee>

| Term | Definition |
|---|---|
| **auto** | Configure the switch to auto detect the peer DCBX version. |

| | |
|---|---|
| **cee** | Configure the switch to operate according to standard cee 1.06. |
| **cin** | Configure the switch to operate according to DCBX standard CIN 1.0. |
| **ieee** | Configure the switch to operate according to standard IEEE 802.1Qaz. |

**Default** Auto

**Mode** Global Config

**Note**: Application priority is only supported in IEEE mode with application selector 2 (TCP) and 3 (UDP). ACL rules corresponding to the application-to-priority mapping(s) will only be added with application selector 2 and 3; mapping(s) with application selector other than 2 and 3 will be propagated internally and transmitted to peer(s) in application priority TLVs without actual effect in local device.

Current supported TLVs for each version are listed in the table below.

| **version** | PFC | ETS Configuration | ETS Recommend | Application Priority |
|---|---|---|---|---|
| CEE | O | O | O | X |
| CIN | O | O | O | X |
| IEEE | O | O | O | O |

### no lldp dcbx version

Use the **no lldp dcbx version** to reset the value to default.

**Format** no lldp dcbx version

**Mode** Global Config

## 5.16.21. Lldp dcbx port-role

This command is used to configure the port role to manual, auto-upstream, auto-downstream and configuration source. In order to reduce configuration flapping, ports that obtain configuration information from a configuration source port will maintain that configuration for 2x the LLDP timeout, even if the configuration source port becomes operationally disabled.

**Format** lldp dcbx port-role <auto-down | auto-up | configuration-source | manual>

| **Term** | **Definition** |
|---|---|
| **auto-down** | Configure interface as auto-down stream. Advertises a configuration but is not willing to accept one from the link partner. However, the port will accept a configuration propagated internally by the configuration source. An auto-downstream port that receives an internally propagated configuration overwrites its local configuration with the new parameter values. These ports |

| | |
|---|---|
| | have the willing bit set to disabled. Selection of a port based upon compatibility of the received configuration is suppressed. These ports should be connected to a trusted FCF. |
| **auto-up** | Configure interface as auto-up stream. Advertises a configuration, but is also willing to accept a configuration from the link-partner and propagate it internally to the auto-downstream ports as well as receive configuration propagated internally by other auto-upstream ports. A port that receives an internally propagated configuration overwrites its local configuration with the new parameter values. The first auto-upstream that is capable of receiving a peer configuration is elected as the configuration source. These ports have the willing bit enabled. These ports should be connected to FCFs. |
| **configuration-source** | Configure interface as configuration source. In this role, the port has been manually selected to be the configuration source. Configuration received over this port is propagated to the other auto-configuration ports. Selection of a port based upon compatibility of the received configuration is suppressed. These ports should be connected to a trusted FCF. These ports have the willing bit enabled. Note that coexistence of configuration sources is not allowed. |
| **manual** | Configure interface as manual port. Ports operating in the Manual role do not have their configuration affected by peer devices or by internal propagation of configuration. These ports will advertise their configuration to their peer if DCBX is enabled on that port. The willing bit is set to disabled on manual role ports. |

**Default** Manual

**Mode** Interface Config

### no lldp dcbx port-role

Use the **no lldp dcbx port-role** to reset this function to default.

**Format** no lldp dcbx port-role

**Mode** Interface Config

## 5.16.22. Lldp dcbx app-pri-map

This command is used to create an application priority map and enter the corresponding app-pri-map configuration mode. An application priority map should be created before an interface is using it. Enter the app-pri-map configuration mode using this command in order to configure the priority-queue mappings (5.16.27) or add/remove application entries (5.16.28).

**Note**: ACL names starting with “app-pri-map-” are reserved for the use of application priority, configuring ACLs with such names is prohibited.

**Format** lldp dcbx app-pri-map <map-id>

| Term | Definition |
|---|---|
| **map-id** | The ID of an application priority map. Range is 1-4. |

**Default** None

**Mode** Global Config

### no lldp dcbx app-pri-map

Use the **no lldp dcbx app-pri-map** to destroy an application priority map.

**Format** no lldp dcbx app-pri-map

**Mode** Global Config

## 5.16.23. Lldp dcbx app-pri-map apply

This command is used to apply an application priority map to an interface.
When an application priority map couldn't be successfully applied to an interface, check the following:

- An application priority map should be created before an interface is using it.
- At most one application priority map is permitted to be applied to an interface. In order to alter the map applied to an interface, it is required to remove the current map from interface using *no lldp dcbx app-pri-map apply* before reapplication.

**Note**: An application priority map may be applied to an interface regardless of the port role the interface is operating in. However, the applied map will be operational only when the interface is a manual port.

**Format** lldp dcbx app-pri-map <map-id> apply

| Term | Definition |
|---|---|
| **map-id** | The ID of an application priority map. Range is 1-4. |

**Default** None

**Mode** Interface Config

### no lldp dcbx app-pri-map apply

Use the **no lldp dcbx app-pri-map apply** to remove an application priority map from an interface.

**Format** no lldp dcbx app-pri-map <map-id> apply

**Mode** Interface Config

## 5.16.24. Lldp tlv-select dcbxp

This command is used to send specific DCBX TLVs if LLDP is enabled to transmit on the given interface.

**Format** lldp tlv-select dcbxp [pfc | application-priority]

| Term | Definition |
|---|---|
| **pfc** | Transmit DCBX priority flow control TLV. |
| **application-priority** | Transmit DCBX application-priority TLV. |

**Default** PFC and application priority

**Mode** Global Config
Interface Config

**Note**: Application priority is only supported in IEEE mode with application selector 2 (TCP) and 3 (UDP). An IP access list named “AppPriACL” will be created with all auto-ports as inbound interfaces when the configuration source receives such information. ACL rule(s) corresponding to the application-to-priority mapping(s) will only be added with application selector 2 and 3; mapping(s) with other application selectors will be propagated internally and transmitted to peer in application priority TLVs without actual effect in local device. A maximum of 4 application-to-priority mappings are allowed.

### no lldp tlv-select

Use the **no lldp tlv-select** to disable LLDP from sending all or individual DCBX TLVs, even if LLDP is enabled for transmission on the given interface.

**Format** no lldp tlv-select dcbxp [pfc | application-priority]

**Mode** Global Config
Interface Config

## 5.16.25. Lldp mgmt-address

This command is used to specify which management address is transmitted in the LLDPDUs.

**Format** lldp mgmt-address {vlan | serviceport | sys-mac}

| Term | Definition |
|---|---|
| **vlan** | Configure the IP address on VLAN 1 as the management address |
| **serviceport** | Configure the IP address on service port as the management address |
| **sys-mac** | Configure the system MAC as the management address |

**Default** serviceport

**Mode** Global Config

### no lldp mgmt-address

Use the **no lldp mgmt-address** to reset this function to default value.

**Format** no lldp mgmt-address

**Mode** Global Config

## 5.16.26. Lldp portid-subtype

This command is used to configure the port ID subtype field which is used to indicate how the port is being referenced in the Port ID field in LLDPDU.

**Format** lldp portid-subtype {interface-alias | interface-name | mac-address}

| Term | Definition |
|---|---|
| **interface-alias** | Interface alias name (configured by "*description*" CLI command) |
| **interface-name** | Interface system name |
| **mac-address** | MAC address of the physical port |

**Default** Interface-name

**Mode** Interface Config

### no lldp portid-subtype

Use the **no lldp portid-subtype** to reset this function to default value.

**Format** no lldp portid-subtype

**Mode** Interface Config

## 5.16.27. Priority-queue

This command is used to configure the priority-queue mapping of an application priority map, use this command in app-pri-map mode.

**Note**: This command is used to configure the mapping from priority to queue on manual port and will take effective only when the port status is in manual. You need to remove the app-pri-map from the manual port and reapply again if priority-queue mapping is altered.

**Format** priority-queue <0-7> <0-7>

| Term | Definition |
|---|---|
| **0-7** | The 802.1p priority. |
| **0-7** | The queue to which the 802.1p priority maps. |

**Default** 0 (All priorities are mapped to queue 0 by default)

**Mode** app-pri-map Mode

### no priority-queue

Use the **no priority-queue** to reset the priority-queue mapping of an application priority map.

**Format** no priority-queue <0-7>

**Mode** app-pri-map Mode

## 5.16.28. Application Priority

This command is used to add an application entry to an application priority map.

**Note**: A maximum of 4 application entries are allowed to be add to an application priority map.

**Format** application <udp/tcp> <1-65535> priority <0-7>

| Term | Definition |
|---|---|
| **tcp/udp** | Configure an application with TCP/UDP destination port number |
| **1-65535** | The TCP/UDP port number |
| **Priority** | Configure the 802.1p priority for this application |
| **0-7** | Configure the 802.1p priority |

**Default** None

**Mode** app-pri-map Mode

### no lldp dcbx app-pri-map

Use the **no application** to remove an application entry from an application priority map.

**Format** no application <udp/tcp> <1-65535>

**Mode** app-pri-map Mode

# 5.17. System Utilities

This section describes the commands you use to help troubleshoot connectivity issues and to restore various configurations to their factory defaults.

## 5.17.1. Clear

### 5.17.1.1. *Clear arp*

This command is used to remove all dynamic ARP entries from the ARP cache.

**Format** clear arp

**Default** None

**Mode** Privileged Exec

### 5.17.1.2. *Clear traplog*

This command clears the trap log.

**Format** clear traplog

**Default** None

**Mode** Privileged Exec

### 5.17.1.3. *Clear eventlog*

This command is used to clear the event log, which contains error messages from the system.

**Format** clear eventlog

**Default** None

**Mode** Privileged Exec

### 5.17.1.4. *Clear logging buffered*

This command is used to clear the message log maintained by the switch. The message log contains system trace information.

**Format** clear logging buffered

**Default** None

**Mode** Privileged Exec

### 5.17.1.5. *Clear config*

This command resets the configuration to the factory defaults without powering off the switch. You are prompted to confirm if the IP settings of service port would be kept and if the reset should proceed.

**Format** clear config

**Default** None

**Mode** Privileged Exec

### 5.17.1.6. *Clear pass*

This command resets all user passwords to the factory defaults without powering off the switch. You are prompted to confirm that the password reset should proceed.

**Format** clear pass

**Default** None

**Mode** Privileged Exec

### 5.17.1.7. *Clear counters*

This command clears the statistics for a specified slot/port, for all the ports, for BHD counter, for loop-detection information, or for an interface on an assigned VLAN based or port channel ID.

**Format** clear counters [<slot/port> | bhd | port-channel <portchannel-id> | loop-detection | vlan <vlan-id> | all [vrf <vrf-name>]]

**Default** None

**Mode** Privileged Exec

### 5.17.1.8. *Clear vlan*

This command resets VLAN configuration parameters to the factory defaults.

**Format** clear vlan

**Default** None

**Mode** Privileged Exec

### 5.17.1.9. *Clear igmp snooping*

This command clears IGMP snooping entries from the MFDB table.

**Format** clear igmp snooping

**Default** None

**Mode** Privileged Exec

### 5.17.1.10. *Clear ip filter*

This command is used to clear all IP filter entries.

**Format** clear ip filter

**Default** None

**Mode** Privileged Exec

### 5.17.1.11. *Clear dot1x authentication-history*

This command is used to clear 802.1x authentication history table.

**Format** clear dot1x authentication-history [<slot/port>]

**Default** None

**Mode** Privileged Exec

### 5.17.1.12. *Clear radius statistics*

This command is used to clear all RADIUS statistics.

**Format** clear radius statistics

**Default** None

**Mode** Privileged Exec

### 5.17.1.13. *Clear host*

This command is used to delete entries from the host name-to-address cache, and it clears the entries from the DNS cache maintained by the software.

The parameter “hostname” means to deletes the cached entry which matches assigned hostname.

**Format** clear host <all | hostname >

**Default** None

**Mode** Privileged Exec

### 5.17.1.14. *Clear port- security dynamic*

This command is used to clear an entry of dynamic MAC address in port-security table.

**Format** clear port-security dynamic [interface {<slot/port> | port-channel <1-64>} | mac-address <mac-address>] [vlan <vlan-id>]

**Default** None

**Mode** Privileged Exec

### 5.17.1.15. *Clear ip arp-cache*

This command is used to remove dynamic ARP entries which belong to assigned parameter type from ARP cache.

The parameter “gateway” means to clear the dynamic and gateway entries from the ARP cache.

**Format** clear ip arp-cach [gateway | interface {<slot/port> | vlan <vlan-id>} | vrf <vrf-name> [gateway]]

**Default** None

**Mode** Privileged Exec

### 5.17.1.16. *Clear lldp statistics*

This command is used to reset LLDP (Link Layer Discovery Protocol) statistics.

**Format** clear lldp statistics

**Default** None

**Mode** Privileged Exec

### 5.17.1.17. *Clear lldp remote-data*

This command is used to delete all information from the LLDP (Link Layer Discovery Protocol) remote data table, including MED-related information.

**Format** clear lldp remote-data

**Default** None

**Mode** Privileged Exec

### 5.17.1.18. *Clear ipv6 neighbors*

This command is used to clear all entries in IPv6 neighbor table or an entry on a specific interface. Use the <slot/port> parameter to specify the interface.

**Format** clear ipv6 neighbors [<slot/port> | address <ipv6-address> | vlan <vlan-id>]

**Default** None

**Mode** Privileged Exec

### 5.17.1.19. *Clear ipv6 statistics*

This command is used to clear IPv6 statistics for all interfaces or for a specific interface, including loopback and tunnel interfaces. IPv6 statistics display in the output of the show ipv6 traffic command. If you do not specify an interface, the counters for all IPv6 traffic statistics will be reset to zero.

**Format** clear ipv6 statistics [<slot/port> | loopback <loopback-id> | tunnel <tunnel-id> | vlan <vlan-id>]

**Default** None

**Mode** Privileged Exec

### 5.17.1.20. *Clear ipv6 dhcp statistics*

This command is used to clear DHCPv6 statistics for all interfaces.

**Format** clear ipv6 dhcp statistics

**Default** None

**Mode** Privileged Exec

### 5.17.1.21. *Clear ipv6 dhcp statistics per interface*

This command is used to clear DHCPv6 statistics for a specific interface.

**Format** clear ipv6 dhcp interface {<slot/port> | vlan <vlan-id>} statistics

**Default** None

**Mode** Privileged Exec

### 5.17.1.22. *Enable password*

This command changes the password which is used to confirm current user mode to be able to upgrade Privileged EXEC mode.

There're two types of password formats:

- The type "passwd 0" specifies password in plain text, and following <password> could use alphanumeric characters with maximum length is 64 characters.
- The type "passwd 7" specifies password in encrypted form, and following <password> must be hexadecimal digitals with length of 128 characters.

**Format** [no] enable passwd {0 | 7} <password>

**Default** None

**Mode** Global Config

Example: First Example sets the password of enable to plain text "testPassword", and second one set the password to encrypted string which is fixed 128 characters of hexadecimal digitals.

(QCT) (Config)# enable passwd 0 testPassword

(QCT) (Config)# enable passwd 7
0fdd841c8a524979e5ba47893efcf48b12a08619953e1b6e42cde0931198ca717cb5ff8b49795a3497e283990827c5ba1ce32855ced76a505726dfb1ee222c4b

## 5.17.2. Copy

This command uploads and downloads files to and from the switch. You can also use the copy command to manage the dual images (active and backup) on the file system. Local URLs can be specified using FTP, TFTP. SFTP and SCP are available as additional transfer methods if the software package supports secure management. If FTP is used, a password is required.

### 5.17.2.1. *Upload files from switch*

This command uploads files from the switch. The parameter *url* can be specified using TFTP, SCP, or SFTP. If SCP or SFTP is used, a password is required

**Format** copy *source* <url>

| Parameter | Definition |
|---|---|
| **url** | Uploads file using {tftp://<ipaddress\|ipv6address[%scopeid]\|hostname>/<filepath>/<filename>\| scp://<user>@<ipaddr\|ipv6address[%scopeid]\|hostname>/<path>/<filename> \| sftp://<user>@<ipaddr\|ipv6address[%scopeid]\|hostname>/<path>/<filename>}. |

**Mode** Privileged EXEC

| Source Parameter | Definition |
|---|---|
| **application <sourcefilename>** | Uploads *sourcefilename* application file |
| **backup-config** | Uploads Backup Config file. |
| **clibanner** | Uploads Pre-login Banner file. |
| **core-dump** | Uploads the core dump file |
| **cpu-pkt-capture** | Uploads CPU packets capture file |
| **crash-log** | Uploads Crashlog file |
| **errorlog** | Uploads Errorlog file. |
| **factory-defaults** | Uploads Factory Defaults file. |
| **fastpath.cfg** | Uploads Binary Config file. |
| **freeradius-dictionary** | Uploads FreeRADIUS dictionary file which defines Quanta Vendor Specific Attributes. |
| **image {active \| backup}** | Uploads the Active or the Backup Operational Code. |
| **log** | Uploads Log file. |
| **operational-log** | Uploads Operational Log file. |
| **running-config** | Copies system config file. |
| **script <sourcefilename>** | Uploads *sourcefilename* Configuration Script file. |
| **startup-config** | Uploads Startup Config file. |
| **startup-log** | Uploads Startup Log file. |
| **tech-support** | Uploads Tech Support file. |
| **traplog** | Uploads Trap log file. |

### 5.17.2.2. *Download files to switch*

This command downloads files to the switch. The parameter *url* can be specified using TFTP, SCP, or SFTP. If SCP and SFTP is used, a password is required

**Format** copy <url> *destination*

| Parameter | Definition |
|---|---|
| **url** | Downloads file using {tftp://<ipaddress\|ipv6address[%scopeid]\|hostname>/<filepath>/<filename>\| scp://<user>@<ipaddr\|ipv6address[%scopeid]\|hostname>/<path>/<filename> \| sftp://<user>@<ipaddr\|ipv6address[%scopeid]\|hostname>/<path>/<filename>}. |

**Mode** Privileged EXEC

| Destination Parameter | Definition |
|---|---|
| **application <destfilename>** | Downloads application file as *destfilename* filename |
| **backup-config** | Downloads Backup Config file |
| **clibanner** | Downloads Pre-login Banner file |
| **factory-defaults** | Downloads Factory Default file |
| **image {active \| backup}** | Downloads the Active or the Backup Operational Code |
| **license-key** | Download License file |
| **openflow-ssl-ca-cert** | Downloads OpenFlow CA certificate file |
| **openflow-ssl-cert** | Downloads OpenFlow switch certificate file |
| **openflow-ssl-priv-key** | Downloads OpenFlow private key file |
| **publickey-config** | Downloads Public Key for Config Script validation |
| **script <destfilename>** | Downloads Configuration Script file as *destfilename* filename |
| **sshkey-dsa** | Downloads SSH DSA Key file |
| **sshkey-rsa2** | Downloads SSH RSA2 Key file |
| **sshkey-user-public-key {dsa \| rsa}** | Downloads SSH user Public Key file for current user. It supports DSA or RSA Key file of OpenSSH key format. |
| **sslpem-root** | Download SSL root certificate file for SSL feature of RESTFul API. If both root certificate and server key existed, two keys will be merged as ssl.pem file |
| **sslpem-server** | Download SSL server key file for SSL feature of RESTFul API. If both root certificate and server key existed, two keys will be merged as ssl.pem file |
| **startup-config** | Downloads Config file as startup configuration file |
| **tech-support-cmds** | Downloads Tech support commands file |

Example: The following shows an example of downloading and applying as users file.

```
(QCT) #copy tftp://172.16.2.60/QNOS-lb9e-5.4.01.11.stk image active
Mode..................................... TFTP
Set Server IP.................................. 172.16.2.60
Path..................................... ./
Filename..................................... QNOS-lb9e-5.4.01.11.stk
Data Type..................................... Code
Destination Filename..................... active

Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n) y

File transfer in progress. Management access will be blocked for the duration of the transfer. please wait...
TFTP Code transfer starting...
File contents are valid. Copying file to flash...
```

File transfer operation completed successfully.

#### 5.17.2.3. *Write running configuration file into flash*

This command saves the running configuration to NVRAM.

**Format** copy running-config {startup-config | factory-defaults | <url>}

**Mode** Privileged EXEC

#### 5.17.2.4. *Manage the dual images*

This command manages the dual images (active and backup) on the file system. You can copy active code to backup image or copy backup to active image of the manager unit.

**Format** copy image {active backup | backup active}

**Mode** Privileged EXEC

#### 5.17.2.5. *Manage the dual configurations*

This command manages the dual configurations (startup and backup) on the file system. You can copy startup configuration file to backup or copy backup configuration file to startup.

**Format** copy {startup-config {backup-config | <url>} | backup-config {startup-config | <url>}}

**Mode** Privileged EXEC

### 5.17.3. Delete

This command deletes the backup image file from the permanent storage or the core dump file from the local file system.

**Format** delete {backup | core-dump-file}

**Mode** Privileged EXEC

### 5.17.4. Erase Application

This command erases the application file from the permanent storage.

**Format** erase application <filename>

**Mode** Privileged EXEC

## 5.17.5. Erase config file

This command erases the startup-config or factory-defaults from the permanent storage. When the factory defaults is erased, the factory-defaults provided by device manufacture would be restored.

**Format** erase {startup-config | factory-defaults}

**Mode** Privileged EXEC

## 5.17.6. Erase user public key

This command erases an assigned SSH user public key from the permanent storage, and it only allows user “admin” or public key owner to execute this command.

**Format** erase user-public-key <username>

**Mode** Privileged EXEC

## 5.17.7. Dir

Use this command to list the files in the directory /mnt/fastpath in flash from the CLI.

**Format** dir

**Mode** Privileged EXEC

Example: The following shows an example of dir.

(QCT) #dir

```
 2  drwx            4096 Mar 13 2000 10:24:58 .
12  drwx               0 Mar 11 2000 06:26:20 ..
11  drwx           16384 Feb 13 2000 11:38:49 lost+found
12  -rw-        62284359 Feb 13 2000 11:39:26 image1
```

```
    13  -rw-      62268250 Mar 13 2000 10:24:58 image2
    14  -rw-           668 Feb 19 2000 05:07:47 ssh_host_dsa_key
    15  -rw-           891 Feb 19 2000 05:07:39 ssh_host_rsa_key
    16  -rw-           222 Feb 19 2000 05:07:39 ssh_host_rsa_key.pub
    17  -rw-           525 Feb 19 2000 05:07:39 ssh_host_key
    18  -rw-           330 Feb 19 2000 05:07:39 ssh_host_key.pub
    19  -rw-           598 Feb 19 2000 05:07:47 ssh_host_dsa_key.pub
    20  -rw-             5 Feb 13 2000 11:41:15 sshkey
 26241  drwx          4096 Feb 13 2000 11:41:21 ruby
371681  drwx          4096 Feb 13 2000 11:41:23 bootstrap
379761  drwx          4096 Feb 13 2000 11:41:53 usr
121201  drwx          4096 Feb 13 2000 11:42:06 python
428241  drwx          4096 Feb 13 2000 11:42:06 dstat
    21  -rw-             0 Mar 11 2000 06:26:39 fluent.conf
    22  -rwx            10 Feb 13 2000 11:42:08 user.start
436321  drwx          4096 Feb 13 2000 11:42:08 crashlogs
    23  -rw-         16328 Mar 11 2000 06:26:40 log2.bin
    36  -rw-             5 Mar 11 2000 06:26:23 ologNdx0.txt
    25  -rw-             0 Mar 05 2000 12:48:11 slog2.txt
    33  -rw-             5 Mar 09 2000 06:05:18 ologNdx1.txt
    27  -rw-           172 Feb 13 2000 11:42:25 hpc_port_broad.cfg
395921  drwx          4096 Mar 11 2000 08:45:59 user-apps
    28  -rw-           413 Mar 11 2000 06:26:38 coredump_regular_config
    29  -rw-            72 Mar 11 2000 06:26:38 coredump_regular_config.md5sum
    30  -rw-            96 Mar 11 2000 06:26:40 snmpOprData.cfg
    31  -rw-           156 Feb 13 2000 11:42:44 dh512.pem
    32  -rw-           245 Feb 13 2000 11:42:44 dh1024.pem
    26  -rw-             0 Mar 05 2000 12:48:11 olog2.txt
    34  -rw-             0 Mar 09 2000 06:05:18 slog1.txt
    24  -rw-             5 Mar 05 2000 12:48:11 ologNdx2.txt
    35  -rw-             0 Mar 09 2000 06:05:18 olog1.txt
    37  -rw-             0 Mar 11 2000 06:26:23 slog0.txt
    38  -rw-             0 Mar 11 2000 06:26:23 olog0.txt
    39  -rw-            64 Mar 11 2000 06:26:23 logNvmSave.bin
    40  -rw-          2401 Mar 11 2000 06:24:45 fastpath.cfg
    41  -rw-           678 Mar 11 2000 06:24:47 startup-config

Total Size: 3646722048
Bytes Free: 3354427392
```

## 5.17.8. show bootvar

This command is used to display which images were booted when the system powered up.

**Format** show bootvar

**Mode** Privileged EXEC

Example: The following shows an example of this command.

(QCT) #show bootvar

Image Descriptions

active :
backup :

Images currently available on Flash

| unit | active | backup | current-active | next-active |
|---|---|---|---|---|
| 1 | 19.06 | <non> | 19.06 | 19.06 |

## 5.17.9. Boot-system

This command is used to specify the file or image used to start up the system. It will be the active image or backup image for subsequent reboots. If the specified image does not exist on the system, this command returns an error message.

**Format** boot-system opcode {active | backup}

**Mode** Privileged EXEC

## 5.17.10. Ping

Use this command to determine whether another computer is on the network. Ping provides a synchronous response when initiated from the CLI interface.

### 5.17.10.1. *Ping*

Use this command to determine whether another computer is on the network. To use this command, configure the switch for network (in-band) connection. The source and target devices must have the ping utility enabled and running on top of TCP/IP. The switch can be pinged from any IP workstation with which the switch is connected through the default VLAN (VLAN 1), as long as there is a physical path between the switch and the workstation. The terminal interface sends, three pings to the target station.

**Format** ping [vrf <vrf-name>] {<ip-address> | <ip6addr> | <hostname>} [count <1-15>] [interval <1-60>] [size <0-13000>] [source {< ip-address> | <slot/port> | loopback <loopback-id> | serviceport | vlan <vlan-id>}]

**Default** The default count is 3.

The default interval is 3 seconds.

The default size is 0 bytes.

**Mode** Privileged EXEC

User EXEC

Using the options described below, you can specify the number and size of Echo Requests and the interval between Echo Requests.

| Parameter | Definition |
|---|---|
| **vrf-name** | The name of the virtual router in which to initiate the ping. If no virtual router is specified, the ping is initiated in the default router instance. |
| **count** | Use the **count** parameter to specify the number of ping packets (ICMP Echo requests) that are sent to the destination address specified by the ip-address field. The range for count is 1 to 15 requests. |
| **interval** | Use the **interval** parameter to specify the time between Echo Requests, in seconds. Range is 1 to 60 seconds. |
| **size** | Use the **size** parameter to specify the size, in bytes, of the payload of the Echo Requests sent. Range is 0 to 13000 bytes. |
| **source** | Use the source parameter to specify the source IP/IPv6 address or interface to use when sending the Echo requests packets. |

### 5.17.10.2. *Ping ipv6*

Use this command to determine whether another computer is on the network. Ping provides a synchronous response when initiated from the CLI interface. To use the command, configure the switch for network (in-band) connection. The source and target devices must have the ping utility enabled and running on top of TCP/IP. The
switch can be pinged from any IP workstation with which the switch is connected through the default VLAN (VLAN 1), as long as there is a physical path between the switch and the workstation. The terminal interface sends three pings to the target station. Use the *ipv6-address|hostname* parameter to ping an interface by using
the global IPv6 address of the interface. Use the optional *size* keyword to specify the size of the ping packet. You can utilize the ping or traceroute facilities over the service/network ports when using an IPv6 global address *ipv6-address|hostname*. Any IPv6 global address or gateway assignments to these interfaces will cause IPv6 routes to be installed within the IP stack such that the ping or traceroute request is routed out the service/network port properly. When referencing an IPv6 link-local address, you must also specify the service or network port interface by using the *serviceport* or *network* parameter.

**Format** ping ipv6 <ipv6-address | hostname> [count <1-15>] [interval <1-60>] [size <0-13000>] [source {< ip-address> | <slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}]

**Default** The default count is 3.

The default interval is 3 seconds.

The default size is 0 bytes.

**Mode** Privileged EXEC

User EXEC

### 5.17.10.3. *Ping ipv6 interface*

This command use to determine whether another computer is on the network. To use the command, configure the switch for network (in-band) connection. The source and target devices must have the ping utility enabled and running on top of TCP/IP. The switch can be pinged from any IP workstation with which the switch is connected through the default VLAN (VLAN 1), as long as there is a physical path between the switch and the workstation. The terminal interface sends three pings to the target station. Use the *interface* keyword to ping an interface by using the link-local address or the global IPv6 address of the interface. You can use a loopback, network port, serviceport, tunnel, or physical interface as the source. Use the optional *size* keyword to specify the size of the ping packet. The *ipv6-address* is the link local IPv6 address of the device you want to query.

**Format** ping ipv6 interface {<slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>} <link-local-address> [count <1-15>] [interval <1-60>] [size <0-13000>] [source {< ip-address> | <slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}]

**Default** The default count is 3.

The default interval is 3 seconds.

The default size is 0 bytes.

**Mode** Privileged EXEC

User EXEC

## 5.17.11. Traceroute

### 5.17.11.1. *Traceroute*

Use the traceroute command to discover the routes that packets actually take when traveling to their destination through the network on a hop-by-hop basis. Traceroute continues to provide a synchronous response when initiated from the CLI.

**Format** traceroute [vrf <vrf-name>] <ip-address | hostname> [initTtl <initTtl>] [maxTtl <maxTtl>] [maxFail <maxFail>] [interval <interval>] [count <count>] [port <port>] [size <size>] [source {< ip-address> | <slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}]

| Parameter | Definition |
|---|---|
| **vrf-name** | The name of the virtual router in which to initiate traceroute. Only hosts reachable from within the VRF instance can be tracerouted. If a source parameter is specified in conjunction with a vrf parameter, it must be a member of the VRF. The ipv6 parameter cannot be used in conjunction with |

| | |
|---|---|
| | the vrf parameter. |
| **initTtl** | Use **initTtl** to specify the initial time-to-live (TTL), the maximum number of router hops between the local and remote system. Range is 0 to 255. |
| **maxTtl** | Use **maxTtle** to specify the maximum TTL. Range is 1 to 255. |
| **maxFail** | Use **maxFail** to terminate the traceroute after failing to receive a response for this number of consecutive probes. Range is 0 to 255. |
| **port** | Use the optional **port** parameter to specify destination UDP port of the probe. This should be an unused port on the remote destination system. Range is 1 to 65535. |
| **count** | Use the **count** parameter to specify the number of probes per hop. The range for count is 1 to 10. |
| **interval** | Use the **interval** parameter to specify the time between probes, in seconds. If traceroute does receive a response to a probe within this interval, then it sends the next probe immediately. Range is 1 to 60 seconds. |
| **size** | Use the **size** parameter to specify the size of probe packets, in bytes. Range is 0 to 39936 bytes. |
| **source** | Use the **source** parameter to specify the source IP/IPv6 address or interface to use for the traceroute. |

**Default** The default initTtl is 1.

The default maxTtl is 30.

The default maxFail is 5.

The default interval is 3 seconds.

The default count is 3.

The default port is 33434.

The default size is 0 bytes.

**Mode** Privileged EXEC

### 5.17.11.2. *Traceroute ipv6*

Use the traceroute command to discover the routes that packets actually take when traveling to their destination through the network on a hop-by-hop basis. The <ipv6-address|hostname> parameter must be a valid IPv6 address|hostname.

**Format** traceroute ipv6 <ipv6-address | hostname> [initTtl <initTtl>] [maxTtl <maxTtl>] [maxFail <maxFail>] [interval <interval>] [count <count>] [port <port>] [size <size>] [source {< ip-address> | <slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}]

**Default** The default initTtl is 1.

The default maxTtl is 30.

The default maxFail is 5.

The default interval is 3 seconds.

The default count is 3.

The default port is 33434.

The default size is 0 bytes.

**Mode** Privileged EXEC

## 5.17.12. Logging CLI command

This command enables the CLI command Logging feature. The Command Logging component enables the switch to log all Command Line Interface (CLI) commands issued on the system.

**Format** logging cli-command

**Default** None

**Mode** Global Config

## 5.17.13. Calendar set

This command is used to set the system clock.

**Format** calendar set <mm/dd/yyy> <hh:mm:ss>

| Parameter | Definition |
|---|---|
| **<mm/dd/yyyy>** | Date Time <mm/dd/yyyy> format. (Month <1-12>. Day <1-31>. Year <2000-2037> |
| **<hh:mm:ss>** | hh in 24-hour format (Range: 0 - 23), mm (Range: 0 - 59), ss (Range: 0 - 59) |

**Default** None

**Mode** Privileged Exec

## 5.17.14. Reload

This command resets the switch without powering it off. Reset means that all network connections are terminated and the boot code executes. The switch uses the stored configuration to initialize the switch. You are prompted to confirm that the reset should proceed. The LEDs on the switch indicate a successful reset.

If ONIE is installed, the os parameter is added to the reload command. This parameter enables the user to boot back into ONIE.

**Format** reload [warm | configuration [scriptname]]

| Parameter | Definition |
|---|---|
| **warm** | When the Warm Reload feature is present, the reload command adds the warm option. This option reduces the time it takes to reboot a Linux switch, thereby reducing the traffic disruption in the network during a switch reboot. For a typical Linux Enterprise switch, the traffic disruption is reduced from about two minutes for a cold reboot to about 20 seconds for a warm reboot.<br><br>Note: The Warm Reload starts only the application process. The Warm Reload does not restart the boot code, the Linux kernel and the root file system. Since the Warm Reload does not restart all components, some code upgrades require that customers perform a cold reboot.<br><br>Note: Warm resets can only be initiated by the administrator and do not occur automatically. |
| **configuration** | Gracefully reloads the configuration. If no configuration file is specified, the startup-config file is loaded. |
| **scriptname** | The configuration file to load. The scriptname must include the extension. |

**Default** None

**Mode** Privileged Exec

## 5.17.15. Configure

This command is used to activate global configuration mode.

**Format** Configure

**Default** None

**Mode** Privileged Exec

## 5.17.16. Disconnect

This command is used to close a remote console session.

**Format** disconnect {<0-30> | all}

| Parameter | Definition |
|---|---|
| **<0-30>** | Remote session ID. |
| **all** | All remote sessions. |

**Default** None

**Mode** Privileged Exec

## 5.17.17. Hostname

This command is used to set the system hostname. It also changes the prompt string. The length of name is up to 64 alphanumeric, case-sensitive characters.

**Format** hostname <hostname>

**Default** Switch

**Mode** Global Config

## 5.17.18. Quit

This command is used to exit a CLI session.

**Format** quit

**Default** None

**Mode** Privileged Exec

## 5.17.19. AutoInstall commands

### 5.17.19.1. *Show autoinstall*

This command displays the current status of the AutoInstall process.

**Format** show autoinstall

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **AutoInstall Operation** | Displays the autoinstall operation is started or stoped. |
| **AutoInstall Persistent Mode** | Displays the autoinstall persistently for next reboot cycle. |

| | |
|---|---|
| **AutoSave Mode** | Displays the auto-save of downloaded configuration. |
| **AutoReboot Mode** | Displays the auto-reboot, which is used to allow the switch to automatically reboot after successfully downloading an image. |
| **AutoUpgrade Mode** | Displays the upgrade mode, which is used to allow to download the newer image. |
| **AutoInstall Retry Count** | Retry Count The number of times the switch has attempted to contact the TFTP server during the current AutoInstall session. |

### 5.17.19.2. *Boot-system autoinstall*

Use this command to operationally start or stop the AutoInstall process on the switch. The command is non-persistent and is not saved in the startup or running configuration file.

**Format** boot-system autoinstall { start | stop }

**Default** None

**Mode** Privileged Exec

### 5.17.19.3. *Boot-system host autoinstall*

Use this command to enable AutoInstall on the switch for the next reboot cycle. The command does not change the current behavior of AutoInstall and saves the command to NVRAM.

**Format** boot-system host autoinstall

**Default** None

**Mode** Privileged Exec

### no boot-system host autoinstall

Use this command to disable AutoInstall for the next reboot cycle.

**Format** no boot-system host autoinstall

**Mode** Privileged Exec

### 5.17.19.4. *Boot-system host autosave*

Use this command to automatically save the downloaded configuration file to the startup-config file on the switch. When autosave is disabled, you must explicitly save the downloaded configuration to non-volatile memory. If the switch reboots and the downloaded configuration has not been saved, the AutoInstall process begins, if the feature is enabled.

**Format** boot-system host autosave

**Default** None

**Mode** Privileged Exec

### no boot-system host autosave

Use this command to disable automatically saving the downloaded configuration on the switch.

**Format** no boot-system host autosave

**Mode** Privileged Exec

## 5.17.19.5. *Boot-system host autoreboot*

Use this command to allow the switch to automatically reboot after successfully downloading an image. When auto reboot is enabled, no administrative action is required to activate the image and reload the switch.

This command only work on the autoupgrade is enabled.

**Format** boot-system host autoreboot

**Default** None

**Mode** Privileged Exec

### no boot-system host autoreboot

Use this command to prevent the switch from automatically rebooting after the image is downloaded by using the AutoInstall feature.

**Format** no boot-system host autoreboot

**Mode** Privileged Exec

## 5.17.19.6. *Boot-system host upgrade*

Use this command to allow the switch only to upgrade the newer image version.

**Format** boot-system host upgrade

**Default** None

**Mode** Privileged Exec

### no boot-system host upgrade

Use this command to disable this function.

**Format** no boot-system host upgrade

**Mode** Privileged Exec

### 5.17.19.7. *Boot-system host retrycount*

Use this command to set the number of attempts to download a configuration file from the TFTP server.

**Format** boot-system host retrycount <1-3>

**Default** 3

**Mode** Privileged Exec

## 5.17.20. Capture CPU packet commands

### 5.17.20.1. *Show capture*

Use this command to display packets captured and save to RAM, It is possible to capture and save into RAM, packets that are received or transmitted through the CPU. A maximum 128 packets can be saved into RAM per capturing session. A maximum 128 bytes per packet can be saved into the RAM. If a packet holds more than 128 bytes, only the first 128 bytes are saved; data more than 128 bytes is skipped and cannot be displayed in the CLI.

Capturing packets is stopped automatically when 128 packets are captured and have not yet been displayed during a capture session. Captured packets are not retained after a reload cycle.

**Format** show capture [packets]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **<packets>** | Specifies this parameter to display the captured packets on the CLI. |
| **Operational Status** | Displays capture status. |
| **Current Capturing Type** | Displays the current capturing type. Possible types are Line, File, and Remote. |
| **Capturing Traffic Mode** | Displays the capturing traffic mode. Possible modes are Rx, Tx, or Tx/Rx. |
| **Line Wrap Mode** | Displays the line wrap mode for Line capturing type. Default is disabled. |
| **RPCAP Listening Port** | Displays the pcap listening port number. Default listening port number is 2002. |
| **RPCAP dump file size (KB)** | Disaply the capture packet file size. Default file size is 512KB. |

### 5.17.20.2. *Capture start*

Use this command to manually start capturing CPU packets for packets for trace. The packet capture operates in three modes:

- capture file
- remote capture
- capture line

This command is not persistent across a reboot cycle.

**Format** capture start [{all | received | transmit}]

| Parameter | Definition |
|---|---|
| **<all>** | Specifies all to capture packets for both transmitted and received packets. |
| **<received>** | Specifies received to capture only received packets. |
| **<transmit>** | Specifies transmit to capture only transmitted packets. |

**Default** None

**Mode** Privileged Exec

### 5.17.20.3. *Capture stop*

Use this command to manually stop capturing CPU packets for packets for trace.

**Format** capture stop

**Default** None

**Mode** Privileged Exec

### 5.17.20.4. *Capture packet to file, remote or line*

Use this command to configure packet capture options. This command is persistent across a reboot cycle.

**Format** capture {file | remote | line}

| Parameter | Definition |
|---|---|
| **file** | In the capture file mode, the captured packets are stored in a file on Flash. The maximum file size defaults to 512KB. The switch can transfer the file to a TFTP server via TFTP, FTP via CLI. The file is formatted in pcap format, is name cpu-pkt-capture.pcap, and can be examined using network analyzer tools such as Wireshark or Ethereal. Starting a file capture automatically terminates any remote capture sessions and line captureing. After the packet capture is activated, the capture proceeds until the capture file reaches its maximum size, or until the capture is stopped manually using CLI command *capture stop*. |
| **Remote** | In the remote capture mode, the captured packets are redirected in real time to an external PC running the wireshark tool for Microsoft Windows. A packet capture server runs on the switch side and sends the captured packets via a TCP connection to the Wireshark tool. The remote capture can be enabled or disable using the CLI. There should be a Windows PC with the Wireshark tool to display the captured file. When using the remote capture mode, the switch does not sotre any captured data locally on its file system. |
| **line** | In the capture line mode, the captured packets are saved into the RAM and can be displayed on the CLI. Starting a line capture automatically terminates any remote capture session and capturing into a file. There is a maximum 128 packets of maximum 128 btes that can be captured and displayed in Line mode. |

**Default** Remote

**Mode** Global Config

### 5.17.20.5. *Capture remote port*

Use this command to configure file capture options. This command is persistent across a reboot cycle.

**Format** capture remote [port <port-id>]

| Parameter | Definition |
|---|---|
| **<port-id>** | Configure the listening TCP port. The range of port ID is 1024 to 49151. |

**Default** 2002

**Mode** Global Config

### 5.17.20.6. *Capture file size*

Use this command to configure file capture options. This command is persistent across a reboot cycle.

**Format** capture file [size <file-size>]

| Parameter | Definition |
|---|---|
| **<file-size>** | Configure the file size in KB. The range of file size is 2 to 512KB. |

**Default** 512

**Mode** Global Config

### 5.17.20.7. *Capture line wrap*

This command enables wrapping of captured packets in line mode when the captured packets reaches full capacity. This command is persistent across a reboot cycle.

**Format** capture line [wrap]

**Default** Disable

**Mode** Global Config

**no capture line wrap**

This command disables wrapping of captured packets and configures capture packet to stop when the captured packet capacity is full.

**Format** no capture line wrap

**Mode** Global Config

## 5.17.21. CLIBanner

This command is used to set the pre-login CLI banner before displaying the login prompt.

**Format** set clibanner <line>

**Default** None

**Mode** Global Config

| Parameter | Description |
|---|---|
| **line** | Banner text where “” (double quote) is a delimiting character. The banner message can be up to 2000 characters. |

**no set clibanner**

This command unconfigures the pre-login CLI banner.

**Format** no set clibanner

**Mode** Global Config

## 5.17.22. Link-Flap commands

### 5.17.22.1. *Show link-flap*

Use this command to check the admin status and configured parameters of link-flap.

**Format** show link-flap

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Admin status** | Displays the admin state of link-flap. |
| **Maximum flap count** | Displays maximal allowed number of link-flap in the detection duration |
| **Detection duration** | Displays the time (in seconds) of duration for detecting link-flap |

### 5.17.22.2. *Link-flap*

Use this command to enable Link-Flap functionality and configure the maximum allowed link-flap times and the detection duration.

Use no form of this command to reset to default.

**Format** [no] link-flap [<3-10> [<5-30>]]

| Parameter | Definition |
|---|---|
| **<3-10>** | Configure the maximum allowed link-flap times before the interface is put into err-disabled state. (Default is 3) |
| **<5-30>** | Configure the error detection duration in seconds. (Default is 10) |

**Default** Disabled

**Mode** Global Config

## 5.17.23. Loop Detection commands

### 5.17.23.1. *Show loop-detection*

Use this command to display the admin status and configured parameters of loop detection.

**Format** show loop-detection

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Admin status** | Displays the admin state of loop detection |
| **Transmit interval** | Displays the interval between transmission of PDUs (in second) |
| **Max PDU Receive** | Displays the maximal number of PDU to be received by switch before an action is taken on the interface |

### 5.17.23.2. *Show loop-detection statistics*

Use this command to display the statistics of loop detection for all ports or specific interfaces.

**Format** show loop-detection statistics {<intf-range> | all}

**Mode** Privileged Exec

| Parameter | Definition |
|---|---|

| | |
|---|---|
| **intf-range** | The interfaces for which to show statistics. |
| **all** | Show statistics for all interfaces |

**Display Message**

| Parameter | Definition |
|---|---|
| **Port** | The slot/port associated with the interface. |
| **Admin Status** | The enable/disable mode for the specified port. |
| **Loop Detected** | The loop presence on the specified port. |
| **Loop Count** | The loop count for the the specified port. |
| **Time Since Last Loop** | The time since last loop occured for the specified port. |
| **Rx Action** | The action mode for the the specified port. |
| **Port Status** | The admin state of the specified interface. |

### 5.17.23.3. *loop-detection (Global Config)*

Use this command to enable loop-detection functionality and configure the transmission interval and the maximal packets to be received before an action is taken.

Use no form of this command to reset to default.

**Format** [no] loop-detection [<1-10> [1-10]]

| Parameter | Definition |
|---|---|
| **<1-10>** | Configure the interval between transmission of PDUs in second (Default is 5) |
| **<1-10>** | Configure the maximal number of PDU to be received by switch before an action is taken on the interface (Default is 1) |

**Default** Disabled

**Mode** Global Config

### 5.17.23.4. loop-detection (Interface Config)

Use this command to enable loop-detection on the interface.

Use no form of this command to reset to default.

Format [no] loop-detection

Default Disabled

Mode Interface Config

### 5.17.23.5. *loop-detection action*

Use this command to configure the action to be taken on an interface when a loop is detected.

Use no form of this command to reset to default.

**Format** [no] loop-detection action {both | disable | log}

| Parameter | Definition |
|---|---|
| **both** | Logs and disables the port |
| **disable** | Shuts down the port. This is the default |
| **log** | Only logs the message. The log mode only logs the message to buffer logs without bringing the port down |

**Default** both

**Mode** Interface Config

## 5.17.24. License-key

### 5.17.24.1. *Show license-key*

Use this command to display the information of the license key.

The information of the License Key Status may be "Key Not Present" or the different type of the registered key, such as "Basic", "Advance", or "Trail Key" with remained trial days. The License Key presents the registered license key string, or it shows "(Doesn't have any license key)" if the device doesn't have any valid license key.

If a device doesn't have a valid license key (Key Not Present) or the trial license key expires, all the front ports will be shut down automatically.

**Format** show license-key

**Mode** Privileged Exec

**Example:**

(Switch) #show license-key

License Key Status..... Basic Key

License Key..... 1F25-1FB0-B881-1844-7A94-0D22-1CDF-D6E3-D6EE-805D-847C-5AAB-68F8-64FB-6264-9DEB-C1A4-6522-BC35-1A88-B482-3564-B438-6F7A-D4C8-F2FD-5407-3E43-496A-2F5A-6A78-A685-5F35-FDCE-E177-79D9-63CC-2267-70AE-AE92-5011-ECD3-5839-358B-67D7-B75D-A383-A8B2-D11A-11B6-A906-36A0-1329-24F7-F104-074F-79D5-2BD0-B38D-4944-5CF2-9C07-CAC5-549E

(Switch) #

### 5.17.24.2. *License-key*

Use this command to register a device license key.

The key-string is a sequence of 128 ASCII codes in hexadecimal, which every 2 characters are separated by a hyphen (-). If user does not register a valid license key or the trial license key expires, all the front ports would be shut down automatically. After registering a new license key to the device successfully, please reload the device to make the license key takes effect.

**Format** license-key [key string]

| Parameter | Definition |
|---|---|
| **<key-string>** | The string format of license key is 256 hexadecimal numbers and every 4 hexadecimal numbers is separated by hyphen(-) |

**Default** None

**Mode** Global Config

## 5.17.25. In-Service Software Upgrade

The in-service software upgrade (ISSU) feature allows users to upgrade the switch software without interrupting data forwarding through the switch.

The goal of ISSU is to maintain Ethernet data connectivity with the servers attached to TOR switches while the TOR switch software is being upgraded. A software upgrade that requires a reboot or a kernel upgrade is not supported via ISSU.

During the ISSU process, management to the switch is disrupted. After the upgrade, users must log on to the switch again and re-authenticate to resume any switch management session.

The ISSU feature is available only on x86 platforms. As of the current QNOS release, the following features support ISSU:

**L2 FDB, RSTP, MSTP, 802.1Q, 802.3AD, ARP, Routing Interfaces, NDP Cache, BGP with GR, and VRF**

Any feature not listed above is ISSU unaware. This means that the feature does not distinguish between an ISSU restart and a normal restart. A feature that is not ISSU-aware tends to initialize afresh whithout the knowledge of previous active instance of the same and can cause traffic disruption during initialization.

### 5.17.25.1. *Show issu status*

Use this command to display the current ISSU status summary.

**Format** show issu status

**Mode** Privileged Exec

**Example:**

(Switch) #show issu status

Last reset reason..... Normal

Current state..... In Service Software Upgrade not started

Time elapsed since ISSU initiation..... 0 minutes 0 seconds

(Switch) #

### 5.17.25.2. *Show issu status details*

Use this command to display the ISSU event logs in chronological order.

**Format** show issu status detail

**Mode** Privileged Exec

**Example:**

(Switch) #show issu status detail

| Timestamp | State | Time elapsed |
|---|---|---|
| May 22 06:44:13 2019 | ISSU initiated, storing application data | 0m 0s |
| May 22 06:44:20 2019 | Application data stored | 0m 7s |

(Switch) #

# 5.18. DHCP Snooping Commands

DHCP snooping is a security feature that monitors DHCP messages between a DHCP client and DHCP servers to filter harmful DHCP messages and to build a bindings database of {MAC address, IP address, VLAN ID, port} tuples that are considered authorized. You can enable DHCP snooping globally and on specific VLANs, and configure ports within the VLAN to be trusted or untrusted. DHCP servers must be reached through trusted ports.

The DHCP snooping binding table contains the MAC address, IP address, lease time, binding type, VLAN number, and interface information that corresponds to the local untrusted interfaces of a switch; it does not contain information regarding hosts interconnected with a trusted interface. An untrusted interface is an interface that is configured to receive messages from outside the network or firewall. A trusted interface is an interface that is configured to receive only messages from within the network.

DHCP snooping acts like a firewall between untrusted hosts and DHCP servers. It also gives you a way to differentiate between untrusted interfaces connected to the end-user and trusted interfaces connected to the DHCP server or another switch.

DHCP snooping enforces the following security rules:

DHCP packets from a DHCP server (DHCPOFFER, DHCPACK, DHCPNAK, DHCPRELEASEQUERY) are dropped if received on an untrusted port.

DHCPRELEASE and DHCPDECLINE messages are dropped if for a MAC address in the snooping database, but the binding's interface is other than the interface where the message was received.

On untrusted interfaces, the switch drops DHCP packets whose source MAC address does not match the client hardware address. This feature is a configurable option.

The hardware identifies all incoming DHCP packets on ports where DHCP snooping is enabled. DHCP snooping is enabled on a port if (a) DHCP snooping is enabled globally, and (b) the port is a member of a VLAN where DHCP snooping is enabled. On untrusted ports, the hardware traps all incoming DHCP packets to the CPU. On trusted ports, the hardware forwards client messages and copies server messages to the CPU so that DHCP snooping can learn the binding.

You can enable the switch to operate as a DHCP Layer 2 relay agent to relay DHCP requests from clients to a Layer 3 relay agent or server. The Circuit ID and Remote ID can be added to DHCP requests relayed from clients to a DHCP server. This information is included in DHCP Option 82, as specified in sections 3.1 and 3.2 of RFC3046.

## 5.18.1. Show ip dhcp snooping

This command displays the DHCP snooping global configurations and summaries of port configurations.

**Format** show ip dhcp snooping

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ip dhcp snooping

DHCP snooping is Enabled
DHCP snooping source MAC verification is enabled
DHCP snooping is enabled on the following VLANs:
1

| Interface | Trusted | Log Invalid Pkts |
|---|---|---|
| 0/1 | Yes | No |
| 0/2 | No | No |
| 0/3 | No | No |
| 0/4 | No | No |
| 0/5 | No | No |
| 0/6 | No | No |
| 0/7 | No | No |
| 0/8 | No | No |
| 0/9 | No | No |
| 0/10 | No | No |
| 0/11 | No | No |
| 0/12 | No | No |
| 0/13 | No | No |
| 0/14 | No | No |
| 0/15 | No | No |

(QCT) #

## 5.18.2. Show ip dhcp snooping per interface

This command displays the DHCP snooping detail configurations for all interfaces or for a specific interface.

**Format** show ip dhcp snooping interfaces [<slot/port> | port-channel <portchannel-id>]

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ip dhcp snooping interfaces

| Interface | Trust State | Rate Limit (pps) | Burst Interval (seconds) |
|---|---|---|---|
| 0/1 | Yes | None | N/A |
| 0/2 | No | None | N/A |
| 0/3 | No | None | N/A |
| 0/4 | No | None | N/A |
| 0/5 | No | None | N/A |
| 0/6 | No | None | N/A |
| 0/7 | No | None | N/A |
| 0/8 | No | None | N/A |
| 0/9 | No | None | N/A |
| 0/10 | No | None | N/A |
| 0/11 | No | None | N/A |
| 0/12 | No | None | N/A |
| 0/13 | No | None | N/A |
| 0/14 | No | None | N/A |
| 0/15 | No | None | N/A |
| 0/16 | No | None | N/A |
| 0/17 | No | None | N/A |
| 0/18 | No | None | N/A |
| 0/19 | No | None | N/A |

(QCT) #

## 5.18.3. Show ip dhcp snooping binding

This command displays the DHCP Snooping binding entries.

The parameter “static” means to restrict the output based on static entries which are added by user manually.

The parameter “static” means to restrict the output based on dynamic entries which are added by DHCP Snooping automatically

**Format** show ip dhcp snooping binding [{static | dynamic}] [interface {<slot/port> | port-channel <portchannel-id>}] [vlan <vlan-id>]

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ip dhcp snooping binding

Total number of bindings: 363
Total number of Tentative bindings: 61

| MAC Address | IP Address | VLAN | Interface | Type | Lease (Secs) |
|---|---|---|---|---|---|
| 44:0A:A7:8A:00:00 | 10.10.1.6 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:01 | 10.10.1.8 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:02 | 10.10.1.10 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:03 | 10.10.1.11 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:04 | 10.10.1.12 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:05 | 10.10.1.13 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:00 | 10.10.1.2 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:01 | 10.10.1.3 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:02 | 10.10.1.4 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:03 | 10.10.1.5 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:04 | 10.10.1.7 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:05 | 10.10.1.9 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:02:00 | 10.10.1.20 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:02:01 | 10.10.1.21 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:02:02 | 10.10.1.22 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:02:03 | 10.10.1.23 | 1 | 0/10 | DYNAMIC | 86383 |

(QCT) #

## 5.18.4. Show ip dhcp snooping database

This command displays the DHCP Snooping configuration related to the database persistency.

**Format** show ip dhcp snooping database

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ip dhcp snooping database

agent url: local

write-delay: 300

(QCT) #

## 5.18.5. Show ip dhcp snooping information all

This command displays the summaries of DHCP Option-82 configurations.

**Format** show ip dhcp snooping information all

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ip dhcp snooping information all

DHCP Information Option82 is Enabled.

| Interface | OPT82 Mode | TrustMode |
|---|---|---|
| 0/1 | Enabled | trusted |
| 0/2 | Disabled | untrusted |
| 0/3 | Disabled | untrusted |
| 0/4 | Disabled | untrusted |
| 0/5 | Disabled | untrusted |
| 0/6 | Disabled | untrusted |
| 0/7 | Disabled | untrusted |
| 0/8 | Disabled | untrusted |
| 0/9 | Disabled | untrusted |
| 0/10 | Disabled | untrusted |
| 0/11 | Disabled | untrusted |

0/12 Disabled untrusted
0/13 Disabled untrusted
0/14 Disabled untrusted
0/15 Disabled untrusted
0/16 Disabled untrusted
0/17 Disabled untrusted
0/18 Disabled untrusted

(QCT) #

## 5.18.6. Show ip dhcp snooping information statistics

This command displays DHCP Option-82 statistics per interface.

**Format** show ip dhcp snooping information stats interface {<slot/port> | all}

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ip dhcp snooping information stats interface all

| Interface | UntrustedServer MsgsWithOpt82 | UntrustedClient MsgsWithOpt82 | TrustedServer MsgsWithoutOpt82 | TrustedClient MsgsWithoutOpt82 |
|---|---|---|---|---|
| 0/1 | 0 | 0 | 0 | 0 |
| 0/2 | 0 | 0 | 0 | 0 |
| 0/3 | 0 | 0 | 0 | 0 |
| 0/4 | 0 | 0 | 0 | 0 |
| 0/5 | 0 | 0 | 0 | 0 |
| 0/6 | 0 | 0 | 0 | 0 |
| 0/7 | 0 | 0 | 0 | 0 |
| 0/8 | 0 | 0 | 0 | 0 |
| 0/9 | 0 | 0 | 0 | 0 |
| 0/10 | 0 | 0 | 0 | 0 |
| 0/11 | 0 | 0 | 0 | 0 |
| 0/12 | 0 | 0 | 0 | 0 |
| 0/13 | 0 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| 0/14 | 0 | 0 | 0 | 0 |
| 0/15 | 0 | 0 | 0 | 0 |
| 0/16 | 0 | 0 | 0 | 0 |
| 0/17 | 0 | 0 | 0 | 0 |
| 0/18 | 0 | 0 | 0 | 0 |
| 0/19 | 0 | 0 | 0 | 0 |

(QCT) #

## 5.18.7. Show ip dhcp snooping information agent-option

This command displays the Option-82 configurations of DHCP Relay agent on specific VLAN.

**Format** show ip dhcp snooping information agent-option vlan <vlan-list>

**Default** None

**Mode** Privileged Exec

Example:

```
(QCT) # show ip dhcp snooping information agent-option vlan 1

DHCP Information Option82 is  Enabled.


VLAN Id   DHCP OPT82   CircuitId   RemoteId
--------- ---------- ---------- --------------------------------
1         Enabled    Enabled    testRemoteIdString

(QCT) #
```

## 5.18.8. Show ip dhcp snooping information per vlan

This command displays the DHCP Option-82 configurations per specific VLAN.

**Format** show ip dhcp snooping information vlan <vlan-list>

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ip dhcp snooping information vlan 1

DHCP Information Option82 is  Enabled.

DHCP L2 Relay is enabled on the following VLANs:
1

(QCT) #

## 5.18.9. Show ip dhcp snooping information circuit-id

This command displays the remote-id configuration of DHCP Option-82 per specific VLAN.

**Format** show ip dhcp snooping information circuit-id vlan <vlan-list>

**Default** None

**Mode** Privileged Exec

Example:

(QCT) # show ip dhcp snooping information circuit-id vlan 1

DHCP Information Option82 is Enabled.

DHCP Circuit-Id option is enabled on the following VLANs:
1

(QCT) #

## 5.18.10. Show ip dhcp snooping information remote-id

This command displays the remote-id configuration of DHCP Option-82 per specific VLAN.

**Format** show ip dhcp snooping information remote-id vlan <vlan-list>

**Default** None

**Mode** Privileged Exec

Example:

(QCT) # show ip dhcp snooping information remote-id vlan 1

DHCP Information Option82 is Enabled.

VLAN ID  Remote Id
---------  --------------------------------
1  testRemoteIdString

(QCT) #

## 5.18.11. Show ip dhcp snooping information interface

This command displays the remote-id configuration of DHCP Option-82 per interface.

**Format** show ip dhcp snooping information interface {<slot/port> | all}

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ip dhcp snooping information interface 0/1

DHCP Information Option82 is  Enabled.

Interface  OPT82 Mode  TrustMode
---------  ------------  --------------
0/1  Enabled  trusted

(QCT) #

## 5.18.12. Ip dhcp snooping

This command enables or disables the DHCP Snooping globally.

**Format** [no] ip dhcp snooping

**Default** Disable

**Mode** Global Config

## 5.18.13. Ip dhcp snooping vlan

This command enables or disables the DHCP Snooping to the specific VLAN.

**Format** [no] ip dhcp snooping vlan <vlan-list>

**Default** Disable

**Mode** Global Config

## 5.18.14. Ip dhcp snooping verify mac-address

This command enables or disables the verification of the source MAC address with the client hardware address in the received DHCP message.

**Format** [no] ip dhcp snooping verify mac-address

**Default** Disable

**Mode** Global Config

## 5.18.15. Ip dhcp snooping database

This command configures the persistent location of the DHCP Snooping database. This can be local or a remote file on a given IP machine.

The parameter “local” means to set database access inside device.

The parameter “tftp://hostIP/filename” means to set database access on remote TFTP Server.

**Format** ip dhcp snooping database {local | <url>}

**Default** Local

**Mode** Global Config

## 5.18.16. Ip dhcp snooping database write-delay

This command configures the interval in seconds at which the DHCP Snooping database will be persisted, and this database stores the results of DHCP snooping bindings. Use keyword “no” to restore the default value of this command.

The parameter “<interval>” value ranges is from 15 to 86400 seconds.

**Format** ip dhcp snooping database write-delay <interval>

no ip dhcp snooping database write-delay

**Default** 300

**Mode** Global Config

## 5.18.17. Ip dhcp snooping binding

This command configures the static DHCP Snooping binding which binds a MAC address to assigned IP address on a specific VLAN ID and interface. Use keyword “no” to remove an existing entry of DHCP Snooping binding.

**Format** ip dhcp snooping binding <mac-address> vlan <vlan id> <ip address> interface {<slot/port> | port-channel < portchannel-id>}

no ip dhcp snooping binding <mac-address>

**Default** None

**Mode** Global Config

Example: To add a static entry of DHCP snooping binding which binds MAC address 00:11:22:33:44:55 to IP address 10.0.0.1 on vlan 1 and port interface 0/1.

```
(QCT) #configure
(QCT) (Config)#ip dhcp snooping binding 00:11:22:33:44:55 vlan 1 10.0.0.1 interface 0/1
(QCT) (Config)#
```

## 5.18.18. Ip dhcp snooping information option

This command enables or disables the DHCP Snooping application to support information Option 82 in global configuration or a specific interface.

**Format** [no] ip dhcp snooping information option

**Default** Disable

**Mode** Global Config

Interface Config

## 5.18.19. Ip dhcp snooping information option circuit-id

This command enables or disables the DHCP Snooping Option 82 with sub-option circuit-id in a range of VLANs.

The format of circuit-id is LLLLVVVVXXYYZZ, and LLLL is the length from V to Z, VVVV is VLAN ID, XX is the Unit ID, YY is the function/module ID and ZZ is the Port number.

**Format** [no] ip dhcp snooping information option circuit-id vlan <vlan-list>

**Default** Disable

**Mode** Global Config

## 5.18.20. Ip dhcp snooping inforatmion option remote-id

This command enables or disables the DHCP Snooping Option 82 with sub-option remote-id in a range of VLANs. When it's enabled, all DHCP client's requests received to this device will be added remote-id sud-option with remote-id string.

The format of remote-id is LLLLXXXXX, and LLLL is the total length of all X, XXXXX is remote-id string which is set by user.

The parameter "<remoteId string>" defines remote-id string which of maximum length is 32 characters

**Format** [no] ip dhcp snooping information option remote-id <remoteId string> vlan <vlan-list>

no ip dhcp snooping information option remote-id vlan <vlan-list>

**Default** Disable

**Mode** Global Config

## 5.18.21. Ip dhcp snooping information option vlan

This command enables or disables the DHCP Snooping option 82 in a range of VLANs.

**Format** [no] ip dhcp snooping information option vlan <vlan-list>

**Default** Disable

**Mode** Global Config

## 5.18.22. Ip dhcp snooping information option trust

This command configures an interface to be trusted for Option-82 reception.

**Format** [no] ip dhcp snooping information option trust

**Default** Disable

**Mode** Interface Config

## 5.18.23. Ip dhcp snooping limit

This command controls the rate at which the DHCP Snooping messages come. If packet rate exceeds limitation over burst interval, the assigned port will shut down automatically. User could use interface command “shutdown” and then “no shutdown” to recover it. Use keyword “no” to restore the default value of this command.

The parameter “rate” means to the limitation of packet rate. Its range is from 0 to 300 packets per second.

The parameter “burst interval” means the time interval of packet burst could be over rate limitation. Its range is from 1 to 15 seconds.

**Format** ip dhcp snooping limit {rate <pps> [burst interval <seconds>]} | none

no ip dhcp snooping limit rate

**Default** “rate” is None

“burst interval” is 1 second.

**Mode** Interface Config

Example: While the packet rate of DHCP message received from port 0/1 exceeds 100 pps and consecutive time interval is over 10 seconds, the port 0/1 will be shutdown automatically.

(QCT) #configure

(QCT) (Config)#interface 0/1

(QCT) (Interface 0/1)# ip dhcp snooping limit rate 100 burst interval 10

(QCT) (Interface 0/1)#

## 5.18.24. Ip dhcp snooping log-invalid

This command controls logging the illegal DHCP messages to logging buffer.

**Format** [no] ip dhcp snooping log-invalid

**Default** Disabled

**Mode** Interface Config

## 5.18.25. Ip dhcp snooping trust

This command enables or disables a port as DHCP Snooping trust port.

**Format** [no] ip dhcp snooping trust

**Default** Disabled

**Mode** Interface Config

## 5.18.26. Ip dhcp snooping trust

This command enables or disables a port as DHCP Snooping trust port.

**Format** [no] ip dhcp snooping trust

**Default** Disabled

**Mode** Interface Config

## 5.18.27. Clear ip dhcp snooping binding

This command is used to clear all DHCP Snooping bindings on all interfaces or on a specific interface.

**Format** clear ip dhcp snooping binding [interface <slot/port>]

**Default** None

**Mode** Privileged EXEC

## 5.18.28. Clear ip dhcp snooping statistics

This command is used to clear all DHCP Snooping statistics.

**Format** clear ip dhcp snooping statistics

**Default** None

**Mode** Privileged EXEC

## 5.18.29. Clear ip dhcp snooping information statistics

This command is used to clear statistics of DHCP Snooping Option 82.

**Format** clear ip dhcp snooping information statistics interface [<slot/port> | all]

**Default** None

**Mode** Privileged EXEC

# 5.19. IP Source Guard (ISG) Commands

IP Source Guard (IPSG) is a security feature that filters IP packets based on source ID. The source ID may be either the source IP address or a {source IP address, source MAC address} pair. The DHCP snooping binding database and static IPSG entries identify authorized source IDs. You can configure:

- Whether enforcement includes the source MAC address.
- Static authorized source IDs.

Similar to DHCP snooping, this feature is enabled on a DHCP snooping untrusted Layer 2 port. Initially, all IP traffic on the port is blocked except for DHCP packets that are captured by the DHCP snooping process. When a client receives a valid IP address from the DHCP server, or when a static IP source binding is configured by the user, a per-port and VLAN Access Control List is installed on the port. This process restricts the client IP traffic to those source IP addresses configured in the binding; any IP traffic with a source IP address other than that in the IP source binding is filtered out. This filtering limits a host's ability to attack the network by claiming a neighbor host's IP address.

IPSG can be enabled on physical or LAG ports. IPSG is disabled by default. If you enable IPSG on a port where DHCP snooping is disabled or where DHCP snooping is enabled but the port is trusted, all IP traffic received on that port is dropped depending on the admin-configured IPSG entries. IPSG cannot be enabled on a port-based routing interface.

## 5.19.1. Show commands

### 5.19.1.1. *Show ip verify*

This command displays the IPSG interface configurations on all ports.

**Format** show ip verify [interface <slot/port> | port-channel <portchannel-id>]

| Term | Definition |
|---|---|
| **<slot/port>** | Specifies the interface number. |
| **<portchannel-id>** | Specifies the port-channel interfaces. The range of the port-channel ID is 1 to 64. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Interface address in slot/port or port-channel format. |
| **Filter Type** | Is one of two values:<br>• **ip-mac:** User has configured MAC address filtering on this interface. |

- **ip:** Only IP address filtering on this interface.

### 5.19.1.2. *Show ip verify source*

This command displays the IPSG interface and binding configurations on all ports.

**Format** show ip verify source [interface <slot/port> | port-channel <portchannel-id>]

| Term | Definition |
|---|---|
| **<slot/port>** | Specifies the interface number. |
| **<portchannel-id>** | Specifies the port-channel interfaces. The range of the port-channel ID is 1 to 64. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Interface address in slot/port or port-channel format. |
| **Filter Type** | Is one of two values:<br>• **ip-mac:** User has configured MAC address filtering on this interface.<br>• **ip:** Only IP address filtering on this interface. |
| **IP Address** | IP address of the interface. |
| **MAC Address** | If MAC address filtering is not configured on the interface, the MAC Address field is empty. If port security is disabled on the interface, then the MAC Address field displays "permit-all". |
| **VLAN** | The VLAN for the binding rule. |

### 5.19.1.3. *Show ip source binding*

This command displays the IPSG bindings.

**Format** show ip source binding [{static | dhcp-snooping}] [interface <slot/port>] [vlan <vlan-id>]

| Term | Definition |
|---|---|
| **static** | Statically configured from CLI. |
| **dhcp-snooping** | Dynamically learned from DHCP Snooping. |

| | |
|---|---|
| **<slot/port>** | Specifies the interface number. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | Interface in slot/port or port-channel format. |
| **Type** | Entry type; statically configured from CLI or dynamically learned from DHCP Snooping. |
| **IP Address** | The IP address of the entry that is added. |
| **MAC Address** | The MAC address for the entry that is added. |
| **VLAN** | VLAN for the entry. |

## 5.19.2. Configuration commands

### 5.19.2.1. *Ip verify source*

This command configures the IPSG source ID attribute to filter the data traffic in the hardware. Source ID is the combination of IP address and MAC address. Normal command allows data traffic filtration based on the IP address. With the "port-security" option, the data traffic will be filtered based on the IP and MAC addresses.

To disable the IPSG configuration in the hardware, use the no form of this command.

**Format** ip verify source [port-security]

no ip verify source

| Term | Definition |
|---|---|
| **<port-security>** | Filter data traffic based on the IP and MAC addresses. |

**Default** Disabled

**Mode** Interface Config

### 5.19.2.2. *Ip verify binding*

This command configures static IP source guard (IPSG) entries.

To remove the IPSG static entry from the IPSG database, use the no form of this command.

**Format** ip verify binding <mac-address> vlan <vlan-id> <ip address> interface {<slot/port> | port-channel <portchannel-id> }

no ip verify binding <mac-address> vlan <vlan-id> <ip address> interface {<slot/port> | port-channel <portchannel-id> }

| Term | Definition |
|---|---|
| **<mac-address>** | Specifies an MAC address. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<ip address>** | Specifies an IP address. |
| **<slot/port>** | Specifies the interface number. |
| **<portchannel-id>** | Specifies the port-channel interfaces. The range of the port-channel ID is 1 to 64. |

**Default** None

**Mode** Global Config

# 5.20. Dynamic ARP Instpection (DAI) Command

Dynamic ARP Inspection (DAI) is a security feature that rejects invalid and malicious ARP packets. DAI prevents a class of man-in-the-middle attacks, where an unfriendly station intercepts traffic for other stations by poisoning the ARP caches of its unsuspecting neighbors. The miscreant sends ARP requests or responses mapping another station's IP address to its own MAC address.

To prevent ARP poisoning attacks, a switch must ensure that only valid ARP requests and responses are relayed. DAI prevents these attacks by intercepting all ARP requests and responses. Each of these intercepted packets is verified for valid MAC address to IP address bindings before the local ARP cache is updated or the packet is forwarded to the appropriate destination. Invalid ARP packets are dropped.

DAI determines the validity of an ARP packet based on valid MAC address to IP address bindings stored in a trusted database. This database is built at runtime by DHCP snooping, provided this feature is enabled on VLANs and on the switch. DAI relies on DHCP snooping. DHCP snooping listens to DHCP message exchanges and builds a binding database of valid {MAC address, IP address, VLAN, and interface} tuples. In addition, in order to handle hosts that use statically configured IP addresses, DAI can also validate ARP packets against user-configured ARP ACLs.

When DAI is enabled, the switch drops ARP packets whose sender MAC address and sender IP address do not match an entry in the DHCP snooping bindings database. You can optionally configure additional ARP packet validation.

## 5.20.1. Show commands

### 5.20.1.1. *Show ip arp instpection statistics*

This command displays the statistics of the ARP packets processed by Dynamic ARP Inspection. Give the vlan-list argument and the command displays the statistics on all DAI-enabled VLANs in that list. Give the single vlan argument and the command displays the statistics on that VLAN. If no argument is included, the command lists a summary of the forwarded and dropped ARP packets.

**Format** show ip arp inspection statistics [vlan <vlan-list>]

| Term | Definition |
|---|---|
| **<vlan-list>** | Specifies VLAN ID in a list. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **VLAN** | The VLAN ID for each displayed row. |
| **DHCP Drops** | The number of packets dropped due to DHCP snooping binding database match failure. |
| **ACL Drops** | The number of packets dropped due to ARP ACL rule match failure. |
| **DHCP Permits** | The number of packets permitted due to DHCP snooping binding database match. |

| | |
|---|---|
| **ACL Permits** | The number of packets permitted due to ARP ACL rule match. |
| **Bad Src MAC** | The number of packets dropped due to Source MAC validation failure. |
| **Bad Dest MAC** | The number of packets dropped due to Destination MAC validation failure. |
| **Invalid IP** | The number of packets dropped due to invalid IP checks. |
| **Packet Queue Exceed** | The number of packets dropped due to the DAI processing queue is full. |

### 5.20.1.2. *Show ip arp inspection*

This command displays the Dynamic ARP Inspection global configuration and configuration on all the VLANs. With the vlan-list argument (i.e. comma separated VLAN ranges), the command displays the global configuration and configuration on all the VLANs in the given VLAN list. The global configuration includes the source mac validation, destination mac validation and invalid IP validation information.

**Format** show ip arp inspection [vlan <vlan-list>]

| Term | Definition |
|---|---|
| **<vlan-list>** | Specifies VLAN ID in a list. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Source MAC Validation** | Displays whether Source MAC Validation of ARP frame is enabled or disabled. |
| **Destination MAC Validation** | Displays whether Destination MAC Validation is enabled or disabled. |
| **IP Address Validation** | Displays whether IP Address Validation is enabled or disabled. |
| **VLAN** | The VLAN ID for each displayed row. |
| **Configuration** | Displays whether DAI is enabled or disabled on the VLAN. |
| **Log Invalid** | Displays whether logging of invalid ARP packets is enabled on the VLAN. |
| **ACL Name** | The ARP ACL Name, if configured on the VLAN. |
| **Static Flag** | If the ARP ACL is configured static on the VLAN. |

### 5.20.1.3. *Show ip arp inspection interfaces*

This command displays the Dynamic ARP Inspection configuration on all the DAI-enabled interfaces. An interface is said to be enabled for DAI if at least one VLAN, that the interface is a member of, is enabled for DAI. Given a interface argument, the command displays the values for that interface whether the interface is enabled for DAI or not.

**Format** show ip arp inspection interfaces [<slot/ port> | <loopback-id> | <portchannel-id> | <tunnel-id> | vlan <vlan-list>]

| Term | Definition |
|---|---|
| **<slot/port>** | Interface Number. |
| **<loopback-id>** | Specifies the loopback interfaces. The range of the loopback ID is 0 to 63. |
| **<portchannel-id>** | The range of the port-channel ID is 1 to 64. |

| | |
|---|---|
| **<tunnel-id>** | Specifies the tunnel interfaces. The range of the tunnel ID is 0 to 7. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Term | Definition |
|---|---|
| **Interface** | The interface ID for each displayed row. |
| **Trust State** | Whether the interface is trusted or untrusted for DAI. |
| **Rate Limit** | The configured rate limit value in packets per second. |
| **Burst Interval** | The configured burst interval value in seconds |

### 5.20.1.4. *Show arp access-list*

This command displays the configured ARP ACLs with the rules. Giving an ARP ACL name as the argument will display only the rules in that ARP ACL.

**Format** show arp access-list [acl-name]

| Term | Definition |
|---|---|
| **<acl-name>** | Specifies the ARP ACL name. |

**Default** None

**Mode** Privileged Exec

## 5.20.2. Configuration commands

### 5.20.2.1. *Ip arp inspection validate*

This command enables additional validation checks like source-mac validation, destination-mac validation, and ip address validation on the received ARP packets.

To disable the additional validation checks on the received ARP packets, use the no form of this command.

**Format** ip arp inspection validate {[src-mac] [dst-mac] [ip]}

no ip arp inspection validate {[src-mac] [dst-mac] [ip]}

**Default** Disable

**Mode** Global Config

### 5.20.2.2. *Ip arp inspection vlan*

This command enables Dynamic ARP Inspection on a list of comma-separated VLAN ranges.

To disable Dynamic ARP Inspection on a list of comma-separated VLAN ranges, use the no form of this command.

**Format** ip arp inspection vlan <vlan-list>

no ip arp inspection vlan <vlan-list>

| Term | Definition |
|---|---|
| **<vlan-list>** | Specifies VLAN ID in a list. The range of VLAN ID is 1 to 4093. |

**Default** Disable

**Mode** Global Config

### 5.20.2.3. *Ip arp inspection vlan logging*

This command enables logging of invalid ARP packets on a list of comma-separated VLAN ranges.

To disable logging of invalid ARP packets on a list of comma-separated VLAN ranges, use the no form of this command.

**Format** ip arp inspection vlan <vlan-list> logging

no ip arp inspection vlan <vlan-list> logging

| Term | Definition |
|---|---|
| **<vlan-list>** | Specifies VLAN ID in a list. The range of VLAN ID is 1 to 4093. |

**Default** Enable

**Mode** Global Config

### 5.20.2.4. *Ip arp inspection filter*

This command configures the ARP ACL used to filter invalid ARP packets on a list of comma-separated VLAN ranges. If the static keyword is given, packets that do not match a permit statement are dropped without consulting the DHCP snooping bindings.

To unconfigure the ARP ACL used to filter invalid ARP packets on a list of comma-separated VLAN ranges, use the no form of this command.

**Format** ip arp inspection filter <acl-name> vlan <vlan-list> [static]

no ip arp inspection filter <acl-name> vlan <vlan-list> [static]

| Term | Definition |
|---|---|
| **<acl-name>** | Specifies the ARP access-list name up to 31 characters in length. |
| **<vlan-list>** | Specifies VLAN ID in a list. The range of VLAN ID is 1 to 4093. |
| **<static>** | Specifies ARP ACL is configured static. |

**Default** No ARP ACL is configured on a VLAN

**Mode** Global Config

### 5.20.2.5. *Ip arp inspection trust*

This command configures an interface as trusted for Dynamic ARP Inspection.

To configure an interface as untrusted for Dynamic ARP Inspection, use the no form of this command.

**Format** ip arp inspection trust

no ip arp inspection trust

**Default** Disable

**Mode** Interface Config

### 5.20.2.6. *Ip arp inspection limit*

This command configures the rate limit and burst interval values for an interface. Configuring none for the limit means the interface is not rate limited for Dynamic ARP Inspections.

To set the rate limit and burst interval values for an interface to the default values, use the no form of this command.

**Format** ip arp inspection limit {rate <pps> [burst interval <seconds>] | none}

no ip arp inspection limit

| Term | Definition |
|---|---|
| **<pps>** | Specifies rate limit in pps. The range of rate is 0 to 300. |
| **<seconds>** | Specifies burst interval in seconds. The range of rate is 1 to 15. |

**Default** 15 pps for rate and 1 second for burst-interval

**Mode** Interface Config

### 5.20.2.7. *Arp access-list*

This command creates an ARP ACL.

To delete a configured ARP ACL, use the no form of this command.

**Format** arp access-list <acl-name>

no arp access-list <acl-name>

| Term | Definition |
|---|---|

| | |
|---|---|
| **<acl-name>** | Specifies the ARP access-list name up to 31 characters in length. |

**Default** None

**Mode** Global Config

### 5.20.2.8. *Permit ip host mac host*

This command configures a rule for a valid IP address and MAC address combination used in ARP packet validation.

To delete a rule for a valid IP and MAC combination.

**Format** permit ip host <sender-ip> mac host <sender-mac>

no permit ip host <sender-ip> mac host <sender-mac>

| Term | Definition |
|---|---|
| **<sender-ip>** | Specifies IP address in the ARP ACL rule. |
| **<sender-mac>** | Specifies MAC address in the ARP ACL rule. |

**Default** None

**Mode** ARP Access-list Config

### 5.20.2.9. *Clear ip arp inspection statistics*

This command resets the statistics for Dynamic ARP Inspection on all VLANs.

**Format** clear ip arp inspection statistics

**Default** None

**Mode** Privileged Exec

# 5.21. Differenciated Service Commands

⚠ This Switching Command function can only be used on the QoS software version.

This chapter contains the CLI commands used for the QoS Differentiated Services (DiffServ) package.

The user configures DiffServ in several stages by specifying:

1. Class

- creating and deleting classes
- defining match criteria for a class

⚠ The only way to remove an individual match criterion from an existing class definition is to delete the class and re-create it.

2. Policy

- creating and deleting policies
- associating classes with a policy
- defining policy statements for a policy/class combination

3. Service

- adding and removing a policy to/from a directional (that is, inbound, outbound) interface

Packets are filtered and processed based on defined criteria. The filtering criteria are defined by a class. The processing is defined by a policy's attributes. Policy attributes may be defined on a per class instance basis, and it is these attributes that are applied when a match occurs.

Packet processing begins by testing the match criteria for a packet. A policy is applied to a packet when a class match within that policy is found.

Note that the type of class - all, any, or acl - has a bearing on the validity of match criteria specified when defining the class. A class type of 'any' processes its match rules in an ordered sequence; additional rules specified for such a class simply extend this list. A class type of ‘acl’ obtains its rule list by interpreting each ACL rule definition at the time the Diffserv class is created. Differences arise when specifying match criteria for a class type 'all', since only one value for each non-excluded match field is allowed within a class definition. If a field is already specified for a class, all subsequent attempts to specify the same field fail, including the cases where a field can be specified multiple ways through alternative formats. The exception to this is when the 'exclude' option is specified, in which case this restriction does not apply to the excluded fields.

The following class restrictions are imposed by the LB8 Series L3 Switch DiffServ design:

- nested class support limited to:
  - 'all' within 'all'

- no nested 'not' conditions
- no nested 'acl' class types
- each class contains at most one referenced class

- hierarchical service policies not supported in a class definition
- access list matched by reference only, and must be sole criterion in a class
  - that is, ACL rules copied as class match criteria at time of class creation, with class type 'any'
  - implicit ACL 'deny all' rule also copied
  - no nesting of class type 'acl'

Regarding nested classes, referred to here as class references, a given class definition can contain at most one reference to another class, which can be combined with other match criteria. The referenced class is truly a reference and not a copy, since additions to a referenced class affect all classes that reference it. Changes to any class definition currently referenced by any other class must result in valid class definitions for all derived classes otherwise the change is rejected. A class reference may be removed from a class definition.

The user can display summary and detailed information for classes, policies, and services. All configuration information is accessible via the CLI, and SNMP user interfaces.

## 5.21.1. General commands

The following characteristics are configurable for the platform as a whole.

### 5.21.1.1. *Diffserv*

This command sets the DiffServ operational mode to active. While disabled, the DiffServ configuration is retained and can be changed, but it is not activated. When enabled, Diffserv services are activated.

**Format** diffsev

**Default** None

**Mode** Global Config

### 5.21.1.2. *No diffserv*

This command sets the DiffServ operational mode to inactive. While disabled, the DiffServ configuration is retained and can be changed, but it is not activated. When enabled, Diffserv services are activated.

**Format** no diffsev

**Default** None

**Mode** Global Config

## 5.21.2. Class commands

The 'class' command set is used in DiffServ to define:

> **Traffic Classification** specifies Behavior Aggregate (BA) based on DSCP, and Multi- Field (MF) classes of traffic (name, match criteria)
>
> **Service Levels** specifies the BA forwarding classes / service levels. Conceptually, DiffServ is a two-level hierarchy of classes: 1. Service/PHB, 2. Traffic Class

This set of commands consists of class creation/deletion and matching, with the class match commands specifying layer 3, layer 2, and general match criteria. The class match criteria are also known as class rules, with a class definition consisting of one or more rules to identify the traffic belonging to the class. Note that once a class match criterion is created for a class, it cannot be changed or deleted - the entire class must be deleted and re-created.

The CLI command root is ***class-map***.

### 5.21.2.1. *Class-map*

This command defines a new DiffServ class of type match-all, match-any or match-access-group.

**Format** class-map [match-all] <class-map-name> [{ipv4 | ipv6}]

| Parameter | Description |
|---|---|
| **<class-map-name>** | Case sensitive alphanumeric string from 1 to 31 characters uniquely identifying the class. |

When used without any match condition, this command enters the class-map mode. The **<class-map-name>** is the name of an existing DiffServ class.

The class name 'default' is reserved and is not allowed here. The class type of **match-all** indicates all of the individual match conditions must be true for a packet to be considered a member of the class.

The optional keywords [{ipv4 | ipv6}] specify the Layer 3 protocol for this class. If not specified, this parameter defaults to ‘ipv4’. This maintains backward compatibility for configurations defined on systems before IPv6 match items were supported.

The CLI mode is changed to Class-Map Config or Ipv6-Class-Map Config when this command is successfully executed depending on the [{ipv4 | ipv6}] keyword specified.

**Default** None

**Mode** Global Config

### 5.21.2.2. *No class-map*

This command eliminates an existing DiffServ class.

**Format** no class-map <class-map-name>

| Parameter | Description |
|---|---|
| **<class-map-name>** | The name of an existing DiffServ class.. |

The class name 'default' is reserved and is not allowed here. This command may be issued at any time; if the class is currently referenced by one or more policies or by any other class, this deletion attempt shall fail.

**Default** None

**Mode** Global Config

### 5.21.2.3. *Rename*

This command changes the name of a DiffServ class.

**Format** rename <new-class-map-name>

| Parameter | Description |
|---|---|
| **<new-class-map-name>** | Case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the class. |

The class name ‘default’ is reserved and must not be used here.

**Default** None

**Mode** Class-Map Config / Ipv6-Class-Map Config

### 5.21.2.4. *Match any*

This command adds to the specified class definition a match condition whereby all packets are considered to belong to the class.

**Format** match any

**Default** None

**Mode** Class-Map Config / Ipv6-Class-Map Config

### 5.21.2.5. *Match class-map*

This command adds to the specified class definition the set of match conditions defined for another class.

**Format** match class-map <refclassname>

| Parameter | Description |
|---|---|
| **<refclassname>** | The name of an existing DiffServ class whose match conditions are being referenced by the specified class definition. |

There is no [**not**] option for this match command.

**Default** None

**Mode** Class-Map Config / Ipv6-Class-Map Config

Restrictions

The class types of both <***classname***> and <***refclassname***> must be identical (that is, any vs. any, or all vs. all). A class type of acl is not supported by this command.

Cannot specify <***refclassname***> the same as <***classname***> (that is, self-referencing of class name not allowed). At most one other class may be referenced by a class. Any attempt to delete the <***refclassname***> class while still referenced by any <***classname***> shall fail.

The combined match criteria of <***classname***> and <***refclassname***> must be an allowed combination based on the class type. Any subsequent changes to the <***refclassname***> class match criteria must maintain this validity, or the change attempt shall fail. The total number of class rules formed by the complete reference class chain (includes both predecessor and successor classes) must not exceed a platform-specific maximum. In some cases, each removal of a refclass rule reduces the maximum number of available rules in the class definition by one.

### 5.21.2.6. *No match class-map*

This command removes from the specified class definition the set of match conditions defined for another class.

**Format** no match class-map <refclassname>

| Parameter | Description |
|---|---|
| **<refclassname>** | The name of an existing DiffServ class whose match conditions are being referenced by the specified class definition. |


There is no [**not**] option for this match command.

**Default** None

**Mode** Class-Map Config / Ipv6-Class-Map Config

### 5.21.2.7. *Match cos*

This command adds to the specified class definition a match condition for the Class of Service value (the only tag in a single tagged packet or the first or outer 802.1Q tag of a double VLAN tagged packet). The value may be from 0 to 7.


This command is not available on the Broadcom 5630x platform.

**Format** match cos <0-7>

| Parameter | Description |
|---|---|
| **<0-7>** | Integer in the range of 0 to 7 specifying the COS value. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.8. *Match secondary-cos*

This command adds to the specified class definition a match condition for the secondary Class of Service value (the inner 802.1Q tag of a double VLAN tagged packet). The value may be from 0 to 7.

**Format** match secondary-cos <0-7>

| Parameter | Description |
|---|---|
| **<0-7>** | Integer in the range of 0 to 7 specifying the COS value. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.9. *Match destination-address mac*

This command adds to the specified class definition a match condition based on the destination MAC address of a packet. The <address> parameter is any layer 2 MAC address formatted as six, two-digit hexadecimal numbers separated by colons (e.g., 00:11:22:dd:ee:ff). The <mac-mask> parameter is a layer 2 MAC address bit mask, which need not be contiguous, and is formatted as six, two-digit hexadecimal numbers separated by colons (e.g., ff:07:23:ff:fe:dc).

**i** This command is not available on the Broadcom 5630x platform.

**Format** match destination-address mac <address> <mac-mask>

| Parameter | Description |
|---|---|
| **<address>** | Specifies any layer 2 MAC address. |
| **<mac-mask>** | Specifies a layer 2 MAC address bit mask. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.10. *Match dstip*

This command adds to the specified class definition a match condition based on the destination IP address of a packet.

**Format** match dstip <ipaddr> <ipmask>

| Parameter | Description |
|---|---|
| **<ipaddr>** | Specifies an IP address. |
| **<ipmask>** | Specifies an IP address bit mask; note that although similar to a standard |

| | |
|---|---|
| | subnet mask, this bit mask need not be contiguous. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.11. *Match dstl4port*

This command adds to the specified class definition a match condition based on the destination layer 4 port of a packet using a single keyword or numeric notation or a numeric range notation.

**Format** match dstl4port {<port-key> | <0-65535>}

| Parameter | Description |
|---|---|
| **<port-key>** | To specify the match condition as a single keyword, the value for <**portkey**> is one of the supported port name keywords. The currently supported <**portkey**> values are: **domain, echo, ftp, ftpdata, http, smtp, snmp, telnet, tftp, www**. Each of these translates into its equivalent port number, which is used as both the start and end of a port range. |
| **<0-65535>** | To specify the match condition using a numeric notation, one layer 4 port number is required.<br><br>The port number is an integer from 0 to 65535.<br><br>To specify the match condition using a numeric range notation, two layer 4 port numbers are required and together they specify a contiguous port range. Each port number is an integer from 0 to 65535, but with the added requirement that the second number be equal to or greater than the first. |

**Default** None

**Mode** Class-Map Config / Ipv6-Class-Map Config

### 5.21.2.12. *Match ethertype*

This command adds to the specified class definition a match condition based on the value of the ethertype. The <ethertype> value is specified as one of the following keywords: **appletalk, arp, ibmsna, ipv4, ipv6, ipx, mplsmcast, mplsucast, netbios, novell, pppoe, rarp** or as a custom ethertype value in the range of 0x0600-0xFFFF.

**i** This command is not available on the Broadcom 5630x platform.

**Format** match ethertype {<keyword> | <0x0600-0xFFFF>}

| Parameter | Description |
|---|---|
| **<keyword>** | Specifies appletalk, arp, ibmsna, ipv4, ipv6, ipx, mplsmcast etc. |
| **<0x0600-0xFFFF>** | Specifies ethertype value. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.13. *Match ip dscp*

This command adds to the specified class definition a match condition based on the value of the IP DiffServ Code Point (DSCP) field in a packet, which is defined as the high-order six bits of the Service Type octet in the IP header (the low-order two bits are not checked).

**Format** match ip dscp <value>

| Parameter | Description |
|---|---|
| **<value>** | Specified as either an integer from 0 to 63, or symbolically through one of the following keywords: af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef. |

**i** The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation. To specify a match on all DSCP values, use the match [not] ip tos <tosbits> <tosmask> command with <**tosbits**> set to 0 and <**tosmask**> set to 03 (hex).

**Default** None

**Mode** Class-Map Config / Ipv6-Class-Map Config

### 5.21.2.14. *Match ip precedence*

This command adds to the specified class definition a match condition based on the value of the IP Precedence field in a packet, which is defined as the high-order three bits of the Service Type octet in the IP header (the low-order five bits are not checked). The precedence value is an integer from 0 to 7.

**Format** match ip precedence <0-7>

| Parameter | Description |
|---|---|

| | |
|---|---|
| **<0-7>** | Integer from 0 to 7. |

The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation.

To specify a match on all Precedence values, use the match [not] ip tos <tosbits> <tosmask> command with <**tosbits**> set to 0 and <**tosmask**> set to 1F (hex).

**Default** None

**Mode** Class-Map Config

### 5.21.2.15. *Match ip tos*

This command adds to the specified class definition a match condition based on the value of the IP TOS field in a packet, which is defined as all eight bits of the Service Type octet in the IP header.

**Format** match ip tos <tosbits> <tosmask>

| Parameter | Description |
|---|---|
| **<tosbits>** | Two-digit hexadecimal number from 00 to ff. |
| **<tosmask>** | Two-digit hexadecimal number from 00 to ff.<br><br>The <**tosmask**> denotes the bit positions in <**tosbits**> that are used for comparison against the IP TOS field in a packet. For example, to check for an IP TOS value having bits 7 and 5 set and bit 1 clear, where bit 7 is most significant, use a <**tosbits**> value of a0 (hex) and a <**tosmask**> of a2 (hex). |

The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation.

In essence, this the “free form” version of the IP DSCP/Precedence/TOS match specification in that the user has complete control of specifying which bits of the IP Service Type field are checked.

**Default** None

**Mode** Class-Map Config

### 5.21.2.16. *Match protocol*

This command adds to the specified class definition a match condition based on the value of the IP Protocol field in a packet using a single keyword notation or a numeric value notation.

**Format** match protocol {<protocol-name> | <0-255>}

| Parameter | Description |
|---|---|
| **<protocol-name>** | One of the supported protocol name keywords . The currently supported values are: **icmp, igmp, ip, tcp, udp**. Note that a value of **ip** is interpreted to match all protocol number values. |
| **<0-255>** | To specify the match condition using a numeric value notation, the protocol number is a standard value assigned by IANA and is interpreted as an integer from 0 to 255. |


This command does not validate the protocol number value against the current list defined by IANA.

**Default** None

**Mode** Class-Map Config / Ipv6-Class-Map Config

### 5.21.2.17. *Match source-address mac*

This command adds to the specified class definition a match condition based on the source MAC address of a packet. The <address> parameter is any layer 2 MAC address formatted as six, two-digit hexadecimal numbers separated by colons (e.g., 00:11:22:dd:ee:ff). The <macmask> parameter is a layer 2 MAC address bit mask, which may not be contiguous, and is formatted as six, two-digit hexadecimal numbers separated by colons (e.g., ff:07:23:ff:fe:dc).


This command is not available on the Broadcom 5630x platform.

**Format** match source-address mac <address> <macmask>

| Parameter | Description |
|---|---|
| **<address>** | Specifies any layer 2 MAC address. |
| **<macmask>** | Specifies a layer 2 MAC address bit mask. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.18. *Match scrip*

This command adds to the specified class definition a match condition based on the source IP address of a packet.

**Format** match srcip <ipaddr> <ipmask>

| Parameter | Description |
|---|---|
| **< ipaddr >** | Specifies an IP address . |
| **< ipmask >** | specifies an IP address bit mask; note that although it resembles a standard subnet mask, this bit mask need not be contiguous. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.19. *Match srcl4port*

This command adds to the specified class definition a match condition based on the source layer 4 port of a packet using a single keyword or numeric notation or a numeric range notation.

**Format** match srcl4port {<port-key> | <0-65535>}

| Parameter | Description |
|---|---|
| **<port-key>** | One of the supported port name keywords (listed below).<br><br>The currently supported <portkey> values are: domain, echo, ftp, ftpdata, http, smtp, snmp, telnet, tftp, www. Each of these translates into its equivalent port number, which is used as both the start and end of a port range. |
| **<0-65535>** | To specify the match condition as a numeric value, one layer 4 port number is required. The port number is an integer from 0 to 65535.<br><br>To specify the match condition as a range, two layer 4 port numbers are required and together they specify a contiguous port range. Each port number is an integer from 0 to 65535, but with the added requirement that the second number be equal to or greater than the first. |

**Default** None

**Mode** Class-Map Config / IPv6-Class-Map Config

### 5.21.2.20. *Match vlan*

This command adds to the specified class definition a match condition based on the value of the layer 2 VLAN Identifier field (the only tag in a single tagged packet or the first or outer tag of a double VLAN tagged packet). The VLAN ID is an integer from 1 to 4093.


This command is not available on the Broadcom 5630x platform.

**Format** match vlan <1-4093>

| Parameter | Description |
|---|---|
| **<1-4093>** | The VLAN ID is an integer from 1 to 4093. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.21. *Match secondard-vlan*

This command adds to the specified class definition a match condition based on the value of the layer 2 secondary VLAN Identifier field (the inner 802.1Q tag of a double VLAN tagged packet). The VLAN ID is an integer from 1 to 4093.

**Format** match secondary-vlan <1-4093>

| Parameter | Description |
|---|---|
| **<1-4093>** | The VLAN ID is an integer from 1 to 4093. |

**Default** None

**Mode** Class-Map Config

### 5.21.2.22. *Match dstipv6*

This command adds to the specified class definition a match condition based on the destination IPv6 address of a packet.

**Format** match dstip6 <destination-ipv6-prefix/prefix-length>

| Parameter | Description |
|---|---|
| **<destination-ipv6-** | IPv6 address and prefix  length. |

| prefix/prefix-length> | |
|---|---|

**Default** None

**Mode** IPv6-Class-Map Config

### 5.21.2.23. *Match srcipv6*

This command adds to the specified class definition a match condition based on the source IP address of a packet.

**Format** match srcip6 <source-ipv6-prefix/prefix-length>

| Parameter | Description |
|---|---|
| **<source-ipv6-prefix/prefix-length>** | IPv6 address and prefix length. |

**Default** None

**Mode** IPv6-Class-Map Config

### 5.21.2.24. *Match ip6flowlbl*

This command adds to the specified class definition a match condition based on the IPv6 flow label value.

**Format** match ip6flowlbl <label>

| Parameter | Description |
|---|---|
| **<label>** | IPv6 flow label value in the range of 0 to 1048575. |

**Default** None

**Mode** IPv6-Class-Map Config

## 5.21.3. Policy commands

The 'policy' command set is used in DiffServ to define:

**Traffic Classification** Specify traffic conditioning actions (policing, marking, shaping) to apply to traffic classes.

**Service Provisioning** Specify bandwidth and queue depth management requirements of service levels (EF, AF, etc.).

The policy commands are used to associate a traffic class, which was defined by the class command set, with one or more QoS policy attributes. This association is then assigned to an interface in a particular direction to form a service. The user specifies the policy name when the policy is created.

The DiffServ CLI does not necessarily require that users associate only one traffic class to one policy. In fact, multiple traffic classes can be associated with a single policy, each defining a particular treatment for packets that match the class definition. When a packet satisfies the conditions of more than one class, preference is based on the order in which the classes were added to the policy, with the foremost class taking highest precedence.

This set of commands consists of policy creation/deletion, class addition/removal, and individual policy attributes. Note that the only way to remove an individual policy attribute from a class instance within a policy is to remove the class instance and re-add it to the policy. The values associated with an existing policy attribute can be changed without removing the class instance.

The CLI command root is ***policy-map***.

### 5.21.3.1. *Assign-queue*

This command modifies the queue id to which the associated traffic stream is assigned. The queueid is an integer from 0 to n-1, where n is the number of egress queues supported by the device.

**Format** assign-queue <0-7>

| Parameter | Description |
|---|---|
| **<0-7>** | Queue ID . |

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop

### 5.21.3.2. *Drop*

This command specifies that all packets for the associated traffic stream are to be dropped at ingress.

**Format** drop

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Assign Queue, Mark (all forms), Mirror, Police, Redirect

### 5.21.3.3. *Mirror*

This command specifies that all incoming packets for the associated traffic stream are copied to a specific egress interface (physical port or LAG).

i This command is not available on the Broadcom 5630x platform.

**Format** mirror {<slot/port> | port-channel <port-channel-intf-num>}

| Parameter | Description |
|---|---|
| **<slot/port>** | Specifies the physical interface where the mirrored packet send to . |
| **<port-channel-intf-num>** | Specifies the port-channel interface where the mirrorred packet send to. The range of the port-channel ID is 1 to 64. |

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop, Redirect

### 5.21.3.4. *Redirect*

This command specifies that all incoming packets for the associated traffic stream are redirected to a specific egress interface (physical port or port-channel).

**Format** redirect {<slot/port> | port-channel <port-channel-intf-num>}

| Parameter | Description |
|---|---|
| **<slot/port>** | Specifies which physical interface that traffic stream are redirected to. |
| **<port-channel-intf-num>** | Specifies which port-channel interface that traffic stream are directed to. The range of the port-channel ID is 1 to 64. |

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop, Mirror

### 5.21.3.5. *Conform-color*

This command is used to enable color-aware traffic policing and define the conform-color class maps used. Used in conjunction with the police command where the fields for the conform level (for simple, single-rate, and two-rate policing) are specified. The <class-map-name> parameter is the name of an existing Diffserv class map, where different ones must be used for the conform and exceed colors.

**Format** conform-color <class-map-name> exceed-color <class-map-name>

| Parameter | Description |
|---|---|
| **<class-map-name>** | Name of an existing Diffserv class map, where different ones must be used for the conform colors. |

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop, Mirror

### 5.21.3.6. *Mark cos*

This command marks all packets for the associated traffic stream with the specified class of service value in the priority field of the 802.1p header. If the packet does not already contain this header, one is inserted. The CoS value is an integer from 0 to 7.

**Format** mark cos <0-7>

| Parameter | Description |
|---|---|
| **<0-7>** | The range of COS value is 0 to 7. |

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop, Mark IP DSCP, IP Precedence, Police

### 5.21.3.7. *Mark cos-as-sec-cos*

This command marks outer VLAN tag priority bits of all packets as the inner VLAN tag priority, marking CoS as Secondary CoS. This essentially means that the inner VLAN tag CoS is copied to the outer VLAN tag CoS.

**Format** mark cos-as-sec-cos

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop, Mark IP DSCP, IP Precedence, Police

### 5.21.3.8. *Class*

This command creates an instance of a class definition within the specified policy for the purpose of defining treatment of the traffic class through subsequent policy attribute statements.

**Format** class <classname>

| Parameter | Description |
|---|---|
| **<classname>** | The name of an existing DiffServ class. Note that this command causes the specified policy to create a reference to the class definition. |

**Default** None

**Mode** Policy-Map Config

### 5.21.3.9. *No class*

This command deletes the instance of a particular class and its defined treatment from the specified policy.

**Format** no class <classname>

| Parameter | Description |
|---|---|
| **<classname>** | The name of an existing DiffServ class. Note that this command removes the reference to the class definition for the specified policy. |

**Default** None

**Mode** Policy-Map Config

### 5.21.3.10. *Mark ip-dscp*

This command marks all packets for the associated traffic stream with the specified IP DSCP value.

**Format** mark ip-dscp <value>

| Parameter | Description |
|---|---|
| **<value>** | Specified as either an integer from 0 to 63, or symbolically through one of the following keywords: af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef. |

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop, Mark CoS, Mark IP Precedence, Police

### 5.21.3.11. *Mark ip-precedence*

This command marks all packets for the associated traffic stream with the specified IP Precedence value. The IP Precedence value is an integer from 0 to 7.

**Format** mark ip-precedence <0-7>

| Parameter | Description |
|---|---|
| **<0-7>** | IP precedence value in the range of 0 to 7 |

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop, Mark (all forms)

### 5.21.3.12. *Police-simple*

This command is used to establish the traffic policing style for the specified class. The simple form of the police command uses a single data rate and burst size, resulting in two outcomes: conform and violate. The conforming data rate is specified in kilobits-per-second (Kbps) and is an integer from 1 to 4294967295. The conforming burst size is specified in kilobytes (KB) and is an integer from 1 to 128.

For each outcome, the only possible actions are drop, set-cos-transmit, set-dscp-transmit, setprec-transmit, or transmit. In this simple form of the police command, the conform action defaults to transmit and the violate action defaults to drop.

For set-dscp-transmit, a <dscpval> value is required and is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: af11, af12, af13, af21, af22, af23,af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef.

For set-prec-transmit, an IP Precedence value is required and is specified as an integer from 0-7.

For set-cos-transmit an 802.1p priority value is required and is specified as an integer from 0-7.

**Format** police-simple {<1-4294967295> <1-128> conform-action {drop | set-cos-as-sec-cos | set-cos-transmit <0-7> | set-dscp-transmit <value> | set-prec-transmit <0-7> | transmit} [violate-action { drop | set-cos-as-sec-cos | set-cos-transmit <0-7> | set-dscp-transmit <value> | set-prec-transmit <0-7> | transmit }]}

The simple form of the police command uses a single data rate and burst size, resulting in two outcomes:

| Parameter | Description |
|---|---|
| **<conform-action & violate-action>** | The conforming data rate is specified in kilobits-per-second (Kbps) and is an integer from 1 to 4294967295. The conforming burst size is specified in kilobytes (KB) and is an integer from 1 to 128. For each outcome, the only possible actions are drop, set-dscp-transmit, set-prec-transmit, or set-cos-transmit. In this simple form of the police command, the conform action defaults to transmit and the violate action defaults to drop. These actions can be set with this command once the style has been configured. Beside, the set-cos-transmit is to combine only with drop between the conform-action and the violate-action. |
| **<set-cos-transmit>** | Priority value is required and is specified as an integer from 0-7. |
| **<set-dscp-transmit>** | Required and specified as either an integer from 0 to 63, or symbolically through one of the following keywords: **af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef**. |
| **<set-prec-transmit>** | IP Precedence value is required and is specified as an integer from 0-7 |

**Default** None

**Mode** Policy-Class-Map Config

**Incompatibilities** Drop, Mark (all forms)

### 5.21.3.13. *Police-single-rate*

This command is the single-rate form of the police command and is used to establish the traffic policing style for the specified class. For each outcome, the only possible actions are drop, set-cos-as-sec-cos, set-cos-transmit, set-sec-cos-transmit, set-dscp-transmit, set-prec-transmit, or transmit. In this single-rate form of the police command, the conform action defaults to send, the exceed action defaults to drop, and the violate action defaults to drop. These actions can be set with this command once the style has been configured.

**Format** police-single-rate {<1-4294967295> <1-128> <1-128> conform-action {drop | set-cos-as-sec-cos | set-cos-transmit <0-7> | set-dscp-transmit <value> | set-prec-transmit <0-7> | transmit} exceed-action { drop | set-cos-as-sec-cos | set-cos-transmit <0-7> | set-dscp-transmit <value> |

set-prec-transmit <0-7> | transmit} [violate-action { drop | set-cos-as-sec-cos | set-cos-transmit <0-7> | set-dscp-transmit <value> | set-prec-transmit <0-7> | transmit }]}

| Parameter | Description |
|---|---|
| **<conform-action & violate-action & exceed-action>** | The conforming data rate is specified in kilobits-per-second (Kbps) and is an integer from 1 to 4294967295. The conforming burst size is specified in kilobytes (KB) and is an integer from 1 to 128. For each outcome, the only possible actions are drop, set-cos-as-sec-cos , set-dscp-transmit, set-prec-transmit, or set-cos-transmit. In this simple form of the police command, the conform action defaults to transmit and the violate action defaults to drop. These actions can be set with this command once the style has been configured. Beside, the set-cos-transmit is to combine only with drop between the conform-action and the violate-action. |
| **<set-cos-transmit>** | Priority value is required and is specified as an integer from 0-7. |
| **<set-dscp-transmit>** | Required and specified as either an integer from 0 to 63, or symbolically through one of the following keywords: **af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef**. |
| **<set-prec-transmit>** | IP Precedence value is required and is specified as an integer from 0-7 |

**Default** None

**Mode** Policy-Class-Map Config

### 5.21.3.14. *Police-two-rate*

This command is the two-rate form of the police command and is used to establish the traffic policing style for the specified class. For each outcome, the only possible actions are drop, set-cos-as-sec-cos, set-cos-transmit, set-sec-cos-transmit, set-dscp-transmit, set-prec-transmit, or transmit. In this two-rate form of the police command, the conform action defaults to send, the exceed action defaults to drop, and the violate action defaults to drop. These actions can be set with this command once the style has been configured.

**Format** police-two-rate {<1-4294967295> <1-128> <1-4294967295> <1-128> conform-action {drop | set-cos-as-sec-cos | set-cos-transmit <0-7> | set-dscp-transmit <value> | set-prec-transmit <0-7> | transmit} exceed-action { drop | set-cos-as-sec-cos | set-cos-transmit <0-7> | set-dscp-transmit <value> | set-prec-transmit <0-7> | transmit } [violate-action { drop | set-cos-as-sec-cos | set-cos-transmit <0-7> | set-dscp-transmit <value> | set-prec-transmit <0-7> | transmit}]}

| Parameter | Description |
|---|---|
| **<conform-action & violate-action & exceed-action>** | The conforming data rate is specified in kilobits-per-second (Kbps) and is an integer from 1 to 4294967295. The conforming burst size is specified in kilobytes (KB) and is an integer from 1 to 128. For each outcome, the only possible actions are drop, set-cos-as-sec-cos , set-dscp-transmit, set-prec- |

| | |
|---|---|
| | transmit, or set-cos-transmit. In this simple form of the police command, the conform action defaults to transmit and the violate action defaults to drop. These actions can be set with this command once the style has been configured. Beside, the set-cos-transmit is to combine only with drop between the conform-action and the violate-action. |
| **<set-cos-transmit>** | Priority value is required and is specified as an integer from 0-7. |
| **<set-dscp-transmit>** | Required and specified as either an integer from 0 to 63, or symbolically through one of the following keywords: **af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef**. |
| **<set-prec-transmit>** | IP Precedence value is required and is specified as an integer from 0-7 |

**Default** None

**Mode** Policy-Class-Map Config

### 5.21.3.15. *Policy-map*

This command establishes a new DiffServ policy. The <policyname> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the policy. The type of policy is specific to the inbound traffic direction as indicated by the in parameter.

**Format** policy-map <policyname> [{in | out}]

no policy-map <policyname>

| Parameter | Description |
|---|---|
| **<policyname>** | Policy name up to 31 alphanumeric characters. |
| **no** | Delete this policy |

**Default** None

**Mode** Global Config

### 5.21.3.16. *Policy-map rename*

This command changes the name of a DiffServ policy. The <policyname> is the name of an existing DiffServ class. The <newpolicyname> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the policy.

**Format** policy-map rename <policyname> <newpolicyname>

| Parameter | Description |
|---|---|
| **<policyname>** | Old Policy name. |
| **<newpolicyname>** | New policy name. |

**Default** None

**Mode** Global Config

## 5.21.4. Service commands

The 'service' command set is used in DiffServ to define:

**Traffic Classification** Assign a DiffServ traffic conditioning policy (as specified by the policy commands) to an interface in the incoming direction.

**Service Provisioning** Assign a DiffServ service provisioning policy (as specified by the policy commands) to an interface in the outgoing direction.

The service commands attach a defined policy to a directional interface. Only one policy may be assigned at any one time to an interface in a particular direction. The policy type (in, out) must match the interface direction to which it is attached.

This set of commands consists of service addition/removal.

The CLI command root is ***service-policy.***

### 5.21.4.1. *Service-policy*

This command attaches a policy to an interface in a particular direction.

**Format** service-policy {in | out} <policy-map-name>

| Parameter | Description |
|---|---|
| **<policy-map-name>** | The name of an existing DiffServ policy, whose type must match the interface direction. Note that this command causes a service to create a reference to the policy. |

The command can be used in the **Interface Config** mode to attach a policy to a specific interface. Alternatively, the command can be used in the **Global Config** mode to attach this policy to all system interfaces. The direction value is either in or out.

**Default** None

**Mode** Global Config, Interface Config

**Restrictions** Only a single policy may be attached to a particular interface in a particular direction at any one time.

### 5.21.4.2. *No service-policy*

This command detaches a policy from an interface in a particular direction.

**Format** no service-policy {in | out} <policy-map-name>

| Parameter | Description |
|---|---|
| **<policy-map-name>** | The name of an existing DiffServ policy. Note that this command causes a service to remove its reference to the policy. |

The command can be used in the **Interface Config** mode to detach a policy from a specific interface. Alternatively, the command can be used in the **Global Config** mode to detach this policy from all system interfaces to which it is currently attached. The direction value is either in or out.

**i** This command effectively disables DiffServ on an interface (in a particular direction).There is no separate interface administrative 'mode' command for DiffServ.

**Default** None

**Mode** Global Config, Interface Config

## 5.21.5. Show commands

The 'show' command set is used in DiffServ to display configuration and status information for:

- Classes
- Policies
- Services

This information can be displayed in either summary or detailed formats. The status information is only shown when the DiffServ administrative mode is enabled; it is suppressed otherwise. There is also a 'show' command for general DiffServ information that is available at any time.

### 5.21.5.1. *Show class-map*

This command displays all configuration information for the specified class.

**Format** show class-map [<classname>]

| Parameter | Description |
|---|---|
| **<classname>** | The name of an existing DiffServ class. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Class Name** | The name of this class. |
| **Class Type** | The class type (all, any, or acl) indicating how the match criteria are evaluated for this class. A class type of all means every match criterion defined for the class is evaluated simultaneously they must all be true to indicate a class match. For a type of any each match criterion is evaluated sequentially and only one need be true to indicate a class match. Class type acl rules are evaluated in a hybrid manner, with those derived from each ACL Rule grouped and evaluated simultaneously, while each such grouping is evaluated sequentially. |
| **L3 Protocol** | The Layer 3 protocol for this class. Possible values are IPv4 and IPv6. |
| **Match Criteria** | The Match Criteria fields will only be displayed if they have been configured. They will be displayed in the order entered by the user. These are evaluated in accordance with the class type. The possible Match Criteria fields are: Class of Service, Destination IP Address, Destination Layer 4 Port, Destination MAC Address, Every, IP DSCP, IP Precedence, IP TOS, Protocol Keyword, Reference Class, Source IP Address, Source Layer 4 Port, Source MAC Address, and VLAN. |
| **Values** | This field displays the values of the Match Criteria. |
| **Class Name** | The name of this class. (Note that the order in which classes are displayed is not necessarily the same order in which they were created.) |
| **Class Type** | Class type of 'all' means every match criterion defined for the class is evaluated simultaneously and must all be true to indicate a class match. |
| **Reference Class Name** | The name of an existing DiffServ class whose match conditions are being referenced by the specified class definition. |

### 5.21.5.2. *Show diffserv*

This command displays the DiffServ General Status Group information, which includes the current administrative mode setting as well as the current and maximum number of rows in each of the main DiffServ private MIB tables.

**Format** show diffserv

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **DiffServ Admin mode** | The current value of the DiffServ administrative mode. |
| **Class Table Size Current/Max** | The current or maximum number of entries (rows) in the Class Table. |
| **Class Rule Table Size Current/Max** | The current or maximum number of entries (rows) in the Class Rule Table. |
| **Policy Table Size Current/Max** | The Layer 3 protocol for this class. Possible values are IPv4 and IPv6. |
| **Policy Instance Table Size Current/Max** | The current or maximum number of entries (rows) in the Policy Instance Table. |
| **Policy Attribute Table Size Current/Max** | The current or maximum number of entries (rows) in the Policy Attribute Table. |
| **Service Table Size Current/Max** | The current or maximum number of entries (rows) in the Service Table. |

### 5.21.5.3. *Show diffserv service*

This command displays policy service information for the specified interface and direction.

**Format** show diffserv service <slot/port> {in | out}

| Parameter | Description |
|---|---|
| **<slot/port>** | Specifies a valid slot number and port number for the system. The direction parameter indicates the interface direction of interest. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **DiffServ Admin mode** | The current setting of the DiffServ administrative mode. An attached policy is only in effect on an interface while DiffServ is in an enabled mode. |
| **Interface** | The slot number and port number of the interface (slot/port). |
| **Direction** | The traffic direction of this interface service. |
| **Operational Status** | The current operational status of this DiffServ service interface. |
| **Policy Name** | The name of the policy attached to the interface in the indicated direction. |

### 5.21.5.4. *Show diffserv service brief*

This command displays all interfaces in the system to which a DiffServ policy has been attached. The direction parameter is optional; if specified, only services in the indicated direction are shown.

**Format** show diffserv service brief [in | out]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **DiffServ Admin mode** | The current setting of the DiffServ administrative mode. An attached policy is only active on an interface while DiffServ is in an enabled mode. |

The following information is repeated for interface and direction (only those

interfaces configured with an attached policy are shown):

| Fields | Definition |
|---|---|
| **Interface** | The slot number and port number of the interface (slot/port). |
| **Direction** | The traffic direction of this interface service. |
| **OperStatus** | The current operational status of this DiffServ service interface. |
| **Policy Name** | The name of the policy attached to the interface in the indicated direction. |

### 5.21.5.5. *Show policy-map*

This command displays all configuration information for the specified policy.

**Format** show policy-map [<policy-map-name>]

| Parameter | Description |
|---|---|
| **< policy-map-name >** | The name of an existing DiffServ policy. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Policy Name** | The name of this policy. |
| **Policy Type** | The policy type, namely whether it is an inbound or outbound policy definition. |

The following information is repeated for each class associated with this policy

(only those policy attributes actually configured are displayed):

| Fields | Definition |
|---|---|
| **Class Name** | The name of this class. |
| **Mark CoS** | Denotes the class of service value that is set in the 802.1p header of outbound packets. This is not displayed if the mark cos was not specified. |
| **Mark IP DSCP** | Denotes the mark/re-mark value used as the DSCP for traffic matching this class. This is not displayed if mark ip description is not specified using the police-two-rate command, or if policing is in use for the class under this policy. |
| **Mark IP Precedence** | Denotes the mark/re-mark value used as the IP Precedence for traffic matching this class. This is not displayed if either mark DSCP or policing is in use for the class under this policy. |
| **Policing Style** | This field denotes the style of policing, if any, used simple. |
| **Committed Rate (Kbps)** | This field displays the committed rate, used in simple policing, single-rate policing, and two-rate policing. |
| **Committed Burst Size (KB)** | This field displays the committed burst size, used in simple policing. |
| **Conform Action** | The current setting for the action taken on a packet considered to conform to the policing parameters. This is not displayed if policing is not in use for |

| | |
|---|---|
| | the class under this policy. |
| **Conform COS Value** | This field shows the priority mark value if the conform action is markcos. |
| **Conform DSCP Value** | This field shows the DSCP mark value if the conform action is markdscp. |
| **Conform IP Precedence Value** | This field shows the IP Precedence mark value if the conform action is markprec. |
| **Non-Conform Action** | The current setting for the action taken on a packet considered to not conform to the policing parameters. This is not displayed if policing not in use for the class under this policy. |
| **Non-Conform DSCP Value** | This field displays the DSCP mark value if this action is markdscp. |
| **Non-Conform IP Precedence Value** | This field displays the IP Precedence mark value if this action is markprec. |
| **Assign Queue** | Directs traffic stream to the specified QoS queue. This allows a traffic classifier to specify which one of the supported hardware queues are used for handling packets belonging to the class. |
| **Drop** | Drop a packet upon arrival. This is useful for emulating access control list operation using DiffServ, especially when DiffServ and ACL cannot co-exist on the same interface. |
| **Mirror** | Copies a classified traffic stream to a specified egress port (physical port or LAG). This can occur in addition to any marking or policing action. It may also be specified along with a QoS queue assignment. |
| **Redirect** | Forces a classified traffic stream to a specified egress port (physical port or LAG). This can occur in addition to any marking or policing action. It may also be specified along with a QoS queue assignment. |
| **Policy Name** | The name of this policy. (Note that the order in which the policies are displayed is not necessarily the same order in which they were created.) |
| **Policy Type** | The policy type, namely whether it is an inbound or outbound policy definition. |
| **Class Members** | List of all class names associated with this policy. |

### 5.21.5.6. *Show policy-map interface*

This command displays policy-oriented statistics information for the specified interface and direction.

**Format** show policy-map interface {<slot/port> | port-channel <1-64 >} {in | out}

| Parameter | Description |
|---|---|
| **<slot/port>** | Specifies a valid slot number and port number for the system. The direction parameter indicates the interface direction of interest. |
| **<1-64 >** | Specifies the port-channel interface. The range of port-channel ID is 1 to 64. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The slot number and port number of the interface (slot/port) |
| **Direction** | The traffic direction of this interface service, either in or out. |
| **Operational Status** | The current operational status of this DiffServ service interface. |
| **Policy Name** | The name of the policy attached to the interface in the indicated direction. |

The following information is repeated for each class instance within this policy:

| Fields | Definition |
|---|---|
| **Class Name** | The name of this class instance. |
| **In Offered Packets** | Count of the packets offered to this class instance before the defined DiffServ treatment is applied. Only displayed for the 'in' direction. |
| **In Discarded Packets** | Count of the packets discarded for this class instance for any reason due to DiffServ treatment of the traffic class. Only displayed for the 'in' direction. |

i None of the counters listed here are guaranteed to be supported on all platforms. Only supported counters are shown in the display output.

### 5.21.5.7. *Show service-policy*

This command displays a summary of policy-oriented statistics information for all interfaces in the specified direction. The direction parameter indicates the interface direction of interest. This command enables or disables the route reflector client. A route reflector client relies on a route reflector to re-advertise its routes to the entire AS. The possible values for this field are ***enable*** and ***disable.***

**Format** show service-policy {in | out}

**Default** None

**Mode** Privileged Exec

**Display Message**

The following information is repeated for each interface and direction (only those interfaces configured with an attached policy are shown):

| Fields | Definition |
|---|---|
| **Interface** | The slot number and port number of the interface (slot/port). |
| **Operational Status** | The current operational status of this DiffServ service interface. |
| **Policy Name** | The name of the policy attached to the interface. |

i None of the counters listed here are guaranteed to be supported on all platforms. Only supported counters are shown in the display output.

# 5.22. ACL Commands

This chapter contains the CLI commands used for showing and configuring MAC Access Control List (ACL) and IP Access Control List (ACL).

## 5.22.1. Show commands

### 5.22.1.1. *Show mac access-lists name*

This command displays a MAC access list and all of the rules that are defined for the ACL. The command output varies based on the match criteria configured within the rules of the ACL.

**Format** show mac access-lists <name>

| Parameter | Description |
|---|---|
| **name** | The ACL name which is used to identify a specific MAC ACL to display. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **ACL Name** | The name of the MAC ACL rule. |
| **Sequence Number** | The ordered rule number identifier defined within the ACL. |
| **Action** | Displays the action associated with each rule. The possible values are Permit or Deny. |
| **Source MAC Address** | Displays the source MAC address for this rule. |
| **Source MAC Mask** | Displays the source MAC mask for this rule. |
| **Destination MAC Address** | Displays the destination MAC address for this rule. |
| **Destination MAC Mask** | Displays the destination MAC mask for this rule. |
| **Ethertype** | Displays the Ethertype keyword or custom value for this rule. |
| **VLAN ID** | Displays the VLAN identifier value or range for this rule. |
| **CoS Value** | Displays the COS (802.1p) value for this rule. |
| **Assign Queue** | Displays the queue identifier to which packets matching this rule are assigned. |

| | |
|---|---|
| **Redirect Interface** | Displays the slot/port to which packets matching this rule are forwarded. |
| **Mirror Interface** | Displays the slot/port to which packets matching this rule are copied. |
| **Time Range Name** | Displays the name of the time-range if the MAC ACL rule has referenced a time range. |
| **Rule Status** | Status (Active/Inactive) of the MAC ACL rule. |
| **Redirect External AgentId** | Indicates whether matching flow packets are allowed to be sent to external applications running alongside QNOS on a control CPU. |
| **Committed Rate** | The committed rate defined by the rate-limit attribute. |
| **Committed Burst size** | The committed burst size defined by the rate-limit attribute. |

### 5.22.1.2. *Show mac access-lists*

This command displays a summary of all defined MAC access lists in the system.

**Format** show mac access-lists

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Current number of all ACLs** | The number of user-configured rules defined for this ACL |
| **Maximum number of all ACLs** | The maximum number of ACL rules. |
| **MAC ACL Name** | The name of the MAC ACL rule. |
| **Rules** | The number of rules in this ACL. |
| **Direction** | Denotes the direction in which this MAC ACL is attached to the set of interfaces listed. The value is Inbound or Outbound. |
| **Interface(s)** | Displays the list of interfaces (slot/port) to which this MAC ACL is attached in a given direction. |
| **VLAN(s)** | Displays VLAN(s) to which the MAC ACL applies |

### 5.22.1.3. *Show ip access-lists*

Use this command to view summary information about all IP ACLs configured on the switch. To view more detailed information about a specific access list,specify the ACL number or name that is used to indentify the IP ACL.

**Format** show ip access-lists [<1-199> | <name>]

| Parameter | Description |
|---|---|
| **1-199** | The ACL ID used to identify a specific IP ACL to display. |
| **name** | The ACL name used to identify a specific IP ACL to display. |

**Default** None

**Mode** Privileged EXEC , User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Current number of all ACLs** | The number of user-configured rules defined for this ACL |
| **Maximum number of all ACLs** | The maximum number of ACL rules. |
| **ACL ID/Name** | The identifier or Name of this ACL. |
| **Rules** | The number of rules configured for the ACL. |
| **Direction** | Shows whether the ACL is applied to traffic coming into the interface (ingress) or leaving the interface (egress). |
| **Interface(s)** | The interface(s) to which the ACL is applied(ACL interface Bindings) |
| **VLAN(s)** | The VLAN(s) to which the ACL is applied(ACL VLAN Bindings) |
| **Sequence Number** | The ordered rule number identifier defined within the ACL. |
| **Action** | Displays the action associated with each rule. The possible values are Permit or Deny. |
| **Match ALL** | Indicates whether this ACL applies to every packet. The possible values are True or False. |
| **IPv4 Protocol** | Displays the protocol to filter for this rule. |
| **Source IP Address** | Displays the source IP address for this rule. |
| **Source IP Wildcard Mask** | Displays the source IP mask for this rule. |
| **Source L4 Port Keyword** | Displays the source port for this rule. |

| | |
|---|---|
| **Destination IP Address** | Displays the destination IP address for this rule. |
| **Destination MAC Mask** | Displays the destination IP mask for this rule. |
| **Destination L4 Port Keyword** | Displays the destination port for this rule. |
| **IP DSCP** | The value specified for IP DSCP. |
| **IP Precedence** | The value specified for IP Precedence . |
| **IP TOS** | The value specified for IP TOS . |
| **Log** | Displays when you enable logging for this rule. |
| **Redirect Interface** | The slot/port to which packets matching this rule are forwarded. |
| **Mirror Interface** | The slot/port to which packets matching this rule are copied. |
| **Time Range Name** | Displays the name of the time-range if the IP ACL rule has referenced a time range. |
| **Assign Queue** | The queue identifier to which packets matching this rule are assigned. |
| **Committed Rate** | The committed rate defined by the rate-limit attribute. |
| **Committed Burst size** | The committed burst size defined by the rate-limit attribute. |
| **Rule Status** | Status (Active/Inactive) of the IP ACL rule. |

### 5.22.1.4. *Show access-lists interface*

This command displays ACL information for a designated interface and direction. Use the control-plane keyword to display the ACLs applied on the CPU port.

**Format** show access-lists interface { { {<slot/port> | port-channel <1-64> } in | out } | control-plane }

| **Parameter** | **Description** |
|---|---|
| **slot/port** | The interface number |
| 1-64 | The port-channel ID. The port-channel ID is range from 1 to 64. |
| **in \| out** | The direction value is either in or out |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **ACL Type** | The type of access list (IP,IPv6 or MAC) |
| **ACL ID** | The identifier of this ACL. |
| **Sequence Number** | An optional sequence number may be specified to indicate the order of this access list relative to other access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specified access list replaces the currently attached access list using that sequence number. If the sequence number is not specified by the user, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction is used. Valid range is (1 to 4294967295). |

#### 5.22.1.5. *Show access-lists vlan*

This command displays ACL information for a particular VLAN ID.

**Format** show access-lists vlan <vlan-id> {in | out}

| Parameter | Description |
|---|---|
| vlan-id | The VLAN ID |
| **in \| out** | The direction value is either in or out |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **ACL Type** | The type of access list (IP,IPv6 or MAC) |
| **ACL ID** | The identifier of this ACL. |
| **Sequence Number** | The ordered rule number identifier defined within the ACL. |

## 5.22.2. Configuration commands

#### 5.22.2.1. *Mac access-list extended*

This command creates a MAC access control list (ACL) identified by *name*, consisting of classification fields defined for the Layer 2 header of an Ethernet frame.

If a MAC ACL by this name already exists, this command enters Mac-Access-List config mode to allow updating the existing ACL.

**Format** [no] mac access-list extended <name>

| Parameter | Description |
|---|---|
| **name** | The ACL name which is used to identify a specific MAC ACL. It is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the MAC access list. |
| **no** | Remove this MAC ACL. |

**Default** None

**Mode** Global Config

### 5.22.2.2. *Mac access-list extended rename*

This command changes the name of a MAC Access Control List (ACL). The command fails if a MAC ACL by the name *newname* already exists.

**Format** mac access-list extended rename <oldname> <newname>

| Parameter | Description |
|---|---|
| oldname | The name of an existing MAC ACL to be changed. |
| newname | New name which uniquely identifies the MAC access list. |

**Default** None

**Mode** Global Config

### 5.22.2.3. *Mac access-list resequence*

Use this command to renumber the sequence numbers of the entries for specified MAC access list with the given increment value starting from a particular sequence number. The command is used to edit the sequence numbers of ACL rules in the ACL and change the order in which entries are applied. This command is not saved in startup configuration and is not displayed in running configuration.

**Format** mac access-list resequence {<name>} <1-2147483647> <1-2147483647>

| Parameter | Description |
|---|---|

| | |
|---|---|
| name | The ACL name which is used to identify a specific MAC ACL. It is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the MAC access list. |
| <1-2147483647> | The sequence number from which to start. The range is 1-2147483647. The default is 1. |
| <1-2147483647> | The amount to increment. The range is 1-2147483647. The default is 1. |

**Default** 1

**Mode** Global Config

### 5.22.2.4. *Mac access-list*

This command creates a new rule for the current MAC access list. Each rule is appended to the list of configured rules for the list. Note that an implicit 'deny all' MAC rule always terminates the access list.

Note: The 'no' form of this command is not supported, as the rules within an ACL cannot be deleted individually. Rather, the entire ACL must be deleted and re-specified.

A rule may either deny or permit traffic according to the specified classification fields. At a minimum, the source and destination MAC value and mask pairs must be specified, each of which may be substituted using the keyword any to indicate a match on any value in that field. The bpdu keyword may be specified for the destination MAC value/mask pair indicating a well-known BPDU MAC value of 01-80-c2-xx-xx-xx (hex), where 'xx' indicates a don't care. The remaining command parameters are all optional.

The Ethertype may be specified as either a keyword or a four-digit hexadecimal value from 0x0600-0xFFFF. The currently supported <ethertypekey> values are: appletalk, arp, ibmsna, ipv4, ipv6, ipx, mplsmcast, mplsucast, netbios, novell, pppoe, rarp. Each of these translates into its equivalent Ethertype value(s).

The vlan and cos parameters refer to the VLAN identifier and 802.1p user priority fields, respectively, of the VLAN tag. For packets containing a double VLAN tag, this is the first (or outer) tag.

The assign-queue parameter allows specification of a particular hardware queue for handling traffic that matches this rule. The allowed <queue-id> value is 0-(n-1), where n is the number of user configurable queues available for the hardware platform.

The mirror parameter allows the traffic matching this rule to be copied to the specified <slot/port>, while the redirect parameter allows the traffic matching this rule to be forwarded to the specified <slot/port> The assign-queue and redirect parameters are only valid for a 'permit' rule.

The time-range parameter allows imposing time limitation on the MAC ACL rule as defined by the parameter time-range-name. If a time range with the specified name does not exist and the MAC ACL containing this ACL rule is applied to an interface or bound to a VLAN, then the ACL rule is applied immediately. If a time range with specified name exists and the MAC ACL containing this ACL rule is applied to an interface or bound to a VLAN, then the ACL rule is applied when the time-range with specified name becomes active. The ACL rule is removed when the time-range with specified name becomes inactive.

**Format** [1-2147483647] {deny | permit} {{<srcmac> <srcmask>} | any} {{<dstmac> <dstmask>} | any | bpdu} [<ethertypekey> | <0x0600-0xFFFF>] [vlan {{eq <0-4095>}} [ cos <0-7>] [log] [time-range

time-range-name] [assign-queue <queue-id>] [{mirror | redirect} {<slot/port> | port-channel <portchannel-id>}] [rate-limit <1-4294967295><1-128>]

| Parameter | Description |
|---|---|
| 1-2147483647 | The sequence number of the ACL. |
| deny \| permit | To deny or permit the matching rule. |
| srcmac srcmask \| any | Specifies designated source MAC address and mask pair or any for this rule |
| destmac destmask \| any \| bpdu | Specifies designated destination MAC address and mask pair or any or well-known bpdu for this rule |
| ethertypekey | Appletalk,arp,ibmsna,ipv4,ipv6,ipx,mplsmcast,mplsucast,netbios,novell,pppoe,rarp. |
| log | Enable logging for this access list rule |
| time-range-name | Specify the name of the time-range if the MAC ACL rule has referenced a time range. |
| queue-id | Specify the queue identifier to which packets matching this rule are assigned<br><br>**Note**: This option is not supported in the out direction. |
| mirror \| redirect | Specify the traffic matching the rule to be copied/redirected to the specific slot/port or port-channel.<br><br>**Note**: This option is not supported in the out direction. |
| slot/port | The interface number to be mirrored or redirected to. |
| portchannel-id | The port channel ID to be mirrored or redirected to. |
| rate-limit | Specify the allowed rate of traffic as per the configured rate in <1-4294967295> kb/s, and burst-size in <1-128> kilobytes. |

**Default** None

**Mode** Mac Access-list Config

To remove the rule with specified ID, use the below **no** form command.

**Format** no rule-id <ID>

| Parameter | Description |
|---|---|
| ID | The rule with **ID** to be removed. |

**Default** None

**Mode** Mac Access-list Config

**Format** [no] remark <remark>

| Parameter | Description |
|---|---|
| remark | To Add an ACL rule remark |
| <remark> | The rule ID to be removed. |
| no | To remove an ACL rule remark |

**Default** None

**Mode** Mac Access-list Config

### 5.22.2.5. *Mac access-group*

This command attaches a specific MAC Access Control List (ACL) identified by <name> to an interface, or associates it with a VLAN ID, in a given direction. The <name> parameter must be the name of an existing MAC ACL.

An optional sequence number may be specified to indicate the order of this access list relative to other access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specified access list replaces the currently attached access list using that sequence number. If the sequence number is not specified for this command, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction will be used.

This command specified in 'Interface Config' mode only affects a single interface, whereas the 'Global Config' mode setting is applied to all interfaces. The 'Interface Config' mode command is only available on platforms that support independent per-port class of service queue configuration. The VLAN keyword is only valid in the 'Global Config' mode.

⚠ The command with out direction does not apply to the packets generated by own-device. For example, the ping packets from device cannot be filtered by this command with out direction.

**Format** mac access-group <name> [vlan <vlan-id>] {in |out} [<1-4294967295>]

| Parameter | Description |
|---|---|
| name | The ACL name which is used to identify a specific MAC ACL. It is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying |

| | |
|---|---|
| | the MAC access list. |
| vlan-id | The VLAN ID. The VLAN keyword is only valid in the 'Global Config' mode. |
| in \| out | The direction value is either in or out |
| 1-4294967295 | The sequence number of the ACL. |

**Default** None

**Mode** Global Config
Interface Config

### 5.22.2.6. *Ip access-list*

Use this command to create an extended IP Access Control List (ACL) identified by <name>, consisting of classification fields defined for the IP header of an IPv4 frame.

If an IP ACL by this name already exists, this command enters IPv4-Access_List config mode to allow updating the existing IP ACL.

**Format** [no] ip access-list <name>

| Parameter | Description |
|---|---|
| **name** | The ACL name which is used to identify a specific IP ACL. It is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the IP access list. |
| **no** | Remove this IP ACL identified by <name> from the system. |

**Default** None

**Mode** Global Config

### 5.22.2.7. *Ip access-list rename*

This command changes the name of a IP Access Control List (ACL). The command fails if a IP ACL by the name *newname* already exists. The *newname* must be a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the IP access list.

**Format** ip access-list rename <oldname> <newname>

| Parameter | Description |
|---|---|

| | |
|---|---|
| oldname | The name of an existing IP ACL to be changed. |
| newname | New name which uniquely identifies the IP access list. |

**Default** None

**Mode** Global Config

### 5.22.2.8. *Ip access-list resequence*

Use this command to renumber the sequence numbers of the entries for specified IP access list with the given increment value starting from a particular sequence number. The command is used to edit the sequence numbers of ACL rules in the ACL and change the order in which entries are applied. This command is not saved in startup configuration and is not displayed in running configuration.

**Format** ip access-list resequence {name | id } <1-2147483647> <1-2147483647>

| **Parameter** | **Description** |
|---|---|
| name | The ACL name which is used to identify a specific IP ACL. It is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the IP access list. |
| id | The ACL ID used to identify a specific IP ACL .The value is 1~199. |
| <1-2147483647> | The sequence number from which to start. The range is 1-2147483647. The default is 1. |
| <1-2147483647> | The amount to increment. The range is 1-2147483647. The default is 10. |

Default 1

Mode Global Config

### 5.22.2.9. *Access-list (ip)*

This command creates an IP Access Control List (ACL) that is identified by the access list number,which is 1-99 for standard ACLs or 100-199 for extended ACLs.

**Format** IP standard ACL

access list <1-99> {remark <remark>} | { [<1-2147483647>] } {deny | permit} {every | <srcip> <srcmask> | host <srcip>} [log] [time-range time-range-name] [assign-queue <queue-id>] [{mirror | redirect} {<slot/port> | port-channel <portchannel-id>}] [rate-limit <1-4294967295> <1-128>]

| Parameter | Description |
|---|---|
| **1-99** | The access list number for the IP standard ACL. |
| **remark** | Adds a comment (remark) to an IP standard or IP extended ACL. |
| **1-2147483647** | Specifies a sequence number for the IP ACL rule. Every rule is assigned a sequence number which is configured by user or generated by the system. |
| **deny \| permit** | To deny or permit the matching rule. |
| **every** | Matches every packet |
| **<srcip> <srcmask>** | Specify a source ip address and source netmask pair for the match condition of this IP ACL rule. |
| **host <srcip>** | Specify host designated source ip address for this rule. |
| **log** | Enable logging for this access list rule |
| **time-range-name** | Specify the name of the time-range if the IP ACL rule has referenced a time range. |
| **queue-id** | Specify the queue identifier to which packets matching this rule are assigned<br><br>**Note**: This option is not supported in the out direction. |
| **mirror \| redirect** | Specify the traffic matching the rule to be copied/redirected to the specific slot/port or port-channel.<br><br>**Note**: This option is not supported in the out direction. |
| **slot/port** | The interface number to be mirrored or redirected to. |
| **portchannel-id** | The port channel ID to be mirrored or redirected to. |
| **rate-limit <1-4294967295> <1-128>** | Specifies the allowed rate of traffic as per the configured rate in <1-4294967295> kb/s, and burst-size in <1-128> kilobytes |

**Mode** Global Config

**Format** IP extended ACL

access list <100-199> {remark <remark>} | { [<1-2147483647>] } {deny | permit} {every | { { <0-255> | eigrp | gre | icmp | igmp | ip | ipinip | ospf | pim | tcp | udp } {<srcip> <srcmask> | any | host <srcip>} [ {range {<portkey>|<startport>} {<portkey>|<endport>} } | {eq | neq | lt | gt} {<portkey>|<0-65535>} ] {<dstip> <dstmask> | any | host <dstip>} [ {range {<portkey>|<startport>} {<portkey>|<endport>} } | {eq | neq | lt | gt} {<portkey>|<0-65535>} ] [ flag [+fin | -fin] [+syn | -syn] [+rst | -rst] [+psh | -psh] [+ack | -ack] [+urg | -urg] [established]] [icmp-type <icmp-type> [icmp-code <icmp-code>] | icmp-message <icmp-message>] [igmp-type <igmp-type>] [dscp <value> | precedence <0-7> | tos <tos> [<tosmask>] ] [fragments]} [log] [time-range time-range-name] [assign-queue <queue-id>] [{mirror | redirect} {<slot/port> | port-channel <portchannel-id>}] [rate-limit <1-4294967295> <1-128>]

| Parameter | Description |
|---|---|
| **100-199** | The access list number for the IP extended ACL. |
| **remark** | Adds a comment (remark) to an IP standard or IP extended ACL. |
| **1-2147483647** | Specifies a sequence number for the IP ACL rule. Every rule is assigned a sequence number which is configured by user or generated by the system. |
| **deny \| permit** | To deny or permit the matching rule. |
| **every** | Matches every packet |
| **{ <0-255> \| eigrp \| gre \| icmp \| igmp \| ip \| ipinip \| ospf \| pim \| tcp \| udp }** | Specifies the protocol to filter for an extended IP ACL rule. |
| **srcip srcmask \| any \| host** | Specifies a source IP address and source netmask pair for matching condition of this rule.<br>The parameter *any* specifies srcip as 0.0.0.0 and srcmask as 255.255.255.255.<br>The parameter *host* A.B.C.D specifies srcip as A.B.C.D and srcmask as 0.0.0.0. |
| **dstip dstmask \| any \| host** | Specifies a destination IP address and netmask pair for matching condition of this rule.<br>The parameter *any* specifies srcip as 0.0.0.0 and srcmask as 255.255.255.255.<br>The parameter *host* A.B.C.D specifies srcip as A.B.C.D and srcmask as 0.0.0.0. |
| **range {*<portkey>* \|*<startport>*} {*<portkey>*\|*<endport>*}** | Specifies the source layer 4 port match condition for the IP ACL rule. You can use the port number ranging from 0-65535 , or specify the *portkey,* which can be one of the following keywords:<br>● For TCP: bgp,domain,echo,ftp,ftpdata,http,pop2,pop3,smtp,telnet,www.<br>● For UDP: domain,echo,ntp,rip,snmp,tftp,time,who.<br>For both TCP and UDP, each of these keywords translates into its equivalent port number, which is used as both the start and end of a port range.<br>If the parameter *range* is specified, the IP ACL rule matches only if the layer 4 port number falls within the specified port range. The *startport* and *endport* parameters identify the first and last ports that are parts of the range. They have values from 0 to 65535. The ending port must have a value equal or greater than the starting port. The starting port, ending port, and all ports in between will be part of the layer 4 port range.<br>**Note**: This option is available only if the protocol is TCP or UDP. This option is not supported in the out direction. |
| **{eq \| neq \| lt \| gt}** | Specifies the layer 4 port match condition as comparison form for the rule. You can |

| | |
|---|---|
| **{<portkey>\|<0-65535>}** | use the port number ranging from 0-65535, or specify the *portkey.*<br><br>eq: equal to ; lt: less than ; gt: great than ; neq: not equal to.<br>When *eq* is specified, the IP ACL rule matches only if the layer 4 port number is equal to the specified port number or portkey.<br>When *lt* is specified, IP ACL rule matches only if the layer 4 port number is less than the specified port number or portkey. It is equivalent to specifying the range as 0 to <specified port number-1>.<br>When *gt* is specified, the IP ACL rule matches if the layer 4 port number is greater than the specified port number or portkey. It is equivalent to specifying the range as <specified port number+1> to 65535.<br>When *neq* is specified, IP ACL rule matches only if the layer 4 port number is not equal to the specified port number ot portkey.<br><br>**Note**: This option is available only if the protocol is TCP or UDP. Port number matches only apply to unfragmented or first fragments. This option is not supported in the out direction. |
| **flag <value>** | Specifies that the IP ACL rule matches on the TCP flags. The *value* parameter represents : +fin, -fin, +syn, -syn, +rst, -rst,+psh, -psh, +ack, -ack, +urg, -urg, established.<br><br>When + is specified, a match occurs if the specified flag is set in the TCP header.<br>When - is specified, a match occurs if the specified flag is NOT set in the TCP header.<br>When established is specified, a match occurs if the specified RST or ACK bits are set in the TCP.<br><br>Note: This option is available only if the protocol is TCP. |
| **icmp-type <icmp-type> [icmp-code <icmp-code> \| icmp-message <icmp-message>]** | This option is available only if the protocol is ICMP.<br>Specifies a match condition for ICMP packets.<br><br>When *icmp-type* is specified, the IP ACL rule matches on the specified ICMP message type, a number from 0 to 255.<br>When *icmp-code* is specified, the IP ACL rule matches on the specified ICMP message code, a number from 0 to 255.<br><br>Specifying *icmp-message* implies that both *icmp-type* and *icmp-code* are specified. The following icmp-messages are supported: echo, echo-reply, host-redirect, mobile-redirect, net-redirect, net-unreachable, redirect, packet-too-big, port-unreachable, source-quench, router-solicitation, router-advertisement, time-exceeded, ttl-exceeded and unreachable. |
| **igmp-type <igmp-type>** | This option is available only if the protocol is IGMP.<br>When igmp-type is specified, the IP ACL rule matches on the specified IGMP message type, a number from 0 to 255. |
| **dscp <value>** | Specifies the TOS for an IP ACL rule depending on a match of DSCP value using parameters dscp. |

| | |
|---|---|
| **precedence <0-7>** | Specifies the TOS for an IP ACL rule depending on a match of precedence values using parameters <0-7> |
| **tos <tos> [<tosmask>]** | Specifies the TOS for an IP ACL rule depending on a match value using parameters *tos/tosmask.* |
| **fragments** | Specifies that the IP ACL rule matches on fragmented IP packets. |
| **log** | Enable logging for this access list rule |
| **time-range-name** | Specify the name of the time-range if the IP ACL rule has referenced a time range. |
| **queue-id** | Specify the queue identifier to which packets matching this rule are assigned<br><br>**Note**: This option is not supported in the out direction. |
| **mirror \| redirect** | Specify the traffic matching the rule to be copied/redirected to the specific slot/port or port-channel. |
| **slot/port** | The interface number to be mirrored or redirected to. |
| **portchannel-id** | The port channel ID to be mirrored or redirected to. |
| **rate-limit <1-4294967295> <1-128>** | Specifies the allowed rate of traffic as per the configured rate in <1-4294967295> kb/s, and burst-size in <1-128> kilobytes |

**Mode** Global Config

To remove the rule with specified ID, use the below **no** form command.

**Format** no rule-id <ID>

| Parameter | Description |
|---|---|
| ID | The rule with **ID** to be removed. |

**Default** None

**Mode** IP Access-list Config

## 5.22.2.10. *No access-list*

This command deletes an ACL that is identified by the parameter IP ACL <1-99> *or* <100-199> from the system or remove an ACL rule that is identified by the parameter <1-n> from the an IP ACL <1-99> *or* <100-199>.

**Format** no access-list {<1-99> | <100-199>} [<rule-id>]

| Parameter | Description |
|---|---|
| 1-99 | The access list number for the IP standard ACL. |
| 100-199 | The access list number for the IP extended ACL. |
| rule-id | Specifies the access list rule ID. The value is 1~n, where n is the maximum number of user configurable rules per ACL. |

Default None

Mode Global Config

### 5.22.2.11. *Ip access-group*

This command attaches a specified access-control list to an interface, range of interfaces, or all interfaces: or associates it with a VLAN ID in a given direction.

An optional sequence number may be specified to indicate the order of this IP access list relative to other IP access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specified access list replaces the currently attached IP access list using that sequence number. If the sequence number is not specified for this command, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction is used.

This command specified in 'Interface Config' mode only affects a single interface, whereas the 'Global Config' mode setting is applied to all interfaces. The VLAN keyword is only valid in the 'Global Config' mode.

⚠ The command with out direction does not apply to the packets generated by own-device. For example, the ping packets from device cannot be filtered by this command with out direction.

**Format** ip access-group {<1-199> | <name>} [vlan <vlan-id>] {in | out} [<1-4294967295>]

| Parameter | Description |
|---|---|
| name | The ACL name which is used to identify a specific IP ACL. It is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the MAC access list. |
| <1-199> | The identifier of this ACL. Range 1 to 99 is the access list number for an IP standard ACL. Range 100 to 199 is the access list number for an IP extended ACL. |
| vlan-id | The VLAN ID. The VLAN keyword is only valid in the 'Global Config' mode. |

| | |
|---|---|
| in \| out | The direction value is either in or out. |
| 1-4294967295 | The sequence number of the ACL. |

**Default** None

**Mode** Global Config
Interface Config

### 5.22.2.12. *No ip access-group*

This command removes a specified access-control list from an interface, range of interfaces, or all interfaces: or associates it with a VLAN ID in a given direction.

This command specified in 'Interface Config' mode only affects a single interface, whereas the 'Global Config' mode setting is applied to all interfaces. The VLAN keyword is only valid in the 'Global Config' mode.

**Format** no ip access-group {<1-199> | <name>} [vlan <vlan-id>] {in | out}

| Parameter | Description |
|---|---|
| name | The ACL name which is used to identify a specific IP ACL. It is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the MAC access list. |
| <1-199> | The identifier of this ACL. Range 1 to 99 is the access list number for an IP standard ACL. Range 100 to 199 is the access list number for an IP extended ACL. |
| vlan-id | The VLAN ID. The VLAN keyword is only valid in the 'Global Config' mode. |
| in \| out | The direction value is either in or out. |

**Default** None

**Mode** Global Config
Interface Config

### 5.22.2.13. *{deny|permit}*

This command creates a new rule for the current IP access list. Each rule is appended to the list of configured rules for the list.

The ‘no’ form of this command is not supported, since the rules within an IP ACL cannot be deleted individually. Rather, the entire IP ACL must be deleted and respecified.

An implicit ‘deny all’ IP rule always terminates the access list.

A rule may either deny or permit traffic according to the specified classification fields. At a minimum, either the ‘every’ keyword or the protocol, source address, and destination address values must be specified. The source and destination IP address fields may be specified using the keyword ‘any’ to indicate a match on any value in that field. The remaining command parameters are all optional, but the most frequently used parameters appear in the same relative order as shown in the command format.

The assign-queue parameter allows specification of a particular hardware queue for handling traffic that matches this rule. The allowed <queue-id> value is 0-(n-1), where n is the number of user configurable queues available for the hardware platform. The assign-queue parameter is valid only for a permit rule.

The mirror parameter allows the traffic matching this rule to be copied to the specified <slot/port>, while the redirect parameter allows the traffic matching this rule to be forwarded to the specified <slot/port>. The assign-queue and redirect parameters are only valid for a permit rule.

The time-range parameter allows imposing time limitation on the IP ACL rule as defined by the parameter time-range-name . If a time range with the specified name does not exist and the IP ACL containing this ACL rule is applied to an interface or bound to a VLAN, then the ACL rule is applied immediately. If a time range with specified name exists and the IP ACL containing this ACL rule is applied to an interface or bound to a VLAN, then the ACL rule is applied when the time-range with specified name becomes active. The ACL rule is removed when the time-range with specified name becomes inactive.

**Format** {deny | permit} {{every [rule-id] [assign-queue <queue-id>] [log] [{{mirror | redirect} <slot/port> | port-channel <port-channel-group-id>}] [rate-limit <1-4294967295> <1-128>] [sequence <1-2147483647>] [time-range <name>]} | {{<0-255> | icmp | ip | tcp | udp} {<source-ip/source-mask> | any | host <srcip>} [eq {<0-65535> | <portkey>}] {<destination-ip/destination-mask> | any | host <dstip>} [eq {<0-65535> | <portkey>}] [flag [+fin | -fin] [+syn | -syn] [+rst | -rst] [+psh | -psh] [+ack | -ack] [+urg | -urg] [established]] [dscp <value>] [flow-label <vlaue>] [icmp-type <icmp-type> [icmp-code <icmp-code>] | icmp-message <icmp-message>] [fragments] [routing] [rule-id] [assign-queue <queue-id>] [log] [{{mirror | redirect} <slot/port> | port-channel <port-channel-group-id>}] [rate-limit <1-4294967295> <1-128>] [sequence <1-2147483647>] [time-range <name>] }}

| Parameter | Description |
|---|---|
| **deny or permit** | Specifies whether the IP ACL rule permits or denies the matching traffic. |
| **every** | Specifies to match every packet. |
| **[rule-id]** | Specifies a rule ID, the value range from 1 to 1023. |
| **[assign-queue <queue-id>]** | Specifies the assign-queue, which is the queue identifier to which packets matching this rule are assigned, the value range from 0 to 7. |
| **[log]** | Specifies that this rule is to be logged. |
| **{mirror \| redirect} {<slot/port> \| port-channel** | Specifies the mirror or redirect interface which is the unit/slot/port to which |

| | |
|---|---|
| **<port-channel-group-id>}** | packets matching this rule are copied or forwarded, respectively. |
| **rate-limit <rate> <burst-size>** | Specifies the allowed rate of traffic as per the configured rate in kbps range from 1 to 4294967295, and burst-size in kbytes range from 1 to 128. |
| **sequence <sequence-number>** | Specifies a sequence number for the ACL rule. Every rule receives a sequence number. The sequence number is specified by the user or is generated by the device, the value range from 1 to 2147483647. |
| **time-range <name>** | Specifies a time limitation on the ACL rule as defined by the parameter time-range-name. |
| **<0-255>** | Specifies the protocol to match for the IP ACL rule, the value range from 0 to 255. |
| **<source-ip/source-mask>** | Specifies a source IP address and mask to match for the IP ACL rule. |
| **<destination-ip/destination-mask>** | Specifies a destination IP address and mask to match for the IP ACL rule. |
| **Any** | Specifying any implies specifying “0.0.0.0“ with mask “255.255.255.255”. |
| **host <srcip>** | Specifying host source IP address implies matching the specified IP address. |
| **host <dstip>** | Specifying host destination IP address implies matching the specified IP address. |
| **eq {<0-65535> \| <portkey>}** | Specifies the layer 4 port match condition for the IP ACL rule. A port number can be used, in the range 0- 65535, or the portkey, which can be one of the following keywords:<br>• For TCP: bgp, domain, echo, ftp, ftp-data, http, smtp, telnet, www, pop2, pop3<br>• For UDP: domain, echo, ntp, rip, snmp, tftp, time, who. |
| **flag [+fin \| -fin] [+syn \| -syn] [+rst \| -rst] [+psh \| -psh] [+ack \| -ack] [+urg \| -urg] [established]** | Specifies that the IP ACL rule matches on the tcp flags. When +<tcpflagname> is specified, a match occurs if specified <tcpflagname> flag is set in the TCP header. When “-<tcpflagname>” is specified, a match occurs if specified <tcpflagname> flag is *NOT* set in the TCP header. When established is specified, a match occurs if specified either RST or ACK bits are set in the TCP header. Two rules are installed in hardware to when “established” option is specified. This option is visible only if protocol is “tcp”. |
| **dscp <value>** | Specifies the dscp value to match for for the IP rule. The value range from 0 to 63 or a DSCP keyword (af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, s1, cs2, cs3, cs4, cs5, cs6, cs7, ef). |
| **flow-label <vlaue>** | Specifies the flow-label value to match for for the IP rule. The value range from 0 to 1048575. |
| **icmp-type <icmp-type> [icmp-code <icmp-code> \| icmp-message <icmp-message>]** | This option is available only if the protocol is ICMP.<br>Specifies a match condition for ICMP packets.<br><br>When *icmp-type* is specified, the IP ACL rule matches on the specified ICMP message type, a number from 0 to 255. |

| | |
|---|---|
| | When *icmp-code* is specified, the IP ACL rule matches on the specified ICMP message code, a number from 0 to 255.<br><br>Specifying *icmp-message* implies that both *icmp-type* and *icmp-code* are specified. The following icmp-messages are supported: destination-unreachable, echo-reply, echo-request, header, hop-limit, mld-query, mld-reduction, mld-report, nd-na, nd-ns, next-header, no-admin, no-route, packet-too-big, port-unreachable, router-solicitation, router-advertisement, router-renumbering, time-exceeded, and unreachable.<br><br>The ICMP message is decoded into the corresponding ICMP type and ICMP code within that ICMP type. |
| **[fragments]** | Specifies that IP ACL rule matches on fragmented IP packets. |
| **[routing]** | Specifies that IP ACL rule matches on IP packets that have the routing extension header. |

**Default** None

**Mode** IP-Access-List Config

# 5.23. IPv6 ACL Commands

## 5.23.1. Show commands

### 5.23.1.1. *Show ipv6 access-lists*

This command displays an IPv6 access list and all of the rules that are defined for the IPv6 ACL. Use the [name] parameter to identify a specific IPv6 ACL to display.

**Format** show ipv6 access-lists [<name>]

| Parameter | Description |
|---|---|
| **<name>** | ACL name which uniquely identifies the IPv6 ACL to display. |

**Default** None

**Mode** Privileged EXEC

User EXEC

**Display Message**

If the "**<name>**" parameter is not specified, the following fields are displayed:

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Current number of all ACLs** | The current number of all ACLs. |
| **Maximum number of all ACLs** | The maximum number of all ACLs. |
| **IPv6 ACL Name** | The access-list name. |
| **Rules** | The number of rules in this ACL. |
| **Direction** | The applied direction of the ACL on the interface, inbound or outbound. |
| **Interface(s)** | The interfaces which the ACL applied on. |
| **VLAN(s)** | The VLAN which the ACL applied on |

If the "**<name>**" parameter is specified, the following fields are displayed:

| **Fields** | **Definition** |
|---|---|
| **ACL Name** | The access-list name. |
| **Sequence Number** | The ordered rule number identifier defined within the IPv6 ACL. |
| **Action** | The action associated with each rule. The possible values are Permit or Deny. |
| **Match Every** | Indicates whether this access list applies to every packet. Possible values are True or False. |
| **IPv6 Protocol** | The protocol to filter for this rule. |
| **Source IP Address** | The source IP address for this rule. |
| **Source L4 Port Keyword** | The source port for this rule. |
| **Destination IP Address** | The destination IP address for this rule. |
| **Destination L4 Port Keyword** | The destination port for this rule. |
| **Fragments** | Specifies that IPv6 ACL rule matches on fragmented IPv6 packets or not. |
| **Routing** | Specifies that IPv6 ACL rule matches on IPv6 packets that have the routing extension header or not. |
| **IP DSCP** | The value specified for IP DSCP. |
| **Flow Label** | The value specified for IPv6 Flow Label. |
| **Log** | Displays when you enable logging for the rule. |
| **Assign Queue** | The queue identifier to which packets matching this rule are assigned. |

| | |
|---|---|
| **Mirror Interface** | The slot/port to which packets matching this rule are copied. |
| **Redirect Interface** | The slot/port to which packets matching this rule are forwarded. |
| **Redirect External AgentId** | The agent-id is a unique identifier for the external receive client application . Indicates whether matching flow packets are allowed to be sent to external applications running alongside ICOS on a control CPU. |
| **Time Range Name** | Displays the name of the time-range if the Ipv6 ACL rule has referenced a time range. |
| **Rule Status** | Status (Active/Inactive) of the MAC ACL rule. |
| **Committed Rate** | The committed rate defined by the rate-limit attribute. |
| **Committed Burst** | The committed burst size defined by the rate-limit attribute. |

## 5.23.2. Configuration Commands

### 5.23.2.1. *Ipv6 access-list*

This command creates an IPv6 Access Control List (ACL) identified by <name>, consisting of classification fields defined for the IP header of an IPv6 frame. The <name> parameter is a case-sensitive alphanumeric string from 1 to 31 characters

uniquely identifying the IPv6 access list.

If an IPv6 ACL by this name already exists, this command enters IPv6-Access-List config mode to allow updating the existing IPv6 ACL.

To delete the IPv6 ACL identified by <name> from the system, use the no form of this command.

**Format** ipv6 access-list <name>

no ipv6 access-list <name>

| Parameter | Description |
|---|---|
| **<name>** | access-list name up to 31 characters in length. |

**Default** None

**Mode** Global Config

i The CLI mode changes to IPv6-Access-List Config mode when you successfully execute this command.

### 5.23.2.2. *Ipv6 access-list rename*

This command changes the name of an IPv6 ACL. The <name> parameter is the name of an existing IPv6 ACL. The <newname> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the IPv6 access list.

This command fails is an IPv6 ACL by the name <newname> already exists.

**Format** ipv6 access-list rename <oldname> <newname>

| Parameter | Description |
|---|---|
| **<oldname>** | Current Access Control List name. |
| **<newname>** | New Access Control List name. |

**Default** None

**Mode** Global Config

### 5.23.2.3. *Ipv6 access-list resequence*

Use this command to renumber the sequence numbers of the entries for specified IPv6 access list with the given increment value starting from a particular sequence number. The command is used to edit the sequence numbers of ACL rules in the ACL and change the order in which entries are applied. This command is not saved in startup configuration and is not displayed in running configuration.

**Format** ipv6 access-list resequence {name | id } <1-2147483647> <1-2147483647>

| Parameter | Description |
|---|---|
| name | The ACL name which is used to identify a specific IP ACL. It is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the IP access list. |
| id | The ACL ID used to identify a specific IP ACL .The value is 1~199. |
| <1-2147483647> | The sequence number from which to start. The range is 1-2147483647. The default is 1. |
| <1-2147483647> | The amount to increment.  The range is 1-2147483647. The default is 10. |

Default 1

Mode Global Config

### 5.23.2.4. *{deny|permit}*

This command creates a new rule for the current IPv6 access list. Each rule is appended to the list of configured rules for the list.

The ‘no’ form of this command is not supported, since the rules within an IPv6 ACL cannot be deleted individually. Rather, the entire IPv6 ACL must be deleted and respecified.

An implicit ‘deny all’ IPv6 rule always terminates the access list.

A rule may either deny or permit traffic according to the specified classification fields. At a minimum, either the ‘every’ keyword or the protocol, source address, and destination address values must be specified. The source and destination IPv6 address fields may be specified using the keyword ‘any’ to indicate a match on any value in that field. The remaining command parameters are all optional, but the most frequently used parameters appear in the same relative order as shown in the command format.

The assign-queue parameter allows specification of a particular hardware queue for handling traffic that matches this rule. The allowed <queue-id> value is 0-(n-1), where n is the number of user configurable queues available for the hardware platform. The assign-queue parameter is valid only for a permit rule.

The mirror parameter allows the traffic matching this rule to be copied to the specified <slot/port>, while the redirect parameter allows the traffic matching this rule to be forwarded to the specified <slot/port>. The assign-queue and redirect parameters are only valid for a permit rule.

The time-range parameter allows imposing time limitation on the IPv6 ACL rule as defined by the parameter time-range-name . If a time range with the specified name does not exist and the IPv6 ACL containing this ACL rule is applied to an interface or bound to a VLAN, then the ACL rule is applied immediately. If a time range with specified name exists and the IPv6 ACL containing this ACL rule is applied to an interface or bound to a VLAN, then the ACL rule is applied when the time-range with specified name becomes active. The ACL rule is removed when the time-range with specified name becomes inactive.

**Format** {deny | permit} {{every [rule-id] [assign-queue <queue-id>] [log] [{{mirror | redirect} <slot/port> | port-channel <port-channel-group-id>}] [rate-limit <1-4294967295> <1-128>] [sequence <1-2147483647>] [time-range <name>]} | {{<0-255> | icmpv6 | ipv6 | tcp | udp} {<source-ipv6-prefix/prefix-length> | any | host <ipv6 srcip>} [eq {<0-65535> | <portkey>}] {<destination-ipv6-prefix/prefix-length> | any | host <ipv6 dstip>} [eq {<0-65535> | <portkey>}] [flag [+fin | -fin] [+syn | -syn] [+rst | -rst] [+psh | -psh] [+ack | -ack] [+urg | -urg] [established]] [dscp <value>] [flow-label <vlaue>] [icmp-type <icmp-type> [icmp-code <icmp-code>] | icmp-message <icmp-message>] [fragments] [routing] [rule-id] [assign-queue <queue-id>] [log] [{{mirror | redirect} <slot/port> | port-channel <port-channel-group-id>}] [rate-limit <1-4294967295> <1-128>] [sequence <1-2147483647>] [time-range <name>] }}

| Parameter | Description |
|---|---|
| **deny or permit** | Specifies whether the IPv6 ACL rule permits or denies the matching traffic. |
| **every** | Specifies to match every packet. |
| **[rule-id]** | Specifies a rule ID, the value range from 1 to 1023. |

| | |
|---|---|
| **[assign-queue <queue-id>]** | Specifies the assign-queue, which is the queue identifier to which packets matching this rule are assigned, the value range from 0 to 7.<br><br>**Note**: This option is not supported in the out direction. |
| **[log]** | Specifies that this rule is to be logged. |
| **{mirror \| redirect} {<slot/port> \| port-channel <port-channel-group-id>}** | Specifies the mirror or redirect interface which is the unit/slot/port to which packets matching this rule are copied or forwarded, respectively.<br><br>**Note**: This option is not supported in the out direction. |
| **rate-limit <rate> <burst-size>** | Specifies the allowed rate of traffic as per the configured rate in kbps range from 1 to 4294967295, and burst-size in kbytes range from 1 to 128. |
| **sequence <sequence-number>** | Specifies a sequence number for the ACL rule. Every rule receives a sequence number. The sequence number is specified by the user or is generated by the device, the value range from 1 to 2147483647. |
| **time-range <name>** | Specifies a time limitation on the ACL rule as defined by the parameter time-range-name. |
| **<0-255>** | Specifies the protocol to match for the IPv6 ACL rule, the value range from 0 to 255. |
| **<source-ipv6-prefix/prefix-length>** | Specifies a source IPv6 source address and prefix length to match for the IPv6 ACL rule. |
| **<destination-ipv6-prefix/prefix-length>** | Specifies a source IPv6 destination address and prefix length to match for the IPv6 ACL rule. |
| **any** | Specifying any implies specifying "::/0 " |
| **host <ipv6 srcip>** | Specifying host source-ipv6-address implies matching the specified IPv6 address. |
| **host <ipv6 dstip>** | Specifying host destination-ipv6-address implies matching the specified IPv6 address. |
| **eq {<0-65535> \| <portkey>}** | Specifies the layer 4 port match condition for the IPv6 ACL rule. A port number can be used, in the range 0- 65535, or the portkey, which can be one of the following keywords:<br>• For TCP: bgp, domain, echo, ftp, ftp-data, http, smtp, telnet, www, pop2, pop3<br>• For UDP: domain, echo, ntp, rip, snmp, tftp, time, who.<br><br>**Note**: This option is not supported in the out direction. |
| **flag [+fin \| -fin] [+syn \| -syn] [+rst \| -rst] [+psh \| -psh] [+ack \| -ack] [+urg \| -urg] [established]** | Specifies that the IPv6 ACL rule matches on the tcp flags. When +<tcpflagname> is specified, a match occurs if specified <tcpflagname> flag is set in the TCP header. When "-<tcpflagname>" is specified, a match occurs if specified <tcpflagname> flag is *NOT* set in the TCP header. When established is specified, a match occurs if specified either RST or ACK bits are |

| | |
|---|---|
| | set in the TCP header. Two rules are installed in hardware to when "established" option is specified. This option is visible only if protocol is "tcp". |
| **dscp <value>** | Specifies the dscp value to match for for the IPv6 rule. The value range from 0 to 63 or a DSCP keyword (af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, s1, cs2, cs3, cs4, cs5, cs6, cs7, ef). |
| **flow-label <vlaue>** | Specifies the flow-label value to match for for the IPv6 rule. The value range from 0 to 1048575. |
| **icmp-type <icmp-type> [icmp-code <icmp-code> \| icmp-message <icmp-message>]** | This option is available only if the protocol is ICMPv6.<br>Specifies a match condition for ICMP packets.<br><br>When *icmp-type* is specified, the IPv6 ACL rule matches on the specified ICMP message type, a number from 0 to 255.<br>When *icmp-code* is specified, the IPv6 ACL rule matches on the specified ICMP message code, a number from 0 to 255.<br><br>Specifying *icmp-message* implies that both *icmp-type* and *icmp-code* are specified. The following icmp-messages are supported: destination-unreachable, echo-reply, echo-request, header, hop-limit, mld-query, mld-reduction, mld-report, nd-na, nd-ns, next-header, no-admin, no-route, packet-too-big, port-unreachable, router-solicitation, router-advertisement, router-renumbering, time-exceeded, and unreachable.<br><br>The ICMP message is decoded into the corresponding ICMP type and ICMP code within that ICMP type. |
| **[fragments]** | Specifies that IPv6 ACL rule matches on fragmented IPv6 packets (packets that have the next header field set to 44). |
| **[routing]** | Specifies that IPv6 ACL rule matches on IPv6 packets that have the routing extension header (the next header field is set to 43). |

**Default** None

**Mode** IPv6-Access-List Config

### 5.23.2.5. *No rule-id*

This command removes a rule for the current IPv6 access list.

**Format** no rule <ID>

| Parameter | Description |
|---|---|
| **<ID>** | Specifies a rule ID, the value range from 1 to 2147483647. |

**Default** None

**Mode** IPv6-Access-List Config

### 5.23.2.6. *Ipv6 traffic-filter*

This command either attaches a specific IPv6 ACL identified by <name> to an interface or associates with a VLAN ID in a given direction. The <name> parameter must be the name of an existing IPv6 ACL.

An optional sequence number may be specified to indicate the order of this mac access list relative to other IPv6 access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specifiedIPv6 access list replaces the currently attached IPv6 access list using that sequence number. If the sequence number is not specified for this command, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction is used.

This command specified in Interface Config mode only affects a single interface, whereas the Global Config mode setting is applied to all interfaces. The control-plane and vlan keyword is only valid in the Global Config mode. The Interface Config mode command is only available on platforms that support independent per-port class of service queue configuration.

To remove an IPv6 ACL identified by <name> from the interface(s) in a given direction, use the no form of this command.

**Format** ipv6 traffic-filter <name> {{control-plane | in | out} | vlan <vlan-id> {in | out}} [<1-4294967295>]

no ipv6 traffic-filter <name> {{control-plane | in | out} | vlan <vlan-id> {in | out}}

| Parameter | Description |
|---|---|
| **in\|out** | The direction value is either in or out. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<1-4294967295>** | The sequence number (greater than 0) to rank precedence for this interface and direction. A lower sequence number has higher precedence. The range of sequence is 1 to 4294967295. |

**Default** None

**Mode** Global Config

Interface Config

# 5.24. CoS (Class of Service) Command

## 5.24.1. Show commands

### 5.24.1.1. *Show queue cos-map*

This command displays the current Dot1p (802.1p) priority mapping to internal traffic classes for a specific interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service mappings. If specified, the 802.1p mapping table of the interface is displayed. If omitted, the most recent global configuration settings are displayed.

**Format** show queue cos-map {<slot/port> | port-channel <id>}

| Parameter | Description |
|---|---|
| **slot/port** | The interface number. |
| **id** | Specified the port channel ID |

**Default** None

**Mode** Privileged EXEC

**Display Message**

The following information is repeated for each user priority.

| Fields | Definition |
|---|---|
| **User Priority** | The 802.1p user priority value. |
| **Traffic Class** | The traffic class internal queue identifier to which the user priority value is mapped. |

### 5.24.1.2. *Show queue ip-dscp-mapping*

This command maps an IP DSCP value to an internal traffic class. The <ipdscp> value is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef.

The <trafficclass> values can range from 0-6, although the actual number of available traffic classes depends on the platform.

**Format** show queue ip-dscp-mapping

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **IP DSCP** | Displays IP DSCP value. |
| **Traffic Class** | Displays the queue mapping. |

### 5.24.1.3. *Show queue trust*

This command displays the current trust mode setting for a specific interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service mappings. If specified, the port trust mode of the interface is displayed. If omitted, the port trust mode of each interface in the system is shown. If the platform does not support independent per-port class of service mappings, the output represents the system-wide port trust mode used for all interfaces.

**Format** show queue trust {<slot/port> | port-channel <id>}

| Parameter | Description |
|---|---|
| **slot/port** | The interface number. |
| **id** | Specified the port channel ID |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Class of Service Trust Mode** | The trust mode of this interface. |
| **Non-IP Traffic Class** | The traffic class used for non-IP traffic. This is only displayed when the COS trust mode is set to either 'trust ip-dscp' or 'trust ip-precedence'. |
| **Untrusted Traffic Class** | The traffic class used for all untrusted traffic. This is only displayed when the COS trust mode is set to 'untrusted'. |

### 5.24.1.4. *Show queue cos-queue*

This command displays the class-of-service queue configuration for the specified interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service

mappings. If specified, the class-of-service queue configuration of the interface is displayed. If omitted, the most recent global configuration settings are displayed.

**Format** show queue cos-queue {<slot/port> | port-channel <id>}

| Parameter | Description |
|---|---|
| **slot/port** | The interface number. |
| **id** | Specified the port channel ID |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | This displays the slot/port of the interface. If displaying the global configuration, this output line is replaced with a Global Config indication. |
| **Interface Shaping Rate** | The maximum transmission bandwidth limit for the interface as a whole. It is independent of any per-queue maximum bandwidth value(s) in effect for the interface. This is a configured value. |

The following information is repeated for each queue on the interface.

| Fields | Definition |
|---|---|
| **Queue Id** | Interface supports 7 queues numbered 0 to 7. |
| **Minimum Bandwidth** | The minimum transmission bandwidth guarantee for the queue, expressed as a percentage. A value of 0 means bandwidth is not guaranteed and the queue operates using best-effort. This is a configured value. |
| **Scheduler Type** | Indicates whether this queue is scheduled for transmission using a strict priority or a weighted scheme. This is a configured value. |
| **Queue Mgmt Type** | The queue depth management technique used for this queue, either tail drop or weighted random early discard (WRED). This is a configured value. |

### 5.24.1.5. *Show queue random-detect*

This command displays the global WRED settings for each CoS queue. If you specify the slot/port, the command displays the WRED settings for each CoS queue on the specified interface.

**Format** show queue random-detect {<slot/port> | port-channel <id>}

| Parameter | Description |
|---|---|
| **slot/port** | The interface number. |
| **id** | Specified the port channel ID |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Queue Id** | Interface supports 7 queues numbered 0 to 7. |
| **Threshold Units** | The configured unit of the minimum and maximum threshold values; can be in KB or percentage. |
| **WRED Minimum Threshold** | The configured minimum threshold the queue depth (as a percentage) where WRED starts marking and dropping traffic. |
| **WRED Maximum Threshold** | The configured maximum threshold is the queue depth (as a percentage) above which WRED marks/drops all traffic. |
| **WRED Drop Probability** | The configured percentage probability that WRED will mark/drop a packet, when the queue depth is at maximum threshold. (The drop probability increases linearly from 0 just before the minimum threshold, to this value at the maximum threshold, then goes to 100% for larger queue depths. |
| **ECN** | Identifies whether ECN is enabled. |

### 5.24.1.6. *Show queue traffic*

This command displays interface traffic information.

**Format** show queue traffic <slot/port>

| Parameter | Description |
|---|---|
| **slot/port** | The interface number. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface Name** | The interface associated with the rest of the data in the row. |
| **Congestion Drops** | The number of packets that have been dropped on the interface due to congestion. |
| **TX Queue** | The number of bytes in the transmit queue. |
| **RX Queue** | The number of bytes in the receive queue. |
| **Color Drops: Green** | The number of green packets that were dropped |
| **Color Drops: Yellow** | The number of yellow (conformed) packets that were dropped |
| **Color Drops: Red** | The number of red (exceeded) packets that were dropped |
| **WRED TX Queue** | The number of packets in the WRED transmit queue |
| **ECN Tx Queue** | The number of packets in the ECN transmit queue |

## 5.24.2. Configuration commands

### 5.24.2.1. *Queue cos-map*

This command maps an 802.1p priority to an internal traffic class on a "per-port" basis.

**Format** queue cos-map <0-7> <0-7>

no queue cos-map

| Parameter | Description |
|---|---|
| **<0-7>** | The range of queue priority is 0 to 7. |
| **<0-7>** | The range of mapped traffic class is 0 to 7**.** |
| **no** | Reset to the default mapping of the queue priority and the mapped traffic class. |

**Default** None

**Mode** Interface Config

This command maps an 802.1p priority to an internal traffic class for a device.

**Format** queue cos-map all <0-7> <0-7>

no queue cos-map all

| Parameter | Description |
|---|---|
| **<0-7>** | The range of queue priority is 0 to 7. |
| **<0-7>** | The range of mapped traffic class is 0 to 7**.** |
| **no** | Reset to the default mapping of the queue priority and the mapped traffic class. |

**Default** None

**Mode** Global Config

### 5.24.2.2. *Queue trust*

This command sets the class of service trust mode of an interface. You can set the mode to trust one of the Dot1p (802.1p) or IP DSCP packet markings. You can also set the interface mode to untrusted. If you configure an interface to use Dot1p, the mode does not appear in the output of the show running config command because Dot1p is the default.

**Format** queue trust {dot1p | ip-dscp | untrusted} all

no queue trust all

| Parameter | Description |
|---|---|
| **no** | Sets the class of service trust mode to untrusted for all interfaces. |

**Default** dot1p

**Mode** Global Config

**Format** queue trust {dot1p | ip-dscp | untrusted}

no queue trust

| Parameter | Description |
|---|---|
| **no** | Sets the class of service trust mode to untrusted for an interfaces. |

**Default** dot1p

**Mode** Interface Config

### 5.24.2.3. *Queue cos-queue min-bandwidth*

This command specifies the minimum transmission bandwidth guarantee for each interface queue.

**Format** queue cos-queue min-bandwidth <bw-0> <bw-1> ⋯ <bw-7>

no queue cos-queue min-bandwidth

| Parameter | Description |
|---|---|
| **<bw-0> <bw-1> ... <bw-7>** | Each Valid range is (0 to 100) in increments of 5 and the total sum is less than or equal to 100. |
| **no** | Restores the default for each queue's minimum bandwidth value. |

**Default** None

**Mode** Interface Config

This command specifies the minimum transmission bandwidth guarantee for each interface queue in the device.

**Format** queue cos-queue min-bandwidth all <bw-0> <bw-1> ⋯ <bw-7>

no queue cos-queue min-bandwidth all

| Parameter | Description |
|---|---|
| **<bw-0> <bw-1> ... <bw-7>** | Each Valid range is (0 to 100) in increments of 5 and the total sum is less than or equal to 100. |
| **no** | Restores the default for each queue's minimum bandwidth value in the device. |

**Default** None

**Mode** Global Config

### 5.24.2.4. *Queue cos-queue strict*

This command activates the strict priority scheduler mode for each specified queue on a "per-port" basis.

**Format** queue cos-queue strict <queue-id-0> [<queue-id-1> ⋯ <queue-id-7>]

no queue cos-queue strict <queue-id-0> [<queue-id-1> ⋯ <queue-id-7>]

| Parameter | Description |
|---|---|
| **<queue-id>** | Queue ID from 0 to 7. |
| **no** | Restores the default weighted scheduler mode for each specified queue on a "per-port" basis. |

**Default** None

**Mode** Interface Config

This command activates the strict priority scheduler mode for each specified queue on a device.

**Format** queue cos-queue strict all <queue-id-0> [<queue-id-1> ⋯ <queue-id-7>]

no queue cos-queue strict all <queue-id-0> [<queue-id-1> ⋯ <queue-id-7>]

| Parameter | Description |
|---|---|
| **<queue-id>** | Queue ID from 0 to 7. |
| **no** | Restores the default weighted scheduler mode for each specified queue on a device. |

**Default** None

**Mode** Global Config

### 5.24.2.5. *Queue cos-queue traffic-shape*

This command specifies the maximum transmission bandwidth limit for the interface as a whole. Also known as rate shaping, this has the effect of smoothing temporary traffic bursts over time so that the transmitted traffic rate is bounded.

**Format** queue cos-queue traffic-shape <bw>

no queue cos-queue traffic-shape

| Parameter | Description |
|---|---|
| **<bw>** | Valid range is (0 to 100) in increments 1. |
| **no** | Restores the default shaping rate value. |

**Default** None

**Mode** Interface Config

This command specifies the maximum transmission bandwidth limit for all interfaces. Also known as rate shaping, this has the effect of smoothing temporary traffic bursts over time so that the transmitted traffic rate is bounded.

**Format** queue cos-queue traffic-shape all <bw>

no queue cos-queue traffic-shape all

| Parameter | Description |
|---|---|
| **< bw >** | Valid range is (0 to 100) in increments 1. |
| **no** | Restores the default shaping rate value for all interfaces. |

**Default** None

**Mode** Global Config

### 5.24.2.6. *Queue cos-queue random-detect*

This command activates weighted random early discard (WRED) for each specified queue on the interfaces. Specific WRED parameters are configured using the random-detect queue-parms and the random-detect exponential-weighting-constant commands.

**Format** queue cos-queue random-detect <queue-id-0> [<queue-id-1> ⋯ <queue-id-7>]

no queue cos-queue random-detect <queue-id-0> [<queue-id-1> ⋯ <queue-id-7>]

| Parameter | Description |
|---|---|
| **<queue-id>** | Queue ID from 0 to 7. |
| **no** | Restores the default value. |

**Default** None

**Mode** Global Config

Interface Config

### 5.24.2.7. *Random-detect exponential weighting-constant*

This command is used to configure the WRED decay exponent for a CoS queue interface.

**Format** random-detect exponential-weighting-constant 0-15

no random-detect exponential-weighting-constant

**Default** 9

**Mode** Global Config

Interface Config

### 5.24.2.8. *Random-detect queue parms*

This command is used to configure the WRED parameters for each drop precedence level supported by a queue. It is used only when per-CoS queue configuration is enabled (using the *cos-queue random-detect* command)

**Format** random-detect queue-parms <queue-id-0> [<queue-id-1> ⋯ <queue-id-7>] ... [units {KB|percentage}] min-thresh <minthresh-green> <minthresh-yellow> <minthresh-red> <minthresh-nontcp> max-thresh <maxthresh-green> <maxthresh-yellow> <maxthresh-red> <maxthresh-nontcp> drop-prob <drop-prob-green> <drop-prob-yellow> <drop-prob-red> <drop-prob-nontcp> [ecn]

no random-detect queue-parms <queue-id-0> [<queue-id-1> ⋯ <queue-id-7>]

| Parameter | Description |
|---|---|
| **<queue-id>** | Queue ID from 0 to 7. |
| **units** | Minimum and maximum threshold values can be configured in KB or percentage. |
| **min-thresh** | The minimum congestion threshold (in terms of percentage of queue depth) at which to begin dropping or ECN marking packets at 1/8$^{th}$ of the configured drop probability.<br>At or bellow the minimum threshold, no packets are dropped. The range between the minimum and maximum thersholds is divided equally into 8 increasing levels of drop probability. |
| **max-thresh** | The maximum congestion threshold to end dropping at the configured maximum drop probability and to begin dropping at 100%. |
| **drop-probability** | The maximum drop probability. Range 0-100.<br>Ths is the drop probability for a packet when the maximum threshold is reached. Above the maximum threshold, 100% of matching packets are dropped. |
| **ecn** | Enable ECN marking on the selected CoS queues. When ECN is enabled, packets not marked as ECN capable are dropped when selected for discard by WRED. |

**Default** Units: percentage

minthresh-green: 40, minthresh-yellow: 30, minthresh-red : 20, minthresh-nontcp: 99
maxthresh-green: 100, maxthresh-yellow: 90, maxthresh-red : 80, maxthresh-nontcp: 100
drop-prob-green: 10, drop-prob-yellow: 10, drop-prob-red : 10, drop-prob-nontcp: 10
ECN: disabled

**Mode** Global Config
Interface Config

# 5.25. iSCSI Optimization Commands

This section describes commands you use to monitor iSCSI sessions and prioritize iSCSI packets. iSCSI Optimzation provides a means of giving traffic between iSCSI initiator and target systems special Quality of Service (QoS) treatment. This is accomplished by monitoring traffic to detect packets used by iSCSI stations to establish iSCSI sessions and connections. Data from these exchanges is used to create classification rules that assign the traffic between the stations to a configured traffic class. Packets in the flow are queued and scheduled for egress on the destination port based on these rules.

## 5.25.1. Show iscsi

Use this command to display the iSCSI settings.

**Format** show iscsi

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **iSCSI enabled/disabled** | Displays if iSCSI session monitor is enabled or disabled. |
| **iSCSI Egress queue** | Indicates the egress queue for the iSCSI session. |
| **Session aging time** | The number of minutes a session must be inactive prior to its removal. Range: 1-43,200 |
| **Maximum number of sessions** | Indicates the maximum number of the iSCSI sessions. The value is 192. |
| **TCP Port** | iSCSI target TCP port. |
| **Target IP Address** | iSCSI target IP address. |
| **Name** | iSCSI target Name |

## 5.25.2. Show iscsi sessions

Use this command to display the iSCSI sessions.

**Format** show iscsi sessions [detailed]

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Session #** | The iSCSI sequence number |
| **Target** | The target Name |
| **Initiator** | The initiator Name |
| **ISID** | The iSCSI session ID |
| **Up Time** | The starting time for the iSCSI session connected |
| **Time for aging out** | The time left to be inactive, in mins. |
| **Target IP Address** | The IP address for the target |
| **Target TCP Port** | The TCP port number for the target |
| **Initiator IP Address** | The IP address for the initiator. |
| **Initiator TCP Port** | The TCP port number for the initiator |

## 5.25.3. Iscsi enable

Use this command to globally enables iSCSI awareness.

**Format** iscsi enable

**Default** Disable

**Mode** Global Config

### no iscsi enable

The command disables iSCSI awareness. When you use the no iscsi enable command, iSCSI resources will be released.

**Format** no iscsi enable

**Default** Disable

**Mode** Global Config

## 5.25.4. Iscsi aging time

Use this command to configure the aging time for iSCSI sessions. Behavior when changing aging time:

- When aging time is increased, current sessions will be timed out according to the new value.
- When aging time is decreased, any sessions that have been dormant for a time exceeding the new setting will be immediately deleted from the table. All other sessions will continue to be monitored against the new time out value.

**Format** iscsi aging time <time>

| Parameter | Description |
|---|---|
| **<time>** | Time in minutes. The range of session id is 1 to 43200. |

**Default** 10

**Mode** Global Config

### no iscsi aging time

The command recovery iSCSI aging time to default value.

**Format** no iscsi aging time

**Default** 10

**Mode** Global Config

## 5.25.5. Iscsi queue

Use this command to configure iSCSI egress queue value.

**Format** iscsi queue <queue>

| Parameter | Description |
|---|---|
| **<queue>** | iSCSI egress queue value. The range of session id is 0 to 7. |

**Default** 3

**Mode** Global Config

### no iscsi queue

The command recovery iSCSI egress queue out parameter.

**Format** no iscsi queue

**Default** 3

**Mode** Global Config

## 5.25.6. Iscsi target

Use this command to configures an iSCSI target port and, optionally, a target system's IP address and IQN name. When working with private iSCSI ports (not IANA-assigned ports 3260/860), it is recommended to specify the target IP address as well, so that the switch will only snoop frames with which the TCP destination port is one of the configured TCP ports, and the destination IP is the target's IP address. This way the CPU will not be falsely loaded by non-iSCSI flows (if by chance other applications also choose to use these un-reserved ports.

When a port is already defined and not bound to an IP address, and you want to bind it to an IP address, you should first remove it by using the no form of the command and then add it again, this time together with the relevant IP address.

Target names are only for display when using the show iscsi command. These names are not used to match with the iSCSI session information acquired by snooping.

A maximum of 16 TCP ports can be configured either bound to IP or not.

**Format** iscsi target port <tcp-port1> [<tcp-port2> ... <tcp-port16>] [address <ip-address>] [name <target-name>]

| Fields | Definition |
|---|---|
| tcp-port **1 [** tcp-port **2..** tcp-port **16]** | TCP port number or list of TCP port numbers on which the iSCSI target listens to requests. Up to 16 TCP ports can be defined in the system in one command or by using multiple commands. |
| ip-address | IP address of the iSCSI target. When the no form of this command is used, and the tcp port to be deleted is one bound to a specific IP address, the address field must be present. |
| target-name | iSCSI name of the iSCSI target. The name can be statically configured; however, it can be obtained from iSCSI or from sendTargets response. The initiator must present both its iSCSI Initiator Name and the iSCSI Target Name to which it wishes to connect in the first login request of a new session or connection.<br><br>The iSCSI target name containing up to 223 characters. |

**Default** iSCSI well-known ports 3260 and 860 are configured as default but can be removed as any other configured target.

**Mode** Global Config

## no iscsi target

The command delete an iSCSI target port, address, and name.

**Format** no iscsi target port <tcp-port1> [<tcp-port2> ... <tcp-port16>] [address <ip-address>]

**Default** iSCSI well-known ports 3260 and 860 are configured as default but can be removed as any other configured target

**Mode** Global Config

# 5.26. Domain Name Server Client Commands

## 5.26.1. Show hosts

This command displays the static host name-to-address mapping table.

**Format** show hosts

**Default** None

**Mode** Privileged Exec

**Display Message**

| Parameter | Definition |
|---|---|
| **Host Name** | Domain host name. |
| **Default Domain** | Default domain name. |
| **Default Domain List** | Default domain list. |
| **Domain Name Lookup** | DNS client enabled/disabled. |
| **Number of Retries** | Number of time to retry sending DNS queries. |
| **Retry Timeout Period** | Amount of time to wait for a response to a DNS query. |
| **Name Servers** | Configured name servers. |

Example: The following shows examples of the CLI display output for the commands.

(QCT) (Config)#show hosts

Host name..... QCT
Default domain..... Domain name is not configured
Default domain list..... quanta.corp
Domain Name Lookup..... Enabled
Number of retries..... 2
Retry timeout period..... 3
Name servers (Preference order)..... 10.243.16.11, 10.243.17.11

Dns Client Source Interface..... (not configured)

Configured host name-to-address mapping:

| Host | Addresses |
|---|---|

test 10.1.1.1

| Host | Total | Elapsed | Type | Addresses |
|---|---|---|---|---|

No hostname is mapped to an IP address

## 5.26.2. Ip host

This command creates a static entry in the DNS table that maps a host name to an IP address.

**Format** ip host <name> <ipaddr>

| Parameter | Definition |
|---|---|
| **<name>** | Host name. |
| **<ipaddr>** | IPv4 address of the host. |

**Default** None

**Mode** Global Config

### no ip host

Remove the corresponding name to IP address mapping entry.

**Format** no ip host <name>

**Mode** Global Config

## 5.26.3. Clear host

This command clears the entire static host name-to-address mapping table.

**Format** clear host <hostname | all>

**Default** None

**Mode** Privileged Exec

## 5.26.4. Ip domain-name

This command defines the default domain name to be appended to incomplete host names (i.e., host names passed from a client are not formatted with dotted notation).

**Format** ip domain-name <name>

| Parameter | Definition |
|---|---|
| **<name>** | Default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. (Range: 1-64 characters) |

**Default** None

**Mode** Global Config

### no ip domain-name

Remove the default domain name.

**Format** no ip domain-name <name>

**Mode** Global Config

## 5.26.5. Ip domain-list

This command defines the domain name that can be appended to incomplete host names (i.e., host names passed from a client are not formatted with dotted notation).

**Format** ip domain-list <name>

| Parameter | Definition |
|---|---|
| **<name>** | Default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. (Range: 1-64 characters) |

**Default** None

**Mode** Global Config

## 5.26.6. Ip name-server

This command specifies the address of one or more domain name servers to use for name-to-address resolution.

**Note**: The listed name servers are queried in the specified sequence until a response is received, or the end of the list is reached with no response.

**Format** ip name-server <ipaddr>

| Parameter | Definition |
|---|---|
| **<ipaddr>** | IP address of the Domain Name Servers. |

**Default** None

**Mode** Global Config

### no ip name-server

Remove the corresponding Domain Name Server entry from the table.

**Format** no ip name-server <ipaddr>

**Mode** Global Config

## 5.26.7. Ip name-server source-interface

This command specifies the source address of dns client to use for name-to-address resolution.

**Format** ip name-server source-interface {<slot/port> | loopback <loopback-id> | serviceport | tunnel <tunnel-id> | vlan <vlan-id>}

| Parameter | Definition |
|---|---|
| **<slot/port>** | Specifies the interface to use as the source interface. |
| **<loopback-id>** | Specifies the loopback interface to use as the source interface. The range of the loopback ID is 0 to 63. |
| **serviceport** | Specifies the serviceport interface to use as the source interface. |
| **<tunnel-id>** | Specifies the tunnel interface to use as the source interface. The range of the tunnel ID is 0 to 7. |
| **<vlan-id>** | Specifies the VLAN interface to use as the source interface. The range of the VLAN ID is 1 to 4093. |

**Default** None

**Mode** Global Config

### no ip name-server source-interface

This command will reset the DNS source interface to the default settings.

**Format** no ip name-server source-interface

**Mode** Global Config

## 5.26.8. Ip domain-lookup

This command enables the IP Domain Naming System (DNS)-based host name-to-address translation.

**Format** ip domain-lookup

**Default** None

**Mode** Global Config

### no ip domain-lookup

This command disables the IP Domain Naming System (DNS)-based host name-to-address translation.

**Format** no ip domain-lookup

**Mode** Global Config

## 5.26.9. Ip domain-retry

This command specifies the number of times to retry sending Domain Name System (DNS) queries.

**Format** ip domain-retry <0-100>

| Parameter | Definition |
|---|---|
| **<0-100>** | The number of times to retry sending a DNS query to the server. |

**Default** 2

**Mode** Global Config

### no ip domain-retry

This command will reset the number of retry times to the default settings.

**Format** no ip domain-retry

**Mode** Global Config

## 5.26.10. Ip domain-retry-timeout

This command specifies the amount of time to wait for a response to a DNS query.

**Format** ip domain-retry-timeout <0-3600>

**Default** 3

**Mode** Global Config

## no ip domain-retry-timeout

This command will reset the timeout to the default setting.

**Format** no ip domain-retry-timeout

**Mode** Global Config

# 5.27. Unidirectional Link Detection Commands

This section describes the commands you use to configure and display Unidirectional Link Detection (UDLD). The purpose of the UDLD feature is to detect and avoid unidirectional links. A unidirectional link is a forwarding anomaly in a Layer 2 communication channel in which a bi-directional link stops passing traffic in one direction.

## 5.27.1. Udld enable (Global Config)

Use this command to enable UDLD globally on the switch.

**Format** udld enable

**Default** Disable

**Mode** Global Config

## no udld enable (Global Config)

Use this command to disable UDLD globally on the switch.

**Format** no udld enable

**Mode** Global Config

## 5.27.2. Udld message time

Use this command to configure the interval value (in seconds) between UDLD probe messages on ports that are in the advertisement phase.

**Format** udld message time <7-90>

**Default** 15

**Mode** Global Config

## 5.27.3. Udld timeout interval

Use this command to configure the time interval value (in seconds) after which the UDLD link is considered to be unidirectional.

**Format** udld timeout interval <5-60>

**Default** 5

**Mode** Global Config

## 5.27.4. Udld enable (Interface Config)

Use this command to enable UDLD on the specified interface.

**Format** udld enable

**Default** Disable

**Mode** Interface Config

## no udld enable (Interface Config)

Use this command to disable UDLD on the specified interface.

**Format** no udld enable

**Mode** Interface Config

## 5.27.5. Udld port

Use this command to select the UDLD mode operating on this interface.

**Format** udld port [aggressive]

**Default** normal

**Mode** Interface Config

## 5.27.6. Udld reset

Use this command to reset all interfaces that have been shutdown by UDLD.

**Format** udld reset

**Mode** Privileged EXEC

## 5.27.7. Show udld

Use this command to display the global settings of UDLD.

**Format** show udld

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Admin Mode** | The global administrative mode of UDLD. |
| **Message Interval** | The time period (in seconds) between the transmission of UDLD probe packets. |
| **Timeout Interval** | The time period (in seconds) between the decision that the link is unidirectional. |

Example: The following example shows the CLI display output for the command *show udld*.

(QCT) #show udld

Admin Mode..... Enabled

Message Interval..... 15

Timeout Interval..... 5

## 5.27.8. Show udld

Use this command to display the UDLD settings for the specified *slot/port*.

**Format** show udld {*slot/port* | all }

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Port** | The identifying port of the interface. |
| **Admin Mode** | The administrative mode of UDLD configured on this interface. The mode is either enabled or disabled. |
| **UDLD Mode** | The UDLD mode configured on this interface. The mode is either normal or aggressive. |

| Parameter | Definition |
|---|---|
| **UDLD Status** | The status of the link as determined by UDLD. The options are:<br>• Undetermined – UDLD has not collected information to determine the state of the link.<br>• Not applicable – UDLD is disabled, either globally or on the port.<br>• Shutdown – UDLD has detected a unidirectional link and shutdown the port. That is, the port is in an errDisabled state.<br>• Bidirectional – UDLD has detected a bidirectional link.<br>• Undetermined (Link Down) – The port would transition into this state when the port link physically goes down due to any reasons other than the port has been put into D-Disable mode by the UDLD protocol on switch. |

Example: The following example shows the CLI display output for the command *show udld 0/3*.

(QCT) #show udld 0/3

Port Admin Mode UDLD Mode UDLD Status

------- ---------- ---------- --------------

0/3 Enabled Aggressive Bidirectional

Host device ID: QTFCOZ534000A

Host port ID: 0/3

Echo entry 1

---

Time-To-Live: 39

Neighbor echo 1 device: QTFCOZ5200014

Neighbor echo 1 port: 0/3

Message Interval: 15

Timeout Interval: 5

Neighbor Device Name: SW2

# 5.28. Multi-chassis Link Aggregation Commands

This section describes the commands you use to configure and display Multi-Chassis Link Aggregation (MLAG). MLAG allows links that are physically connected to two different devices to appear as a single Port Channel to a third device.

Note: MLAG can support RSTP and IGMP Snooping. The configuration of RSTP and IGMP Snooping on peers of MLAG must be the same to guarantee that MLAG can work correctly.

## 5.28.1. Mlag

This command enables Multi-Chassis Link Aggregation (MLAG) globally.

**Format** mlag

**Default** Disable

**Mode** Global Config

## no mlag

This command disables MLAG globally.

**Format** no mlag

**Mode** Global Config

## 5.28.2. Mlag domain

This command creates a MLAG domain with the specified domain ID. Only one MLAG domain can be created on a given device. The domain-id of the MLAG domain should be equal to the one configured on the other MLAG peer with which this device wants to form a MLAG pair. The configured MLAG domain-ids are exchanged during role election and if they are configured differently on the peer devices, the MLAG does not become operational. Domain-id is used to derive the auto-generated MLAG virtual MAC address that is used in the actor ID field in the LACP PDUs.

**Format** mlag domain <1-255>

**Default** None

**Mode** Global Config

## no mlag domain

This command deletes the MLAG domain with the specified domain ID.

**Format** no mlag domain <1-255>

**Mode** Global Config

## 5.28.3. Mlag system-mac

Use this command to manually configure the MAC address for the MLAG domain. The specified MAC address should be a unicast MAC and cannot be equal to the MAC address of either the primary MLAG or secondary MLAG device. The configured MLAG MAC address is exchanged during role election and, if they are configured differently on the peer devices, MLAG does not become operational.

The <mac-address> used in the LACP PDUs and STP BPDUs that are sent out on MLAG member ports, if MLAG primary device election takes place after the MLAG MAC address is configured. When the MLAG MAC address is configured after the MLAG primary device is elected, the operational MLAG MAC address is used in the LACP PDUs and STP BPDUs instead of the configured MLAG MAC address.

**Format** mlag system-mac < mac-address>

**Default** 00:00:00:00:00:00

**Mode** Global Config

## no mlag system-mac

This command returns the MLAG system MAC address to the default settings.

**Format** no mlag system-mac

**Mode** Global Config

## 5.28.4. Mlag system-priority

This command manually configures a system priority for the MLAG domain. The system-priority is used in the LACPPDU and BPDU. If the configured MLAG system priority is different on MLAG peers, the MLAG will not come up.

**Format** mlag system-priority <1-65535>

**Default** 32767

**Mode** Global Config

## no mlag system-priority

This command restores the MLAG system priority to the default settings.

**Format** no mlag system-priority

**Mode** Global Config

## 5.28.5. Mlag role priority

This command configures a role priority for the MLAG domain. This value is used for the MLAG role election. The MLAG switch with lower priority becomes the Primary and the switch with higher priority becomes the Secondary. If both MLAG peer switches have the same role priority, the device with the lower system MAC address becomes the Primary.

**Format** mlag role priority <1-255>

**Default** 100

**Mode** Global Config

## no mlag role priority

This command resets the MLAG role priority to the default settings.

**Format** no mlag system-priority

**Mode** Global Config

## 5.28.6. Mlag peer-link

This command configures a port channel as the MLAG peer link.

**Format** mlag peer-link

**Default** None

**Mode** Port Channel Interface Config

## no mlag peer-link

This command removes the MLAG peer link.

**Format** no mlag peer-link

**Mode** Port Channel Interface Config

## 5.28.7. Mlag id

This command configures a port channel as part of a MLAG. Upon issuing this command, the port channel is down until the port channel member information is exchanged and agreed between the MLAG peer switches.

**Format** mlag <1-63>

**Default** None

**Mode** Port Channel Interface Config

## no mlag id

This command returns the MLAG id to the default settings.

**Format** no mlag <1-63>

**Mode** Port Channel Interface Config

## 5.28.8. Mlag peer detection interval

This command configures the DCPDP transmission interval and reception timeout (in mini seconds).

The configurable transmission interval range is 200ms - 4000ms (Default is 1000ms). The configurable reception timeout range is 700ms - 14000ms (Default is 3500ms).

**Format** mlag peer detection interval <200-4000> timeout <700-14000>

**Default** Transmission interval: 1000ms

Reception timeout: 3500ms

**Mode** Global Config

## no mlag peer detection interval

This command resets the DCPDP transmission interval and reception timeout to default values.

**Format** no mlag peer detection interval <200-4000> timeout <700-14000>

**Mode** Global Config

## 5.28.9. Mlag peer-keepalive destination

This command configures the IP address of the peer MLAG switch, which is the destination IP address of the DCPDP on the peer MLAG switch.

The configurable range for the UDP port is 1 to 65535 (Default is 50000)

**Format** mlag peer-keepalive destination <ipaddress> source <ipaddress> [udp-port <1-65535>]

| Parameter | Description |
|---|---|
| **destination <ipaddress>** | The IP address of the peer MLAG switch. |
| **source <ipaddress>** | The IP address of the self MLAG switch. |
| **udp-port** | The UDP port on which the MLAG switch listens to the DCPDP messages. |

**Default** UDP port: 50000

**Mode** Global Config

## no mlag peer-keepalive destination

This command removes the self IP address and the peer IP address, and returns the UDP port to the default settings.

**Format** no mlag peer-keepalive destination <ipaddress> switch <ipaddress>

**Mode** Global Config

## 5.28.10. Mlag peer-keepalive enable

This command starts the keepalive state machine on the MLAG device if MLAG is globally enabled.

**Default** Disable

**Format** mlag peer-keepalive enable

**Mode** Global Config

## no mlag peer-keepalive enable

This command stops the MLAG peer keepalive state machine.

**Format** no mlag peer-keepalive enable

**Mode** Global Config

## 5.28.11. Mlag peer-keepalive timeout

This command configures the peer keepalive timeout value (in seconds). If a MLAG switch does not receive a keepalive message from the peer for the duration of this timeout value, it transitions its role (if required).

**Format** mlag peer-keepalive timeout <2-15>

**Default** 5

**Mode** Global Config

## no mlag peer-keepalive timeout

This command returns the MLAG peer keepalive timeout value to the default settings.

**Format** no mlag peer-keepalive timeout

**Mode** Global Config

## 5.28.12. Show mlag brief

This command displays the MLAG global status and current MLAG operational mode including the peer link, keepalive status, number of configured MLAG members, operational MLAG, the system MAC, and role state. If the MLAG operational status is disabled, the reason would be displayed in the brackets of MLAG operational status.

**Format** show mlag brief

**Mode** Privileged EXEC

Example1: The following example shows the CLI display output for the command *show mlag brief*. In this example, the MLAG operational status is enabled.

(QCT) #show mlag brief

MLAG domain ID..... 1

MLAG admin status..... Enabled

Keep-alive admin status..... Enabled

MLAG operational status..... Enabled

Self role..... Secondary

Peer role..... Primary

Peer detection admin status..... Disabled

Operational MLAG MAC..... C4:54:44:EA:AA:01

Operational MLAG system priority..... 32767

Peer-Link details

---

Interface..... ch64

Peer-link admin status..... Up

Peer-link STP admin status..... Enabled

Configured VLANs..... 1

Egress tagged VLANs..... none

MLAG Details

---

Number of MLAGs configured..... 1

Number of MLAGs operational..... 1

MLAG id# 1

---

Interface..... ch1

Configured VLANs..... 1

MLAG interface state..... Active

| Local Members | Status |
|---|---|
| --- | --- |
| 0/3 | Up |

| Peer Members | Status |
|---|---|
| --- | --- |
| 0/3 | Up |

Example2: The following example shows the CLI display output for the command *show mlag brief*. In this example, MLAG operational status is disabled because of disabling MLAG admin status. (The Peer-link would be down if the MLAG operational status or Keep-alive admin status is Disabled, so the peer switch would displayed Peer-link is down in the brackets of MLAG operational status)

(QCT) #show mlag brief

MLAG domain ID..... 1

MLAG admin status..... Disabled

Keep-alive admin status..... Enabled

MLAG operational status..... Disabled(Mlag admin status is disable)

Self role..... none

Peer role..... none

Peer detection admin status..... Disabled

Operational MLAG MAC..... 00:00:00:00:00:00

Operational MLAG system priority..... 0

## 5.28.13. Show mlag

This command displays information about a MLAG. The configuration and operational modes of the MLAG are displayed; the MLAG is operationally enabled if all the preconditions are met. The port-channel that is configured as a MLAG interface is also displayed with the member ports on the current switch and peer switch (with their link status).

**Format** show mlag <1-63>

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mlag 1*.

(QCT) #show mlag 1

MLAG id# 1

---

Config mode..... Enabled

Operational mode..... Enabled

Port channel..... ch1

| Local Members | Status |
|---|---|
| --- | --- |
| 0/3 | Up |

| Peer Members | Status |
|---|---|

---------- ------

0/3 Up

## 5.28.14. Show mlag role

This command displays information about the keepalive status and parameters. The role of the MLAG switch as well as the system MAC address and priority are displayed.

**Format** show mlag role

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mlag role*.

(QCT) #show mlag role

Self

----

MLAG domain ID..... 1

Keep-alive admin status..... Enabled

Keep-alive operational status..... Enabled

Role Priority..... 100

Configured MLAG MAC..... 00:00:00:00:00:00

Operational MLAG MAC..... C4:54:44:EA:AA:01

Configured MLAG system priority..... 32767

Operational MLAG system priority..... 32767

Local System MAC..... 2C:60:0C:8B:63:3B

Time-out..... 5

MLAG state..... Secondary

MLAG role..... Secondary

Peer

----

MLAG domain ID..... 1

Role Priority..... 100

Configured MLAG MAC..... 00:00:00:00:00:00

Operational MLAG MAC..... C4:54:44:EA:AA:01

Configured MLAG system priority..... 32767

Operational MLAG system priority..... 32767

Role..... Primary

Local System MAC..... 2c:60:0c:8b:65:09

## 5.28.15. Show mlag consistency-parameters

This command displays the global parameters of the self and peer devices which should be the identical in MLAG domain.

‘ * ‘ means that the parameters between self and peer device configurations are different. “MST VLAN Configuration“ displays associated vlans with MSTP (Multiple Spanning Tree Protocol) instance 0. “IGMP Snooping VLAN Configuration“ displays associated vlans with IGMP Snooping. “MLD Snooping VLAN Configuration“ displays associated vlans with MLD Snooping.

**Format** show mlag consistency-parameters {global | {interface port-channel <portchannel-id>}}

**Mode** Privileged Exec

User Exec

Example:

```
(QCT) (Config)#show mlag consistency-parameters global

Parameter               Self Value            Peer Value            diff
----------------------- --------------------- --------------------- -----
STP Mode                Disabled              Disabled
STP Version             IEEE 802.1w           IEEE 802.1s           *
BPDU Guard Mode         Disabled              Disabled
FDB Age Time (seconds)  1000000               1000000
ARP Age Time (seconds)  1200                  1200
LACP system priority    32768                 32768
MLAG system MAC address 00:00:00:00:00:00     00:00:00:00:00:00
MLAG system priority    32767                 32767
MLAG domain ID          1                     1
IGMP Admin Mode         Enabled               Enabled
MLD Admin Mode          Disabled              Disabled

 MST VLAN Configuration

 Instance           Associated VLANS
---------- ------ ----------------------------------------------
 0          Self   1
            Peer   1

 IGMP Snooping VLAN Configuration
            Associated VLANS
---------- ----------------------------------------------
 Self       1
 Peer       1

 MLD Snooping VLAN Configuration
            Associated VLANS
---------- ----------------------------------------------
 Self       1
 Peer       1
```

## 5.28.16. Show mlag peer-keepalive

This command displays the peer MLAG switch IP address used by the dual control plane detection protocol. The port used for the DCPDP is shown. This command also displays if peer detection is enabled. If enabled, the detection status is displayed. The DCPDP message transmission interval and reception timeout are also displayed.

**Format** show mlag peer-keepalive

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mlag peer-keepalive.*

(QCT) #show mlag peer-keepalive

Peer IP address..... 172.16.2.33

Source IP address..... 172.16.2.52

UDP port..... 50000

Peer detection admin status..... Enabled

Peer detection operational status..... Up

Peer is detected..... TRUE

Configured Tx interval..... 1000 milliseconds

Configured Rx timeout..... 3500 milliseconds

Operational Tx interval..... 1000 milliseconds

Operational Rx timeout..... 3500 milliseconds

## 5.28.17. Show mlag statistics

This command to displays counters for the keepalive and peer-link messages transmitted and received by the MLAG switch.

**Format** show mlag statistics {peer-keepalive | peer-link}

**Mode** Privileged EXEC

Example: The following example shows the CLI display output for the command *show mlag statistics peer-keepalive*.

(QCT) # show mlag statistics peer-keepalive

Total transmitted..... 63341

Tx successful..... 63341

Tx errors..... 0

Total received..... 63342

Rx successful..... 63342

Rx Errors..... 0

Timeout counter..... 0

Example: The following example shows the CLI display output for the command *show mlag statistics peer-link*.

(QCT) # show mlag statistics peer-link

Peer link control messages transmitted..... 16

Peer link control messages Tx errors..... 0

Peer link control messages Tx timeout..... 0

Peer link control messages ACK transmitted..... 64

Peer link control messages ACK Tx errors..... 0

Peer link control messages received..... 64

Peer link data messages transmitted..... 642

Peer link data messages Tx errors..... 0

Peer link data messages Tx timeout..... 0

Peer link data messages received..... 1298

Peer link BPDU's transmitted to peer..... 0

Peer link BPDU's Tx errors..... 0

Peer link BPDU's received from peer..... 14

Peer link BPDU's Rx errors..... 0

Peer link LACPDU's tranmsitted to peer..... 0

Peer link LACPDU's Tx errors..... 0

Peer link LACPDU's received from peer..... 642

Peer link LACPDU's Rx errors..... 0

## 5.28.18. Show mlag core-config

This command displays information about the core configurations to ensure this device can form a MLAG pair.

This command displays two sections: required configurations and optional configurations. In the required configurations section, all the required configurations that starts the MLAG peer keepalive state machine are displayed. In the optional configurations section, the configurations that might change the roles of devices which form MLAG pair are displayed.

**Format** show mlag core-config

**Mode** Privileged Exec
User Exec

Example:

(QCT) (Config)#show mlag core-config

Required configurations
---
MLAG domain ID..... 1
MLAG admin status..... Enabled
Keep-alive admin status..... Enabled
Peer-link interface..... ch64
Peer-link admin status..... Up

Optional configurations
---
Configured MLAG MAC..... 00:00:00:00:00:00
Role Priority..... 100
Time-out..... 5

## 5.28.19. Clear mlag statistics

This command clears all the keepalive and peer-link statistics.

**Format** clear mlag statistics {peer-keepalive | peer-link}

**Mode** Privileged EXEC

# 5.29. Control Plane Policing Commands

Control plane packets are generated or received from network device that are used for the operation of the network itself. Therefore, control plane packets always have a receive destination IP address and are handled by the CPU in the network device. Examples include protocols such as ARP, BGP, OSPF, and other protocols that glue the network together.

Main purpose of Control Plane Policing (CoPP) is to enhance security on the switch to prohibit unnecessary or DoS traffic and giving priority to important control plane and management traffic.

To use CoPP feature needs to set Access Control List (ACL) which matches your purpose and bind it to control-plane interface. Binding ACL to control-plane interface is always considered as “out direction”, so CoPP doesn’t support some ACL conditions which uses for “in direction” only, for example, condition “mirror”, or “redirect”.

You must ensure that the CoPP policy does not filter critical traffic such as routing protocols or interactive access to the switches. If you want to prevent access some of switch services, for example: SSH, it should set destination IP address to switch IP address in associating ACL rules. Since unassigned destination IP address (destination IP address is “any”) will filter out all service associating packets, and make them fail to route to remote server.

## 5.29.1. Interface control-plane

To enter control-plane configuration mode and apply an IP, IPv6 or MAC access list to police traffic destined for the CPU port.

**Format** interface control-plane

**Default** None

**Mode** Global Config

Example: To deny all GRE packets which come from host 10.3.1.1

(QCT) #configure

(QCT) (Config)#ip access-list acl001

(QCT) (Config-ipv4-acl)# deny gre host 10.3.1.1 any

Create ACL 1000 : Rule ID 1

(QCT) (Config-ipv4-acl)#permit every

Create ACL 1000 : Rule ID 2

(QCT) (Config-ipv4-acl)#exit

(QCT) (Config)#interface control-plane

(QCT) (if-control-plane)#ip access-group acl001

(QCT) (if-control-plane)#

## 5.29.2. Show access-lists interface control-plane

This command displays IP, IPv6, and MAC ACLs configurations for CPU port.

**Format** show access-lists interface control-plane

**Default** None

**Mode** Privilege EXEC

Example:

(QCT) #show access-lists interface control-plane

ACL Type ACL ID Sequence Number

-------- ------------------------------ ---------------

IP acl001 1

(QCT) #

# 5.30. VXLAN and RIOT Commands

This section describes the commands you use to configure VXLAN and RIOT settings. The RIOT feature is supported only on IX7D and IX8D platforms.

## 5.30.1. Vxlan mode

Use this command to set VXLAN mode on the switch.

VXLAN mode must be enabled prior to performing any VXLAN configuration on the switch.

A VXLAN supports two different modes for flood traffic:

1. Multicast mode—A VXLAN uses an IP multicast address as the destination IP address to send broadcast, multicast, and unknown unicast flood frames.

2. Unicast mode—A VXLAN uses each VTEP's single unicast IP address as the destination IP address to send broadcast, multicast, and unknown unicast flood frames.

By default, the mode is disabled. VXLAN mode must be disabled prior to performing any VXLAN mode changed.

**Format** vxlan mode {unicast | multicast}

**Default** Disabled

**Mode** VXLAN Config

| Parameter | Description |
|---|---|
| **unicast** | Set VXLAN to unicast mode |
| **multicast** | Set VXLAN to multicast mode |

## no vxlan mode

Use this command to return the VXLAN mode to the default settings.

**Format** no vxlan mode

**Mode** VXLAN Config

## 5.30.2. Vxlan source-interface

Use this command to configure VXLAN source interface on the switch.

The “vxlan source-interface” command specifies an interface from which the VTEP derives the source address (IP) that it uses when exchanging VXLAN frames. This address is used by UDP headers to specify source and destination addresses of hosts that send or receive VXLAN encapsulated packets.

A valid VXLAN configuration requires the assignment of an interface to the VTEP and the assignment of a valid IP address to the specified interface.

There is no default source interface assignment.

**Format** vxlan source-interface {<slot/port> | loopback <loopback-id>| vlan <vlan-id>}

| Parameter | Description |
|---|---|
| **<slot/port>** | The Logic interface number. |
| **<loopback-id>** | The Loopback ID. (Range: 0-63) |
| **<vlan-id>** | The VLAN ID. (Range: 1-4093) |

**Default** None

**Mode** VXLAN Config

## no vxlan source-interface

Use this command to return VXLAN source interface to the default settings.

**Format** no vxlan source-interface

**Mode** VXLAN Config

## 5.30.3. Vxlan udp-port

Use this command to configure VXLAN UDP port on the switch.

Packets bridged to the switch from a specific VLAN are encapsulated with a VXLAN header, sent through a pre-configured UDP port. Packets that arrive through this port are assumed be VXLAN encapsulated packet and forward to the bridging domain of the recipient VLAN which determined by the VNI in the VXLAN header and the VNI and VLAN mapping.

Notice that the UDP port between various VTEPs must be the same, the VXLAN packets can’t forward if the UDP port between source and destination VTEPs are different.

By default, the UDP port is 4789.

**Format** vxlan udp-port <port-id>

| Parameter | Description |
|---|---|
| **<port-id>** | The Udp port ID. (Range : 1-65535) |

**Default** 4789

**Mode** VXLAN Config

## no vxlan udp-port

Use this command to return VXLAN udp port to the default settings.

**Format** no vxlan udp-port

**Mode** VXLAN Config

## 5.30.4. Vxlan unicat-group

Use this command to configure VXLAN unicast group on the switch.
Please refer to the section 4.2.2 for the format of IP address.

The setting is available when VXLAN mode is unicast mode. Switch uses each VTEP's source IP address as the destination IP address to send broadcast, multicast, and unknown unicast flood frames. Flood frames are replicated, and encapsulated with a VXLAN header. Packets that have a unicast MAC address will sent directly to the destination VTEP IP address.

There is no default unicast group assignment. The maximum number of unicast group is 32

**Format** vxlan unicast-group <ipaddr>

**Default** None

**Mode** VXLAN Config

## no vxlan unicast-group

Use this command to return VXLAN unicast group to the default settings.

**Format** no vxlan unicast-group

**Mode** VXLAN Config

## 5.30.5. Vxlan default-multicast-group

Use this command to configure VXLAN default multicast group on the switch.

The setting is available when VXLAN mode is in multicast mode. Switch uses the value as a default multicast group. The default value applied when user creates a new tenant.There is no default multicast group assignment.

**Format** vxlan default-multicast-group <ipaddr>

| Parameter | Description |
|---|---|
| **<ipaddr>** | **Configure multicast-group IP address** |

**Default** None

**Mode** VXLAN Config

## no vxlan default-multicast-group

Use this command to return default VXLAN multicast group to the default settings.

**Format** no vxlan default-multicast-group

**Default** None

**Mode** VXLAN Config

## 5.30.6. Vxlan vni multicast-group

Use this command to configure VXLAN multicast group on the switch.
Please refer to the section 4.2.2 for the format of IP address.

The setting is available when VXLAN mode is multicast mode. Switch uses a specified multicast group as the destination IP address to send broadcast, multicast, and unknown unicast flood frames. Flood frames are encapsulated with a VXLAN header and forwarded. Inter-VTEP multicast communications include all VTEPs that are associated with the specified multicast group.

There is no default multicast group assignment.

**Format** vxlan vni <vn-id> multicast-group <ipaddr>

| Parameter | Description |
|---|---|
| **<vn-id>** | **The VNI ID. (Range:1-16777214)** |
| **<ipaddr>** | **Configure multicast-group IP address** |

**Default** None

**Mode** VXLAN Config

## no vxlan vni multicast-group

Use this command to return VXLAN multicast group to the default settings.

**Format** no vxlan vni <vn-id> multicast-group

**Mode** VXLAN Config

## 5.30.7. Vxlan vlan vni

Use this command to configure VXLAN VLAN to VNI mapping on the switch.

The “vxlan vlan vni” command associates a VLAN ID with a virtual network identifier (VNI). When a VLAN bridges a packet to the VTI, the packet is encapsulated with a VXLAN header that includes the VNI associated with the VLAN. Packets that arrive on the VTI’s UDP socket are bridged to the VLAN that is associated with the VNI specified by the VXLAN header that encapsulates the packet.

All ports belong the VLAN ID will be configured as VXLAN access port.

**Format** vxlan vlan <vlan> vni <vn-id>

| Parameter | Description |
|---|---|
| **<vlan>** | The VLAN ID. (Range:1-4093) |
| **<vn-id>** | The VNI ID. (Range:1-16777214) |

**Default** None

**Mode** VXLAN Config

## no vxlan vlan vni

Use this command to delete a specific mapping, which is VXLAN VLAN to VNI mapping.

**Format** no vxlan vlan <vlan> vni <vn-id>

**Mode** VXLAN Config

## 5.30.8. Interface vxlan

Use this command to configure VXLAN interface on the switch.

**Format** interface vxlan <vxlan-id>

| Parameter | Description |
|---|---|
| **<vxlan-id>** | The VXLAN ID. (Range: 1-1) |

**Default** NA

**Mode** Global Config

## 5.30.9. Show vxlan

Use this command to display detailed information about the VXLAN configured on the switch.

**Format** show vxlan

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Interface** | VXLAN interface |
| **Mode** | VXLAN mode (unicast or multicast) |
| **RIOT Mode** | RIOT mode (Enable or disable) |
| **RIOT Physical Loopback Interface** | The loopback interface used for RIOT routing |
| **UDP Destination Port** | The UDP port which VXLAN uses to send/receive packets |
| **Source Interface** | The source interface of VXLAN |

| | |
|---|---|
| **VXLAN and VLAN Mapping** | The mapping of VLAN to VNI |
| **Unicast Group Address** | The IP address used to send broadcast, multicast, and unknown unicast flood frames |
| **Multicast Group Address** | The multicast group IP address used to send broadcast, multicast, and unknown unicast flood frames |

## 5.30.10. Show vxlan vpn-interface

Use this command to display detailed information about the RIOT VPN interface on the switch.

**Format** show vxlan vpn-interface

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Tenant ID** | The VNI ID |
| **IP Address** | The virtual IP address of the VXLAN overlay interface |
| **Subnet Mask** | The subnet mask of the virtual IP address of the VXLAN overlay interface |
| **Interface Name** | The name of the VPN interface. The number behind the “VPN –“ is the VLAN ID configured in the command *vxlan vlan vni* |
| **Slot/Port** | The slot/port which represents the VPN interface |

## 5.30.11. Show vxlan vtep

Use this command to display IP address about the VXLAN remote VTEPs on the switch.

This command only shows remote VTEPs which really have communication with local device. If system doesn’t receive any packet from remote VTEPs, it means there is no communication in the environment, this command shows nothing.

**Format** show vxlan vtep

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|

| | |
|---|---|
| **Remote VTEPs for Vxlan** | Remote VTEPs which really have communication with local device |

## 5.30.12. Show vxlan address-table

Use this command to display MAC address that VXLAN learning on the switch.

If system doesn't learn any MAC address from VXLAN, this command shows nothing.

**Format** show vxlan address-table

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Tenant ID** | The tenant ID of VXLAN packet |
| **Tenant MAC** | Then source MAC address of VXLAN packet |
| **VTEP** | The source VTEP of VXLAN packet |
| **Interface** | The interface which receive VXLAN packet |
| **Entry Type** | Learned or static address |

## 5.30.13. Vxlan riot

Use this command to enable RIOT mode on the switch.

VXLAN must be enabled prior to enabling RIOT on the switch. RIOT is supported only under VXLAN unicast mode.

**Format** vxlan riot

**Default** Disabled

**Mode** VXLAN Config

## no vxlan riot

Use this command to return the RIOT mode to the default settings.

**Format** no vxlan riot

**Mode** VXLAN Config

## 5.30.14. Vxlan riot-physical-loopback

Use this command to assign an interface as the VXLAN RIOT loopback interface on the switch.

VXLAN RIOT must be enabled prior to assigning an VXLAN RIOT loopback interface on the switch. Switch uses a specified physical port (or port-channel) as an VXLAN loopback port to be an VXLAN access port as well as an L3 router port. Therefore, the VXLAN loopback port need to join the VLAN mapped to VXLAN tenant. This VLAN should be a VLAN routing interface and the other front-end ports should not join to this VLAN.

**Note: The outgoing packets on the riot loopback port need to be VLAN tagging.**

**Format** vxlan riot-physical-loopback {<slot/port> | port-channel <1-64>}

| Parameter | Description |
|---|---|
| **<slot/port>** | The Logic interface number. |
| **<port channel id>** | The interface number of the port channel. (Range: 1-64) |

**Default** None

**Mode** VXLAN Config

Here is the configuration example:

( Switch ) (Config)#interface 0/8
( Switch ) (Interface 0/8)#switchport allowed vlan add tagged 200
( Switch ) (Interface 0/8)#exit
( Switch ) (Config)#interface vlan 200
( Switch ) (if-vlan200)# ip address 192.168.20.1 255.255.255.0
( Switch ) (if-vlan200)#exit
( Switch ) (Config)#interface vxlan 1
( Switch ) (if-vxlan-1)#vxlan riot
( Switch ) (if-vxlan-1)#vxlan riot-physical-loopback 0/8
( Switch ) (if-vxlan-1)#vxlan vlan 200 vni 2001

## no vxlan riot-physical-loopback

Use this command to delete the VXLAN RIOT loopback interface on the switch.

**Format** no vxlan riot-physical-loopback

**Mode** VXLAN Config

## 5.30.15. Ip address virtual

Use this command to configure the virtual IP address for the VPN interface on the switch.

**Format** ip address virtual <ipaddr> {<subnetmask> | <prefix-length>}

| Parameter | Description |
|---|---|
| **<ipaddr>** | The virtual IP address of the VXLAN overlay interface |
| **<subnetmask>** | The subnet mask of the virtual IP address of the VXLAN overlay interface |
| **<prefix-length>** | The length of the subnet mask |

**Default** None

**Mode** Interface VLAN Config

Here is the configuration example:

( Switch ) (Config)#interface vlan 111

Interface vlan 111 created for VLAN ID 111

( Switch ) (Interface 0/8)#ip address virtual 192.168.111.4 /24

## no ip address virtual

Use this command to remove the virtual IP address for the VPN interface on the switch.

**Format** no ip address virtual <ipaddr> {<subnetmask> | <prefix-length>}

**Mode** Interface VLAN Config

## 5.30.16. Ip virtual-router mac-address

Use this command to configure the MAC address for the virtual router on the switch.

**Note: You must set virtual MAC address before enabling the VXLAN unicast mode.**

**Format** ip virtual-router mac-address <mac-addr>

| Parameter | Description |
|---|---|
| **<mac-addr>** | The MAC address for the virtual router |

**Default** None

**Mode** Global Config

Here is the configuration example:

( Switch ) (Config)#interface vlan 111

Interface vlan 111 created for VLAN ID 111

( Switch ) (Interface 0/8)#ip address virtual 192.168.111.4 /24

### no ip virtual-router mac-address

Use this command to remove the MAC address for the virtual router on the switch.

**Format** no ip virtual-router mac-address <macaddr>

**Mode** Global Config

## 5.31. Interface Error Disable and Auto Recovery

Interface error disable automatically disables an interface when an error is detected; no traffic is allowed until the interface is either manually re-enabled or, if auto recovery is configured, the configured auto recovery time interval has passed.

For interface error disable and auto recovery, an error condition is detected for an interface, the interface is placed in a diagnostic disabled state by shutting down the interface. The error disabled interface does not allow any traffic until the interface is re-enabled. The error disabled interface can be manually enabled. Alternatively administrator can enable auto recovery feature. Auto Recovery re-enables the interface after the expiry of configured time interval.

### 5.31.1. Errdisable recovery cause

Use this command to enable auto recovery for a specified cause or all causes. When auto recovery is enabled, ports in the diag-disable state are recovered (link up) when the recovery interval expires. If the interface continues to experience errors, the interface may be placed back in the diag-disable state and disabled (link down). Interfaces in the diag-disable state can be manually recovered by entering the **no shutdown** command for the interface.

**Format** errdisable recovery cause {all | arp-inspection | bpduguard | bcast-storm | bpdustrom | dhcp-rate-limit | mcast-storm | port-security | sfp-mismatch | ucast-storm | udld | link-flap | loop-detection}

**Default** None

**Mode** Global Config

## no errdisable recovery cause

Use this command to disable auto recovery for a specific cause. When disabled, auto recovery will not occur for interfaces in a diag-disable state due to that cause.

**Format** no errdisable recovery cause {all | arp-inspection | bpduguard | bcast-storm | bpdustrom | dhcp-rate-limit | mcast-storm | port-security | sfp-mismatch | ucast-storm | udld | link-flap | loop-detection}

**Mode** Global Config

## 5.31.2. Errdisable recovery interval

Use this command to configure the auto recovery time interval. The auto recovery time interval is common for all causes. When the recovery interval expires, the system attempts to bring interfaces in the diag-disable state back into service (link up).

**Format** errdisable recovery interval <30-86400>

**Default** 300s

**Mode** Global Config

## no errdisable recovery interval

Use this command to return the auto recovery interval to the default settings.

**Format** no errdisable recovery interval

**Mode** Global Config

## 5.31.3. Show errdisable recovery

Use this command to display the errdisable configuration status of all configurable causes.

**Format** show errdisable recovery

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **arp-inspection** | Enable/Disable status of arp-inspection auto recovery. |
| **bcast-storm** | Enable/Disable status of broadcast storm auto recovery. |
| **mcast-storm** | Enable/Disable status of multicast storm auto recovery. |
| **ucast-storm** | Enable/Disable status of unicast storm auto recovery. |
| **bpduguard** | Enable/Disable status of BPDU guard auto recovery. |
| **port-security** | Enable/Disable status of port security auto recovery. |
| **dhcp-rate-limit** | Enable/Disable status of dhcp-rate-limit auto recovery. |
| **sfp-mismatch** | Enable/Disable status of sfp-mismatch auto recovery. |
| **udld** | Enable/Disable status of UDLD auto recovery. |
| **bpdustorm** | Enable/Disable status of bpdustorm auto recovery. |
| **time interval** | Time interval for auto recovery in seconds. |
| **link-flag** | Enable/Disable status of link-flap. |
| **loop-detection** | Enable/Disable status of loop protection. |

Example: The following example shows the CLI display output for the command *show errdisable recovery*.

(DUT4) #show errdisable  recovery

Errdisable Reason Auto-recovery Status

---------- ----------

dhcp-rate-limit Disabled

arp-inspection Disabled

udld Disabled

bcast-storm Disabled

| | |
|---|---|
| mcast-storm | Disabled |
| ucast-storm | Disabled |
| bpdustorm | Disabled |
| sfp-mismatch | Disabled |
| port-security | Disabled |

Timeout for Auto-recovery from D-Disable state 300

### 5.31.4. Show interface status err-disabled

Use this command to display the interfaces that are error disabled and auto-recovery enabled (auto-recovery timer left more than zero).

**Format** show interface status err-disabled

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **interface** | An interface that is error disabled. |
| **Errdisable Reason** | The cause of the interface being error disabled. |
| **Auto-Recovery Time Left** | The amount of time left before auto recovery begins. |

## 5.32. Role-Based Access Control

Role-Based Access Contro (RBAC) allows you to create roles which define CLI executive permissions of individual functions, and assign roles to a user let him own the suitable authorization to manage and operate the system

**User Role**

A role contains one or multiple rules that define the operations allowed for the user who is assigned the role, and one user can have multiple roles. For example, if role1 allows managing layer 3 routing functions and role2 allows managing VLAN function, then a user who has both role1 and role2 can manage routing and VLAN functions.

QNOS provides below default system roles, which can't be deleted or modified:

- **network-admin**: it has full access commands to the entire system.
- **network-operator**: it can access read-only commands to the entire system.

### CLI command string inside a rule

A CLI command string is used to define a rule whether to allow one or one kind of CLI commands to execute. The format of command string may be whole and explicit CLI command, likes "ip igmp snooping querier vlan 1", or use wildcard character '*' on the tail of command string to match any string after prefix string, likes "ip igmp snooping *".

### Feature

Features are system predefined sets of CLI commands which are divided by related functions.

### Feature Group

Feature group provides to bond multiple features into a group name and assign to a role. The system administrator could customize different feature groups according to functional categories and give it an appropriate nickname.

### Rule

A rule defines what operation could be allowed to execute for a role, in other words, a role is made up of one or many rules. A rule can be applied only one action which is a CLI command string, a feature, or a feature group. Every role has an invisible default rule "deny all commands", if a user enters a command which can't match any rule of its roles, this command won't be permitted to execute.

Each rule must be assigned rule ID which is a unique integer between 1 and 256. All Rules in one role are applied in descending order of role ID, and it means when one role has many rules and some of their definition are conflicting, then the greater ID will be higher priority than less one.

For example, below role1 can execute all related commands about "show ip igmp", except the command and sub-commands of "show ip igmp snooping":

*Switch(config)# role name role1*
*Switch(config-role)# rule 1 permit command "show ip igmp *"*
*Switch(config-role)# rule 2 deny command "show ip igmp snooping *"*

One user could have many roles and there isn't any different priority between roles. However, if rules are conflicting between roles, the rule that is "permit" action will be higher priority than another rule that is "deny" action.

For example, below User1 has role1 and role2, therefore, User1 can show all related commands of "ip igmp". Since rule1 of role2 conflicts to rule1 of role1 and "permit" action is higher priority, the rule1 of role2 is invalid.

*Switch(config)# role name role1*
*Switch(config-role)# rule 1 permit command "show ip igmp *"*

*Switch(config)# role name role2*
*Switch(config-role)# rule 1 deny command "show ip igmp groups *"*

*Switch(config)# username User1 role role1*
*Switch(config)# username User1 role role2*

## 5.32.1. Role based access control enable

This command is used to enable RBAC function.

When enabling RBAC function, only users who have the role 'network-admin' will build rule merged table immediately, other login users won't allow to execute any CLI command until he logout and login again to rebuild its rule merged table.

**Format** role based access control enable

**Default** Disabled

**Mode** Global Config

## no role based access control enable

This command is used to disable RBAC function.

**Format** no role based access control enable

**Mode** Global Config

## 5.32.2. Role name

This command is used to create a new role or configure an existing role.

- Role name only allows to include alphabetic, numeric, dash, dot or underscore characters only. Name must start with a letter and the size of the name string must be less than or equal to 31 characters.
- Role name is case sensitive.
- System default role “network-admin” and “network-operator” can’t be destroyed or modified.
- The maximum number of roles is 256.
- A role can’t be deleted, if any user still uses it.

**Format** role name <role-name>

**Default** None

**Mode** Global Config

## no role name

This command is used to destroy an existing role.

**Format** no role name <role-name>

**Mode** Global Config

## 5.32.3. Role description

This command is used to set a description to a role.

- Description could use single quotation mark (‘) or double quotation marks (“) to wrap the text which includes space character.
- The maximum length of description is 255 characters.

**Format** description <text>

**Default** None

**Mode** Role Interface

## no role description

This command is used to clear a description to a role.

**Format** no description

**Mode** Role Interface

## 5.32.4. Rule command

This command is used to add a rule of command string to a role.

- Rule ID is an integer between 1 and 256, and it shall be unique inside one role.
- Maximum length of rule command string is 255 characters.
- Rule command isn't case sensitive and it's converted to lower case automatically. All space characters put to the head or tail of command string will be deleted, and multiple space characters inside a command string will convert to a single space character.
- Wildcard character '*' can match any string after prefix string, and it shall put to the tail of command string.
- Every word inside a command string must be a whole command word, except the last word with wildcard character '*' could be incomplete, likes "show mac-addr*.
- RBAC doesn't support "No form" format of rule command string, because normal command (e.g. "shutdown") and "No form" command (e.g. "no shutdown") are bonded together to deal with access permission.
- RBAC Rule command shall not start with keyword "do", because keyword "do" will be removed before a command is executed.

**Format** rule <rule-id> <deny | permit> command <command-string>

**Default** None

**Mode** Role Interface

## no rule command

This command is used to delete a rule of command string from a role.

**Format** no rule <rule-id>

**Mode** Role Interface

## 5.32.5. Rule feature

This command is used to add a rule of feature to a role.

- Rule ID is an integer between 1 and 256, and it shall be unique inside one role.
- Feature name comes from an existing feature.

**Format** rule <rule-id> <deny | permit> <read | read-write> feature <name>

**Default** None

**Mode** Role Interface

## no rule rule feature

This command is used to delete a rule of feature from a role.

**Format** no rule <rule-id>

**Mode** Role Interface

## 5.32.6. Rule feature group

This command is used to add a rule of feature group to a role.

- Rule ID is an integer between 1 and 256, and it shall be unique inside one role.
- Feature group name comes from an existing feature group.
- Feature group name is case sensitive.

**Format** rule <rule-id> <deny | permit> <read | read-write> feature-group <name>

**Default** None

**Mode** Role Interface

## no rule rule feature group

This command is used to delete a rule of feature group from a role.

**Format** no rule <rule-id>

**Mode** Role Interface

## 5.32.7. Rule read or read-write all commands

This command is used to add a rule which denies or permits to execute all “show commands” or all commands.

- Rule ID is an integer between 1 and 256, and it shall be unique inside one role

**Format** rule <rule-id> <deny | permit> <read | read-write>

**Default** None

**Mode** Role Interface

## no rule read or read-write all commands

This command is used to delete a rule of read or read-write commands from a role.

**Format** no rule <rule-id>

**Mode** Role Interface

## 5.32.8. Rule id renumber

This command is used to change a rule ID to another one.

- Rule ID is an integer between 1 and 256, and it shall be unique inside one role.
- Old rule ID comes from an existing rule, and new rule ID shall not overlap to an existing rule ID.

**Format** rule <old-rule-id> renumber <new-rule-id>

**Default** None

**Mode** Role Interface

## 5.32.9. Feature group

This command is used to create a new feature group or configure an existing feature group.

- Feature group name only allows to include alphabetic, numeric, dash, dot or underscore characters only. Name must start with a letter and the size of the name string must be less than or equal to 63 characters.

- Feature group name is case sensitive.
- The maximum number of feature groups is 256.
- A feature group can't be deleted, if any rule of a role still uses the feature group.

**Format** role feature-group name <name>

**Default** None

**Mode** Global Config

## no feature group

This command is used to destroy an existing feature group.

**Format** no role feature-group name <name>

**Mode** Global Config

## 5.32.10. Feature adds to feature group

This command is used to add a feature into a feature group.

- Feature name is a system pre-defined name, and you need to assign the existing feature name.

**Format** feature <feature-name>

**Default** None

**Mode** Feature Group Interface

## no feature adds to feature group

This command is used to remove a feature from a feature group.

**Format** no feature <feature-name>

**Mode** Feature Group Interface

## 5.32.11. User assigns to a role

This command is used to to assign a role to a user.

- Username comes from an existing user.
- Role name comes from an existing role
- User 'admin' is a system account of administrator and it shall always own the system default role 'network-admin'.
- When RBAC function enables, a user can't access any command if he doesn’t be assigned any role.

**Format** username <user-name> role <role-name>

**Default** None

**Mode** Global Config

## no user assigns to a role

This command is used to remove a role from a user.

**Format** no username <user-name> role <role-name>

**Mode** Global Config

## 5.32.12. Show role name

This command is used to to display information about roles.

**Format** show role [name <role-name>]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Role Based Access Control** | Indicates RBAC function is enabled or disabled now. |
| **Current numbers of roles** | Indicates how many numbers of roles are created now. |

| | |
|---|---|
| **Maximum numbers of roles** | Indicates maximum numbers of roles can be created on the device. |
| **Role** | The role name. |
| **Description** | Description of this role. |
| **ID** | Rule ID |
| **Permit** | Indicates permit or deny this role to execute this rule. |
| **Read & Write** | Indicate this rule is “read” or “read-write”. The “read” means “it can execute ‘show command’ only”, and “read-write” means “it can execute ‘all commands’. |
| **Type** | Indicates type of this rule is command string, feature, or feature group. |
| **Content** | Detailed definition of this rule. |

## 5.32.13. Show feature

This command is used to to display information about features.

**Format** show role feature [detail | name <feature-name>]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Feature name** | The system pre-defined feature name. |
| **Command strings of feature** | This feature contains related command strings. |

## 5.32.14. Show feature group

This command is used to to display information about feature groups.

**Format** show role feature-group [detail | name <feature-group-name>]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Current numbers of feature group** | Indicates how many numbers of feature groups are created now. |
| **Maximum numbers of feature group** | Indicates maximum numbers of feature groups can be created on the device. |
| **feature group name** | The name of this feature group. |
| **Feature name** | The system pre-defined feature name. |
| **Command strings of feature** | This feature contains related command strings. |

## 5.32.15. Show role user

This command is used to to display information of roles according to users.

- Commands “show role user current”, “show role feature *”, and “show role feature groups *” are RBAC common permitted commands, and that is in order to get what commands can be executed for every user.

**Format** show role user [current | name <username>]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Username** | The name of assigned user. |
| **Authenticated method** | Indicates what kind of login authenticated method to use by this user. Possible values are LOCAL, RADIUS, and TACACS |
| **Current numbers of total commands per user** | The total command strings which include rule commands, features, and feature-groups of all roles are assigned to this user. |
| **Maximun numbers of total commands per user** | The maximun numbers of total commands can be set to one user. |
| **Role** | The role name. |
| **Description** | Description of this role. |
| **ID** | Rule ID |

| | |
|---|---|
| **Permit** | Indicates permit or deny this role to execute this rule. |
| **Read & Write** | Indicate this rule is “read” or “read-write”. The “read” means “it can execute ‘show command’ only”, and “read-write” means “it can execute ‘all commands’. |
| **Type** | Indicates type of this rule is command string, feature, or feature group. |
| **Content** | Detailed definition of this rule. |

# 5.33. Time Zone Commands

This command sets the system time and date.

The x86 platforms rely on the Linux NTP to manage the time zone and the time of day. The NTP is configured outside of QNOS. QNOS for x86 does not include the internal SNTP client and does not support SNTP commands and Time Zone clock commands.

System time and date cannot be configured when SNTP is enabled. The SNTP clock takes precedence over the configured system time and date if SNTP is enabled after you configure the system time and date.

## 5.33.1. Clock summer-time date

Use this command to set the Daylight Saving Time (DST), also known as summtertime, offset to UTC. You have toe specify the start year and end year along with the month, day, and time. If the optional parameters are not specified, they are read as either zero (0) or \0, as appropriate.

**Format** clock summer-time date {<date> <month> <year> <hh:mm> <date> <month> <year> <hh:mm>} [offset <offset>] [zone <acronym>]

| Parameter | Definition |
|---|---|
| **date** | Day of the month. The range is 1 to 31. |
| **month** | Month, and the range is the first three letters of month spelling (for example, Jan). |
| **year** | Year, and the renage is 2000 to 2097. |
| **hh:mm** | Time in 24-hour format in hours and minutes. “hh” range is 0 to 23 and “mm” range is 0 to 59. |
| **offset** | The number of minutes to add during the summertime. The range is 1 to 1440. |

| | |
|---|---|
| **acronym** | The acronym for the time zone to be displayed when summertime is in effect. The range is up to four characters. |

**Default** None

**Mode** Global Config

## 5.33.2. Clock summer-time recurring

Use this command to set summertime offset to UTC recursively every year. This means that summertime will affect every year from the time of configuration. You have toe specify the start year and end year along with the month, day, and time. If the optional parameters are not specified, they are read as either zero (0) or \0, as appropriate.

**Format** clock summer-time recurring {<week> <day> <month> <hh:mm> <week> <day> <month> <hh:mm> | <EU> | <USA>} [offset <offset>] [zone <acronym>]

| Parameter | Definition |
|---|---|
| **week** | Week of the month. The range is 1 to 5, first, and last. |
| **day** | Day of the week. The range is the first three letters by name of day; sun, for example. |
| **month** | Month, and the range is the first three letters of month spelling (for example, Jan). |
| **hh:mm** | Time in 24-hour format in hours and minutes. “hh” range is 0 to 23 and “mm” range is 0 to 59. |
| **EU** | The system clock uses the standard recurring daylight saving time settings used in countries in the European Union. |
| **USA** | The system clock uses the standard recurring daylight saving time settings used in United States. |
| **offset** | The number of minutes to add during the summertime. The range is 1 to 1440. |
| **acronym** | The acronym for the time zone to be displayed when summertime is in effect. The range is up to four characters. |

**Default** None

**Mode** Global Config

## no clock summer-time

Use this command to reset the summertime configuration.

**Format** no clock summer-time

**Mode** Global Config

## 5.33.3. Clock timezone

Use this command to set the offset to Coordinated Universal Time (UTC). If the optional parameters are not specified, they are read as either zero (0) or \0, as appropriate.

**Format** clock timezone {hours} [minutes <minutes>] [zone <acronym>]

| Parameter | Definition |
|---|---|
| **hours** | Hours difference from UTC. The range is -12 to 13. |
| **Minutes** | Minutes difference from UTC. The range is zero (0) to 59. |
| **acronym** | The acronym for the time zone. The range is up to four characters. |

**Default** None

**Mode** Global Config

# 5.34. Link Debounce Commands

The link debounce is designed to preventing spurious link flaps.

When a DOWN event is occurred, UP and DOWN events would be ignored in a debounce time interval. After the debounce time, the last link state event would be triggered.

## 5.34.1. Debounce time

Use this command to set the duration of the link debounce timer. The link debounce timer starts when a link-down event occurs on an interface and runs for the configured amount of milliseconds. While the timer is running, any link flaps (up and down cycles) are ignored, and no link-down notifications are sent to higher-layer applications. After the debounce timer expires, if the link is still down, notifications are sent. The unit is milliseconds and in a multiple of 100 milliseconds.

**Format** debounce-time <100-5000>

**Default** 0

**Mode** Interface Config

## no errdisable recovery cause

Use this command to reset the duration of the link debounce timer to the default value, effectively disabling the timer.

**Format** no debounce-time

**Mode** Interface Config

## 5.34.2. Show interface debounce

Use this command to display the information of link debounce.

**Format** show interface debounce

**Mode** Privileged EXEC

**Display Message**

| Parameter | Definition |
|---|---|
| **Interface** | The name of the interface |
| **Debounce Time (ms)** | The amount of time that the link state events would be ignored |
| **Flaps** | The number of times the link state of an interface changed from DOWN to UP. |

# 6. Routing Commands

## 6.1. Address Resolution Protocol (ARP) Commands

### 6.1.1. Show commands

#### 6.1.1.1. *Show ip arp*

This command displays the Address Resolution Protocol (ARP) cache.

**Format** show ip arp

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Age Time** | Is the time it takes for an ARP entry to age out. This value was configured into the unit. Age time is measured in seconds. |
| **Response Time** | Is the time it takes for an ARP request timeout. This value was configured into the unit. Response time is measured in seconds. |
| **Retries** | Is the maximum number of times an ARP request is retried. This value was configured into the unit. |
| **Cache Size** | Is the maximum number of entries in the ARP table. This value was configured into the unit. |
| **Dynamic renew mode** | Displays whether the ARP component automatically attempts to renew dynamic ARP entries when they aged out. |
| **Total Entry Count Current/Peak** | Field listing the total entries in the ARP table and the peak entry count in the ARP table. |
| **Static Entry Count Configured/Active/Max** | Field listing configured static entry count, active static entry count, and maximum static entry count in the ARP table. |

The following are displayed for each ARP entry.

| Fields | Definition |
|---|---|
| **IP Address** | Is the IP address of a device on a subnet attached to an existing routing |

| | |
|---|---|
| | interface. |
| **MAC Address** | Is the hardware MAC address of that device. |
| **Interface** | Is the routing slot/port associated with the device ARP entry. |
| **Type** | Is the type that was configured into the unit. The possible values are Local, Gateway, Dynamic and Static. |
| **Age** | This field displays the current age of the ARP entry since last refresh (in hh:mm:ss format). |

### 6.1.1.2. *Show ip arp brief*

This command displays the brief Address Resolution Protocol (ARP) table information.

**Format** show ip arp brief

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Age Time** | Is the time it takes for an ARP entry to age out. This value was configured into the unit. Age time is measured in seconds. |
| **Response Time** | Is the time it takes for an ARP request timeout. This value was configured into the unit. Response time is measured in seconds. |
| **Retries** | Is the maximum number of times an ARP request is retried. This value was configured into the unit. |
| **Cache Size** | Is the maximum number of entries in the ARP table. This value was configured into the unit. |
| **Dynamic renew mode** | Displays whether the ARP component automatically attempts to renew dynamic ARP entries when they aged out. |
| **Total Entry Count Current/Peak** | Field listing the total entries in the ARP table and the peak entry count in the ARP table. |
| **Static Entry Count Configured/Active/Max** | Field listing configured static entry count, active static entry count, and maximum static entry count in the ARP table. |

### 6.1.1.3. *Show ip arp static*

This command displays the static Address Resolution Protocol (ARP) table information.

**Format** show ip arp static

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **VRF-ID** | Is the VRF ID which the IP address belongs to. |
| **VRF-Name** | Is the VRF Name for that VRF Id. |
| **IP address** | Is the IP address of a device on a subnet attached to an existing routing interface. |
| **MAC address** | Is the MAC address for that device. |

## 6.1.2. Configuraton commands

### 6.1.2.1. *Arp*

This command creates an ARP entry. The value for <ipaddress> is the IP address of a device on a subnet attached to an existing routing interface. The value for <macaddress> is a unicast MAC address for that device.

**Format** arp <ipaddr> <macaddr>

no arp <ipaddr> <macaddr>

| Fields | Definition |
|---|---|
| **IP address** | Is the IP address of a device on a subnet attached to an existing routing interface. |
| **MAC address** | Is a MAC address for that device. The format is 6 two-digit hexadecimal numbers that are separated by colons, for example, 00:06:29:32:81:40. |
| **no** | This command deletes an ARP entry. |

**Default** None

**Mode** Global Config

### 6.1.2.2. *Ip proxy-arp*

This command enables proxy ARP on a router interface or range of interfaces. Without proxy ARP, a device only responses to an ARP request if the target IP address is an address configured on the interface where the ARP request arrived. With proxy ARP, the device may also response if the target IP address is reachable. The device only responses if all next hops in its route to the destination are through interfaces other than the interface that received the ARP request.

To disable proxy ARP on a router interface, use the **no** form of this command.

**Format** ip proxy-arp
no ip proxy-arp

**Default** Enable.

**Mode** Interface Config

### 6.1.2.3. *Ip local-proxy-arp*

This command allows an interface to response to ARP request for IP address within the subnet and to forward traffic between hosts in the subnet.

To reset the local proxy ARP mode on the interface to the default value, use the **no** form of this command.

**Format** ip local-proxy-arp
no ip local-proxy-arp

**Default** Disable.

**Mode** Interface Config

### 6.1.2.4. *Arp cashesize*

This command configures the maximum number of entries in the ARP cache. The ARP cache size value is platform dependency.

**Format** arp cachesize <1152-8192> or arp cachesize <1152-6144>
no arp cachesize

| Fields | Definition |
|---|---|
| **<1152-8192>** | The range of cache size is 1152 to 8192 for the following platform |

| | |
|---|---|
| | • ipv4-routing data-center default<br>• ipv4-routing dcvpn-data-center<br>• dual-ipv4-and-ipv6 default<br>• dual-ipv4-and-ipv6 alpm<br>• dual-ipv4-and-ipv6 alpm-mpls-data-center<br>• dual-ipv4-and-ipv6 data-center<br>• dual-ipv4-and-ipv6 dcvpn-data-center<br>• dual-ipv4-and-ipv6 mpls-data-center |
| **<1152-6144>** | The range of cache size is 1152 to 6144 for the following platform:<br>• ipv4-routing default<br>• ipv4-routing data-center plus |
| **no** | This command configures the default ARP cache size. |

**Default** The default cache size is 8192 or 6144, which depends on the platform currently used.

**Mode** Global Config

### 6.1.2.5. *Arp dynamicrenew*

This command enables ARP component to automatically renew ARP entries of type dynamic when they age out.

**Format** arp dynamicrenew

no arp dynamicrenew

| Fields | Definition |
|---|---|
| **no** | This command disables ARP component from automatically renewing ARP entries of type dynamic when they age out. |

**Default** None

**Mode** Global Config

### 6.1.2.6. *Arp resptime*

This command configures the ARP request response timeout.

**Format** arp resptime <1-10>

no arp resptime

| Fields | Definition |
|---|---|
| **<1-10>** | The range of default response time is 1 to 10 seconds. |
| **no** | This command configures the default response timeout time. |

**Default** The default response time is 1.

**Mode** Global Config

### 6.1.2.7. *Arp retries*

This command configures the ARP count of maximum request for retries.

**Format** arp retries <0-10>

no arp retries

| Fields | Definition |
|---|---|
| **<1-10>** | The range of maximum request for retries is 0 to 10. |
| **no** | This command configures the default count of maximum request for retries. |

**Default** The default value is 4.

**Mode** Global Config

### 6.1.2.8. *Arp Timeout*

This command configures the ARP entry ageout time.

**Format** arp timeout <15-21600>

no arp timeout

| Fields | Definition |
|---|---|
| **<15-21600>** | Represents the IP ARP entry ageout time in seconds. The range is 15 to 21600 seconds. |
| **no** | This command configures the default ageout time for IP ARP entry. |

**Default** The default value is 1200.

**Mode** Global Config

### 6.1.2.9. *Arp access-list*

Use this command to create an ARP ACL

**Format** arp access-list <name>

no arp access-list <name>

| Fields | Definition |
|---|---|
| **<name>** | Enter ARP access-list name <1-31> alphanumeric characters in length. |
| **no** | Use this command to delete a configured ARP ACL. |

**Default** None

**Mode** Global Config

### 6.1.2.10. *Permit ip host mac host*

Use this command to configure a rule for a valid IP address and MAC address combination used in ARP packet validation.

**Format** permit ip host <sender-ip> mac host <sender-mac>

no permit ip host <sender-ip> mac host <sender-mac>

| Fields | Definition |
|---|---|
| **< sender-ip >** | Specifies IP address in the ARP ACL rule. |
| **<sender-mac>** | Specifies MAC address in the ARP ACL rule. |
| **no** | Use this command to delete a rule for a valid IP and MAC combination. |

**Default** None

**Mode** ARP Access-list Config

### 6.1.2.11. *Clear ip arp-cache*

This command causes all ARP entries of type dynamic to be removed form the ARP cache. If the [gateway] parameter is specified, the dynamic entries of type gateway are purged as well.

**Format** clear ip arp-cache [gateway | interface {<slot/port> | vlan <vlan-id>}]

**Default** None

**Mode** Privileged Exec

# 6.2. IP Routing Commands

## 6.2.1. Show commands

### 6.2.1.1. *Show ip brief*

This command displays all the summary information of the IP.

**Format** show ip brief

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Default Time to Live** | The computed TTL (Time to Live) of forwarding a packet from the local router to the final destination. |
| **Routing Mode** | Shows whether the routing is enabled or disabled. |
| **Maximum Next Hops** | The maximum number of hops supported by this switch. |
| **Maximum Routes** | The maximum number of routes the packet can travel. |
| **Maximum Static Routes** | The maximum number of static routes supported by this switch. |
| **ICMP Rate Limit Interval** | Shows how often the token bucket is initialized with burst-size tokens. Burst-interval is from 0 to 2147483647 milliseconds. The default burst-interval is 1000 msec. |
| **ICMP Rate Limit Burst Size** | Shows the number of ICMPv4 error messages that can be sent during one burst-interval. The range is from 1 to 200 messages. The default value is 100 messages. |
| **ICMP Echo Replies** | Shows whether ICMP Echo Replies are enabled or disabled. |
| **ICMP Redirects** | Shows whether ICMP Redirects are enabled or disabled. |

### 6.2.1.2. *Show ip interface port*

This command displays all pertinent information about the IP interfaces.

**Format** show ip interface port <slot/port>

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Routing Interface Status** | Determine the operational status of IPv4 routing Interface. The possible values are Up or Down. |
| **Primary IP Address** | The primary IP address and subnet masks for the interface. This value appears only if you configure it. |
| **Method** | Shows whether the IP address was configured manually or acquired from a DHCP server. |
| **Secondary IP Address** | One or more secondary IP addresses and subnet masks for the interface. This value appears only if you configure it. |
| **Helper IP Address** | The helper IP addresses configured by the command “ip helper-address (Interface Config)” |
| **Routing Mode** | The administrative mode of router interface participation. The possible values are enable or disable. This value is configurable. |
| **Administrative Mode** | The administrative mode of the specified interface. The possible values of this field are enable or disable. This value is configurable. |
| **Forward Net Directed Broadcasts** | Displays whether forwarding of network-directed broadcasts is enabled or disabled. This value is configurable. |
| **Proxy ARP** | Displays whether Proxy ARP is enabled or disabled on the system. |
| **Local Proxy ARP** | Displays whether Local Proxy ARP is enabled or disabled on the interface. Active State Displays whether the interface is active or inactive. An interface is considered active if its link is up and it is in forwarding state. |
| **Active State** | An interface is considered active if it has link up, is in forwarding state. |
| **Link Speed Data Rate** | An integer representing the physical link data rate of the specified interface. This is measured in Megabits per second (Mbps). |
| **MAC Address** | The burned in physical address of the specified interface. The format is 6 two-digit hexadecimal numbers that are separated by colons. |
| **Encapsulation Type** | The encapsulation type for the specified interface. The types are: Ethernet or SNAP. |
| **IP MTU** | The maximum transmission unit (MTU) size of a frame, in bytes. |

| | |
|---|---|
| **Bandwidth** | Shows the bandwidth of the interface. |
| **Destination Unreachables** | Displays whether ICMP Destination Unreachables may be sent (enabled or disabled). |
| **ICMP Redirects** | Displays whether ICMP Redirects may be sent (enabled or disabled). |
| **Interface Suppress Status** | Is interface suppressed or not. |
| **Interface Name** | Get fpti interface name given internal interface number. |

### 6.2.1.3. *Show ip interface vlan*

This command displays all pertinent information about the VLAN routing interfaces.

**Format** show ip interface vlan <1-4093>

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Routing Interface Status** | Determine the operational status of IPv4 routing Interface. The possible values are Up or Down. |
| **Primary IP Address** | The primary IP address and subnet masks for the interface. This value appears only if you configure it. |
| **Method** | Shows whether the IP address was configured manually or acquired from a DHCP server. |
| **Secondary IP Address** | One or more secondary IP addresses and subnet masks for the interface. This value appears only if you configure it. |
| **Helper IP Address** | The helper IP addresses configured by the command “ip helper-address (Interface Config)” |
| **Routing Mode** | The administrative mode of router interface participation. The possible values are enable or disable. This value is configurable. |
| **Administrative Mode** | The administrative mode of the specified interface. The possible values of this field are enable or disable. This value is configurable. |
| **Forward Net Directed Broadcasts** | Displays whether forwarding of network-directed broadcasts is enabled or disabled. This value is configurable. |

| | |
|---|---|
| **Proxy ARP** | Displays whether Proxy ARP is enabled or disabled on the system. |
| **Local Proxy ARP** | Displays whether Local Proxy ARP is enabled or disabled on the interface. Active State displays whether the interface is active or inactive. An interface is considered active if its link is up and it is in forwarding state. |
| **Active State** | An interface is considered active if it has link up, is in forwarding state. |
| **Link Speed Data Rate** | An integer representing the physical link data rate of the specified interface. This is measured in Megabits per second (Mbps). |
| **MAC Address** | The burned in physical address of the specified interface. The format is 6 two-digit hexadecimal numbers that are separated by colons. |
| **Encapsulation Type** | The encapsulation type for the specified interface. The types are: Ethernet or SNAP. |
| **IP MTU** | The maximum transmission unit (MTU) size of a frame, in bytes. |
| **Bandwidth** | Shows the bandwidth of the interface. |
| **Destination Unreachables** | Displays whether ICMP Destination Unreachables may be sent (enabled or disabled). |
| **ICMP Redirects** | Displays whether ICMP Redirects may be sent (enabled or disabled). |
| **Interface Suppress Status** | Is interface suppressed or not. |
| **Auto-State Mode** | Get the mode of AutoState feature of an interface. |
| **Interface Name** | Get fpti interface name given internal interface number. |

### 6.2.1.4. *Show ip interface lookback*

This command displays information about configured loopback interfaces.

**Format** show ip interface loopback [<0-63>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **Loopback Id** | The loopback ID associated with the rest of the information in the row. |

| | |
|---|---|
| **Interface** | The interface name. |
| **IP Address** | The IPv4 address of the interface. |

If you specify a loopback ID, the following information appears:

| Fields | Definition |
|---|---|
| **Routing Interface Status** | Determine the operational status of IPv4 routing Interface. The possible values are Up or Down. |
| **Primary IP Address** | The primary IP address and subnet masks for the interface. This value appears only if you configure it. |
| **Secondary IP Address(es)** | One or more secondary IP addresses and subnet masks for the interface. This value appears only if you configure it. |
| **Routing Mode** | The administrative mode of router interface participation. The possible values are enable or disable. This value is configurable. |
| **Interface Name** | Get fpti interface name given internal interface number |

### 6.2.1.5. *Show ip interface brief*

This command displays summary information about IP configuration settings for all ports in the router.

**Format** show ip interface brief

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | Valid slot, and port number separated by forward slashes or VLAN routing interface. |
| **State** | Indicate the operational state of the routing interface. |
| **IP Address** | The IP address of the routing interface. |
| **IP Mask** | The IP mask of the routing interface. |
| **Method** | Is the way to get the IP Address. The possible value is “Manual”, “DHCP” or “None”. |

| | |
|---|---|
| **Netdir Bcast** | Indicates if IP forwards net-directed broadcasts on this interface. Possible values are Enable or Disable. |
| **MultiCast Fwd** | Indicates the multicast forwarding administrative mode on the interface. Possible values are Enable or Disable. |

### 6.2.1.6. *Show ip route*

This command displays the routing table. The <ip-address> specifies the network for which the route is to be displayed and displays the best matching best-route for the address. The <mask> specifies the subnet mask for the given <ip-address>. When you use the <longer-prefixes> keyword, the <ip-address> and <mask> pair becomes the prefix, and the command displays the routes to the addresses that match that prefix. Use the **<protocol>** parameter to specify the protocol that installed the routes. The value for **<protocol>** can be **connected, bgp, ospf, or static**. Use the <all> parameter to display all routes including best and nonbest routes. If you do not use the <all> parameter, the command only displays the best route.

If you use the <connected> keyword for **<protocol>**, the all option is not available because there are no best or non-best connected routes.

**Format** show ip route [{<ip-address> [<protocol>] | {<ip-address> <mask> [longer-prefixes] [<protocol>] | <protocol>} [all] | all}]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Route Codes** | Displays the key for the routing protocol codes that might appear in the routing table output.<br><br>Route Codes:<br>R - RIP Derived, O - OSPF Derived, C - Connected, S - Static<br>B - BGP Derived, IA - OSPF Inter Area<br>E1 - OSPF External Type 1, E2 - OSPF External Type 2<br>N1 - OSPF NSSA External Type 1, N2 - OSPF NSSA External Type 2<br>S U - Unnumbered Peer<br>L - Leaked Route, K - Kernel, D - Database Route |
| **State** | Indicate the operational state of the routing interface. |
| **IP Address** | The IP address of the routing interface. |
| **IP Mask** | The IP mask of the routing interface. |

| | |
|---|---|
| **Method** | Is the way to get the IP Address. The possible value is “Manual”, “DHCP” or “None”. |
| **Netdir Bcast** | Indicates if IP forwards net-directed broadcasts on this interface. Possible values are Enable or Disable. |
| **MultiCast Fwd** | Indicates the multicast forwarding administrative mode on the interface. Possible values are Enable or Disable. |

The command displays the routing tables in the following format:

Code IP-Address/Mask [Preference/Metric] via Next-Hop, Interface

| Fields | Definition |
|---|---|
| **Code** | The codes for the routing protocols that created the routes. |
| **IP-Address/Mask** | The IP-Address and mask of the destination network corresponding to this route. |
| **Preference** | The administrative distance associated with this route. Routes with low values are preferred over routes with higher values. |
| **Metric** | The cost associated with this route. |
| **via Next-Hop** | The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination. |
| **Interface** | The outgoing router interface to use when forwarding traffic to the next destination. |

### 6.2.1.7. *Show ip route bestroutes*

This command displays router route table information for the best routes.

**Format** show ip route bestroutes

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Total Number of Routes** | The total number of routes. |
| **Network Address** | Is an IP route prefix for the destination. |

| | |
|---|---|
| **Subnet Mask** | Is a mask of the network and host portion of the IP address for the router interface. |
| **Protocol** | Tells which protocol added the specified route. The possibilities are: local, static, OSPF. |

For each next hop:

| Fields | Definition |
|---|---|
| **Next Hop Intf** | The outgoing router interface to use when forwarding traffic to the next destination. |
| **Next Hop IP Address** | The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination. |

### 6.2.1.8. *Show ip route entry*

This command displays the router route entry information.

**Format** show ip route entry <networkaddress>

| Fields | Definition |
|---|---|
| **<networkaddress>** | Is a valid network address identifying the network on the specified interface. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Network Address** | Is a valid network address identifying the network on the specified interface. |
| **Subnet Mask** | Is a mask of the network and host portion of the IP address for the attached network. |
| **Protocol** | Tells which protocol added the specified route. The possibilities are: local, static, OSPF. |
| **Total Number of Routes** | The total number of routes. |

For each next hop:

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Next Hop Intf** | The outgoing router interface to use when forwarding traffic to the next destination. |
| **Next Hop IP Address** | The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination. |
| **Metric** | Specifies the metric for this route entry. |
| **Pref** | The preference value that is used for this route entry. |

### 6.2.1.9. *Show ip route connected*

This command displays directly connected routes.

**Format** show ip route connected

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Route Codes** | Displays the key for the routing protocol codes that might appear in the routing table output. |

The command displays the routing tables in the following format:

Code IP-Address/Mask [Preference/Metric] via Next-Hop, Interface

| Fields | Definition |
|---|---|
| **Code** | The codes for the routing protocols that created the routes. |
| **IP-Address/Mask** | The IP-Address and mask of the destination network corresponding to this route. |
| **Preference** | The administrative distance associated with this route. Routes with low values are preferred over routes with higher values. |
| **Metric** | The cost associated with this route. |
| **via Next-Hop** | The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination. |
| **Interface** | The outgoing router interface to use when forwarding traffic to the next destination. |

### 6.2.1.10. *Show ip route ospf*

This command displays Open Shortest Path First (OSPF) routes. The option **all** command displays all (best and non-best) routes.

**Format** show ip route ospf [all]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Route Codes** | Displays the key for the routing protocol codes that might appear in the routing table output. |

The command displays the routing tables in the following format:

Code IP-Address/Mask [Preference/Metric] via Next-Hop, Interface

| Fields | Definition |
|---|---|
| **Code** | The codes for the routing protocols that created the routes. |
| **IP-Address/Mask** | The IP-Address and mask of the destination network corresponding to this route. |
| **Preference** | The administrative distance associated with this route. Routes with low values are preferred over routes with higher values. |
| **Metric** | The cost associated with this route. |
| **via Next-Hop** | The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination. |
| **Interface** | The outgoing router interface to use when forwarding traffic to the next destination. |

### 6.2.1.11. *Show ip route static*

This command displays Static Routes. The option **all** command displays all (best and non-best) routes.

**Format** show ip route static [all]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Route Codes** | Displays the key for the routing protocol codes that might appear in the routing table output. |

The command displays the routing tables in the following format:

Code IP-Address/Mask [Preference/Metric] via Next-Hop, Interface

| Fields | Definition |
|---|---|
| **Code** | The codes for the routing protocols that created the routes. |
| **IP-Address/Mask** | The IP-Address and mask of the destination network corresponding to this route. |
| **Preference** | The administrative distance associated with this route. Routes with low values are preferred over routes with higher values. |
| **Metric** | The cost associated with this route. |
| **via Next-Hop** | The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination. |
| **Interface** | The outgoing router interface to use when forwarding traffic to the next destination. |

### 6.2.1.12. *Show ip route ecmp-groups*

This command displays all the current ECMP groups in the IPv4 routing table. An ECMP group is a set of two or more next hops used in one or more routes. The groups are numbered arbitrarily from 1 to n. The output indicates the number of next hops in the group and the number of routes that use the set of the next hops.The output lists the IPv4 address and the outgoing interface of each next hop in each group.

**Format** show ip route ecmp-groups

**Default** None

**Mode** Privileged EXEC

### 6.2.1.13. *Show ip route hw-failure*

This command displays the routes that failed to be added to the hardware due to the hash errors or a table full condition.

**Format** show ip route hw-failure

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Route Codes** | Displays the key for the routing protocol codes that might appear in the routing table output. |

The command displays the routing tables in the following format:

Code IP-Address/Mask [Preference/Metric] via Next-Hop, Interface

| Fields | Definition |
|---|---|
| **Code** | The codes for the routing protocols that created the routes. |
| **IP-Address/Mask** | The IP-Address and mask of the destination network corresponding to this route. |
| **Preference** | The administrative distance associated with this route. Routes with low values are preferred over routes with higher values. |
| **Metric** | The cost associated with this route. |
| **via Next-Hop** | The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination. |
| **Interface** | The outgoing router interface to use when forwarding traffic to the next destination. |

### 6.2.1.14. *Show ip route summary*

This command displays the routing table summary. Use the optional **all** parameter to show the number of all routes, including best and non-best routes. To include only the number of best routes, do not use the optional parameter.

**Format** show ip route summary [all]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Connected Routes** | The total number of connected routes in the routing table. |
| **Static Routes** | Total number of static routes in the routing table. |
| **Kernel Routes** | Total number of kernel routes in the routing table. |
| **Unnumbered Peer Routes** | Total number of unnumbered peer routes in the routing table. |
| **BGP Routes** | Total number of routes installed by BGP protocol.<br><br>**External**: The number of external BGP routes.<br><br>**Internal**: The number of internal BGP routes.<br><br>**Local**: The number of local BGP routes. |
| **OSPF Routes** | Total number of routes installed by OSPF protocol:<br><br>**Intra Area Routes**: Total number of Intra Area routes installed by OSPF protocol.<br><br>**Inter Area Routes**: Total number of Inter Area routes installed by OSPF protocol.<br><br>**External Type-1 Routes**: Total number of External Type-1 routes installed by OSPF protocol.<br><br>**External Type-2 Routes**: Total number of External Type-2 routes installed by OSPF protocol. |
| **Reject Routes** | Total number of reject routes installed by all protocols. |
| **Total Routes** | Total number of routes in the routing table. |
| **Best Routes (High)** | The number of best routes currently in the routing table. This number only counts the best route to each destination. The value in parentheses indicates the highest count of unique best routes after counters were last cleared. |
| **Alternate Routes** | The number of alternate routes currently in the routing table. An alternate route is a route that was not selected as the best route to its destination. |
| **Leaked Routes** | The number of leaked routes currently in the routing table. This leaked routes are the routes leaked into RTO from other VRF. |
| **RFC5549 Routes - IPv4 with IPv6 nexthop** | The number of RFC5549 routes currently in the routing table. This RFC5549 routes are advertising BGP IPv4 NLRI with an IPv6 Next Hop. |
| **Route Adds** | The number of routes that have been added to the routing table. |

| | |
|---|---|
| **Route Modifies** | The number of routes that have been changed after they were initially added to the routing table. |
| **Route Deletes** | The number of routes that have been deleted from the routing table. |
| **Unresolved Route Adds** | The number of route adds that failed because none of the route's next hop were on a local subnet. Note that static routes can fail to be added to the routing table at startup because ther routing interfaces are not yet up. This counter gets incremented in this case. The static routes are added to the routing table when the routing interfaces come up. |
| **Invalid Route Adds** | The number of routes that failed to be added to the routing table because the route was invalid. A log message is written for each of these failures. |
| **Failed Route Adds** | The number of routes that failed to be added to the routing table because of a resource limitation in the routing table. |
| **Failed Kernel Route Adds** | The number of kernel routes that failed to be added to the routing table because of a kernel error or a table full condition. |
| **Hardware Failed Route Adds** | The number of routes failed to be inserted into the hardware because of a hash error or a table full condition. |
| **Reserved Locals** | The number of routing table entries reserved for a local subnet on a routing interface that is down. Space for local routes is always reserved so that the local routes can be installed when a routing interface is up. |
| **Unique Next Hop (High)** | The number of the distinct next hops used among all routes currently in the routing table. This number includes local interfaces for local routes and neighbors for indirect routes. The value in the parentheses indicates the highest count of unique next hops after counters were last cleared. |
| **Next Hop Groups (High)** | The current number of next hop groups in use by one or more routes. Each next hop group includes one or more next hops. The value in the parentheses indicates the highest count of next hop groups after counters were last cleared. |
| **ECMP Groups (High)** | The number of next hop groups with multiple next hops. The value in the parentheses indicates the highest count of next hop groups after counters were last cleared. |
| **ECMP Routes** | The number of routes with multiple next hops currently in the routing table. |
| **Truncated ECMP Routes** | The number of ECMP routes that are currently installed in the forwarding table with just one next hop. The forwarding table may limit the number of ECMP routes or the number of ECMP groups. When an ECMP route cannot be installed because such a limit is reached, the route is installed with a single next hop. |
| **ECMP Retries** | The number of ECMP routes that have been installed in the forwarding table after initially being installed with a single next hop. |

| | |
|---|---|
| **Routes with n Next Hop** | The current number of routes with specific number (n) of next hops. |

### 6.2.1.15. *Clear ip route counters*

This command resets the IPv4 routing table counters reported in the command “show ip route summary” to zero. This command only resets event counters. Counters that report the current state of the routing table, such as the number of routes of each type, are not reset.

**Format** clear ip route counters

**Default** None

**Mode** Privileged EXEC

### 6.2.1.16. *Show ip route preferences*

This command displays detailed information about the route preferences. Route preferences are used in determining the best route. Lower router preference values are preferred over higher router preference values.

**Format** show ip route preferences

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Local** | This field displays the local route preference value. |
| **Static** | This field displays the static route preference value. |
| **BGP External** | This field displays the BGP external route preference value. |
| **OSPF Intra** | This field displays the OSPF intra route preference value. |
| **OSPF Inter** | This field displays the OSPF inter route preference value. |
| **OSPF External** | The OSPF External route preference value. |
| **BGP Internal** | The BGP Internal route preference value. |
| **BGP Local** | The BGP local route preference value. |

| | |
|---|---|
| **Configured Default Gateway** | The route preference value of the statically-configured default gateway. |
| **DHCP Default Gateway** | The route preference value of the default gateway learned from the DHCP server. |

### 6.2.1.17. *Show ip stats*

This command displays IP statistical information. Refer to RFC 1213 for more information about the fields that are displayed.

**Format** show ip stats

**Default** None

**Mode** Privileged EXEC

### 6.2.1.18. *Show routing heap summary*

This command displays a summary of the memory allocation from the routing heap. The routing heap is a chunk of memory set aside when the system boots for use by the routing protocols.

**Format** show routing heap summary

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Heap Size** | The amount of memory, in bytes, allocated at startup for the routing heap. |
| **Memory in Use** | The number of bytes currently allocated. |
| **Memory on Free List** | The number of bytes currently on the free list. When a chunk of memory from the routing heap is freed, it is placed on a free list for future reuse. |
| **Memory Available in Heap** | The number of bytes in the original heap that have never been allocated. |
| **In Use High Water Mark** | The maximum memory in use since the system last rebooted. |

## 6.2.2. Configuration commands

### 6.2.2.1. *Routing*

This command enables routing for an interface.

**Format** routing
no routing

| Fields | Definition |
|---|---|
| **no** | Disable routing for an interface. |

**Default** Disable

**Mode** Interface Config

### 6.2.2.2. *Ip routing*

This command enables the IP Router Admin Mode for the master switch.

**Format** ip routing
no ip routing

| Fields | Definition |
|---|---|
| **no** | Disable the IP Router Admin Mode for the master switch. |

**Default** Disable

**Mode** Global Config

### 6.2.2.3. *Ip address*

This command configures an IP address on an interface. The IP address may be a secondary IP address.

**Format** ip address <ipaddr> {<subnet-mask> | <prefix-lengh>} [secondary]
no ip address <ipaddr> <subnet-mask> [secondary]

| Fields | Definition |
|---|---|
| **<ipaddr>** | IP address of the interface. |
| **<subnet-mask>** | Subnet mask of the interface. |

| | |
|---|---|
| **<prefix-lengh>** | Implements RFC 3021 via using the / notation of the subnet mask. This integer indicates the length of the subnet mask. Range is from 1 to 31. |
| **[secondary]** | It is a secondary IP address. |
| **no** | Delete an IP address from an interface. |

**Default** None

**Mode** Interface Config

### 6.2.2.4. *Ip address dhcp*

This command enables the DHCPv4 client on an in-band interface so that it can acquire network information, such as the IP address, subnet mask, and default gateway, from a network DHCP server. When DHCP is enabled on the interface, the system automatically deletes all manually configured IPv4 addresses on the interface.

To enable the DHCPv4 client on an in-band interface and send DHCP client messages with the client identifier option (DHCP Option 61), use the **ip address dhcp client-id** command in interface configuration mode.

**Format** ip address dhcp {[restart] | [client-id]}

no ip address dhcp [client-id]

| **Fields** | **Definition** |
|---|---|
| **[restart]** | To restart the DHCPv4 client to acquire an IP Address from DHCP server. |
| **[client-id]** | To send the DHCPv4 messages with the DHCP client identifier. |
| **no** | This command releases a leased address and disables DHCPv4 on an interface. |

**Default** Disable

**Mode** Interface Config

### 6.2.2.5. *Ip default-gateway*

This command manually configures a global default gateway address. Only one default gateway can be configured. If you invoke this commands several times, each command replaces the previous configuration.

**Format** ip default-gateway <ipaddr>

no ip default-gateway

| Fields | Definition |
|---|---|
| **<ipaddr>** | A valid IPv4 address. |
| **no** | Remove the default gateway address from the configuration. |

**Default** None

**Mode** Global Config

### 6.2.2.6. *Ip load-sharing*

This command manually configures the IP ECMP load balancing mode.

**Format** ip load-sharing <1-6> {inner | outer}

no ip load-sharing

| Fields | Definition |
|---|---|
| **<1 - 6>** | The load balancing or sharing mode for all ECMP groups.<br>1: Based on a hash using the Source IP address of the packet.<br>2: Based on a hash using the Destination IP address of the packet.<br>3: Based on a hash using the Source and Destination IP addresses of the packet.<br>4: Based on a hash using the Source IP address and the Source TCP/UDP Port field of the packet.<br>5: Based on a hash using the Destination IP address and the Destination TCP/UDP Port field of the packet.<br>6: Based on a hash using the Source and Destination IP address, and the Source and Destination TCP/UDP Port fields of the packet. |
| **no** | Reset the load balancing or sharing mode to the defaulte mode, 6. |

**Default** 6

**Mode** Global Config

### 6.2.2.7. *Ip route*

This command configures a static route. Use the optional *vrf* parameter to configure the static route in the specified virtual router instance.

**Format** ip route [vrf <vrf-name>] <networkaddr> <subnetmask> [{<nexthopip> | Null0} {{[<1-255 >] description <description>} | description <description>}]

no ip route <networkaddr> <subnetmask> [{{<nexthopip> [<1-255 > | description]} | {Null0 [<1-255 > | description]}}]

| Fields | Definition |
|---|---|
| **<vrf-name>** | Specify the name of the VRF in which this static route is installed. |
| **<networkaddr>** | A valid IP address. |
| **<subnetmask>** | A valid subnet mask. |
| **<nexthopip>** | IP address of the next hop router. |
| **<1-255>** | The preference value of this route. The range is 1 to 255. |
| **<description>** | The description for the route. |
| **Null0** | Null interface. |
| **no** | Delete all next hops to a destination static route. If the optional <nextHopRtr> parameter is designated, the next hop is deleted and if the optional preference value is designated, the preference value of the static route is reset to its default value, 1. |

**Default** None

**Mode** Global Config

## 6.2.2.8. *Ip route default*

This command configures the default route. Use the optional *vrf* parameter to configure the static route in the specified virtual router instance.

**Format** ip route [vrf <vrf-name>] default <nexthopip> [1-255]

| Fields | Definition |
|---|---|
| **vrf-name** | Specify the name of the VRF in which this static route is installed. |
| **<nexthopip>** | IP address of the next hop router. |
| **<1-255>** | Precedence value of this route. |

**Default** None

**Mode** Global Config

### 6.2.2.9. *Ip route distance*

This command sets the default distance (preference) for static routes. Use the optional *vrf* parameter to configure the default distance (preference) for static routes in the specified virtual router instance.

Lower route distance values are preferred when determining the best route. The ip route and ip route default commands allow you to optionally set the distance (preference) of an individual static route. The default distance is used when no distance is specified in these commands. Changing the default distance does not update the distance of existing static routes, even if they were assigned the original default distance. The new default distance will only be applied to static routes created after invoking the ip route distance command.

**Format** ip route [vrf <vrf-name>] distance <1-255>

| Fields | Definition |
|---|---|
| **vrf-name** | Specify the name of the VRF in which this static route is installed. |
| **<1-255>** | Default the Distance value of static routes. The range is 1 to 255. |

**Default** The default preference value is 1

**Mode** Global Config

### 6.2.2.10. *Ip route static bfd*

This command configures the BFD for static route. To remove the BFD for static route, use **no** form of this command.

QNOS BFD supports single-hop mode and multiple-hop mode.

Depending on status of the BFD session, static routes are added to or removed from the IP routing table. When a BFD session with a specific next hop goes down, all the static routes with the same next hop will be removed from the IP routing table. Once the BFD session comes up, all the static routes with the same next hop will be added into the IP routing table.

**Format** ip route static bfd <next-hop-ip-addr> <src-ip-addr>

no ip route static bfd <nexthopip> <srcip>

| Fields | Definition |
|---|---|

| | |
|---|---|
| **<nexthopip>** | IP address of the next hop router. |
| **<srcip>** | Local IP address of static route for BFD. This IP address must be one of the interface IP address. |

**Default** None

**Mode** Global Config

### 6.2.2.11. *Ip route vrf static bfd*

This command configures the BFD for static route with specific VRF. To remove the BFD for static route with specific VRF, use **no** form of this command.

**Format** ip route vrf <vrf-name> static bfd <next-hop-ip-addr> <src-ip-addr>

no ip route vrf <vrf-name> static bfd <nexthopip> <srcip>

| **Fields** | **Definition** |
|---|---|
| **<vrf-name>** | VRF Name in which the the static route is configured |
| **<nexthopip>** | IP address of the next hop router. |
| **<srcip>** | Local IP address of static route for BFD. |

**Default** None

**Mode** Global Config

### 6.2.2.12. *Ip mtu*

This command sets the IP Maximum Transmission Unit (MTU) on a routing interface or range of interfaces. The IP MTU is the size of the largest IP packet that can be transmitted on the interface without fragmentation. Forwarded packets are dropped if they exceed the IP MTU of the outgoing interface.

Packets originated on the router, such as OSPF packets, may be fragmented by the IP stack.

OSPF advertises the IP MTU in the Database Description packets it sends to its neighbors during database exchange. If two OSPF neighbors advertise different IP MTUs, they will not form an adjacency. (unless OSPF has been instructed to ignore differences in IP MTU with the ip ospf mtu-ignore command.)

**Format** ip mtu <68-12270>

no ip mtu <68-12270>

| Fields | Definition |
|---|---|
| **<68-12270>** | The IP MTU on a routing interface. The range is 68 to 12270. |
| **no** | Reset the ip mtu to the default value. |

**Default** The default value is 1500.

**Mode** Interface Config

### 6.2.2.13. *Ip unnumbered gratuitous-arp accept*

This command enables the configuration of static interface routes to the unnumbered peer dynamically on receiving gratuitous ARP.

**Format** ip unnumbered gratuitous-arp accept

no ip unnumbered gratuitous-arp accept

| Fields | Definition |
|---|---|
| **no** | Disable interface route configuration on receiving gratuitous ARP. |

**Default** Interface route installation for receiving gratuitous ARP is enabled by default.

**Mode** Interface Config

### 6.2.2.14. *Ip unnumbered loopback*

This command identifies unnumbered interfaces and specifies the numbered interface providing the borrowed address.

**Format** ip unnumbered loopback <0-63>

no ip unnumbered

| Fields | Definition |
|---|---|
| **<0-63>** | The loopback interface number. The loopback interface provides the borrowed address and cannot be unnumbered. |
| **no** | Removes the unnumbered configuration. |

**Default** Interface are numbered by default.

**Mode** Interface Config

#### 6.2.2.15. *Encapsulation*

This command configures the link layer encapsulation type for the packet.

**Format** encapsulation {ethernet | snap}

| Fields | Definition |
|---|---|
| **ethernet** | The link layer encapsulation type is ethernet. |
| **snap** | The link layer encapsulation type is SNAP. |

**Default** The default value is ethernet.

**Mode** Interface Config

**Restrictions** Routed frames are always Ethernet encapsulated when a frame is routed to a VLAN.

## 6.3. Open Shortest Path First (OSPF) Commands

### 6.3.1. Show commands

#### 6.3.1.1. *Show ip ospf*

This command displays information relevant to the OSPF router.

**Format** show ip ospf [vrf <vrf-name>]

**Default** None

**Mode** Privileged Exec

**Display Message**

⚠ Some of the information below displays only if you enable OSPF and configure certain features.

| Fields | Definition |
|---|---|
| **Router ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **OSPF Admin Mode** | Shows whether the administrative mode of OSPF in the router is enabled or disabled. This is a configured value. |

| | |
|---|---|
| **RFC 1583 Compatibility** | Indicates whether 1583 compatibility is enabled or disabled. This is a configured value. |
| **External LSDB Limit** | The maximum number of non-default AS-external-LSA (link state advertisement) entries that can be stored in the link-state database. |
| **Exit Overflow Interval** | The number of seconds that, after entering overflow state, a router will attempt to leave overflow state. |
| **SPF Delay Time** | The number of seconds between two subsequent changes of LSAs, during which time the routing table calculation is delayed. |
| **SPF Hold Time** | The number of seconds between two consecutive spf calculations. |
| **Flood Pacing Interval** | The average time, in milliseconds, between LS Update packet transmissions on an interface. This is the value configured with the timers pacing flood command. |
| **LSA Refresh Group Pacing Time** | The size of the LSA refresh group window, in seconds. This is the value configured with the timers pacing lsa-group command. |
| **Opaque Capability** | Shows whether the router is capable of sending Opaque LSAs. This is a configured value. |
| **Autocost Ref BW** | Shows the value of auto-cost reference bandwidth configured on the router. |
| **Default Passive Setting** | Shows whether the interfaces are passive by default. |
| **Prefix Suppression** | Whether the prefix-suppression is enabled or disabled. |
| **Maximum Paths** | The maximum number of paths that OSPF can report for a given destination. |
| **Maximum Routes** | The number of maximum IPv4 routes in a VRF. |
| **Default Metric** | Default value for redistributed routes. |
| **Stub Router Configuration** | One of Always, Startup, or None. |
| **Stub Router Startup Time** | Configured value in seconds. This row is only listed if OSPF is configured to be a stub router at startup. |
| **Summary LSA Metric Override** | One of Enabled (met), Disabled, where met is the metric to be sent in summary LSAs when in stub router mode. |
| **BFD Enabled** | Displays the BFD status. |
| **Default Route Advertise** | Indicates whether the default routes received from other source protocols are advertised or not. |
| **Always** | Shows whether default routes are always advertised. |

| | |
|---|---|
| **Metric** | The metric of the routes being redistributed. If the metric is not configured, this field is blank. |
| **Metric Type** | Shows whether the routes are External Type 1 or External Type 2. |
| **Redistributing** | This field is a heading and appears only if you configure the system to take routes learned from a non-OSPF source and advertise them to its peers. |
| **Source** | Show source protocol/routes that are being redistributed. Possible values are static, connected, or BGP. |
| **Tag** | The decimal value attached to each external route. |
| **Subnets** | For redistributing routes into OSPF, the scope of redistribution for the specified protocol. |
| **Distribute-List** | The access list used to filter redistributed routes. |
| **Number of Active Areas** | The number of OSPF areas to which the router is attached on interfaces that are up. |
| **ABR Status** | Shows whether the router is an OSPF Area Border Router. |
| **ASBR Status** | Reflects whether the ASBR mode is enabled or disabled. Enable implies that the router is an autonomous system border router. The router automatically becomes an ASBR when it is configured to redistribute routes learnt from other protocols. The possible values for the ASBR status is enabled (if the router is configured to redistribute routes learned by other protocols) or disabled (if the router is not configured for the same). |
| **Stub Router Status** | When OSPF runs out of resources to store the entire link state database, or any other state information, OSPF goes into stub router mode. As a stub router, OSPF re-originates its own router LSAs, setting the cost of all non-stub interfaces to infinity. To restore OSPF to normal operation, disable and re-enable OSPF. One of Active, Inactive. |
| **Stub Router Reason** | One of Configured, Startup, or Resource Limitation. This row is only listed if stub router is active. |
| **Stub Router Startup Time Remaining** | The remaining time, in seconds, until OSPF exists stub router mode. This row is only listed if OSPF is in startup stub router mode. |
| **Stub Router Duration** | The time elapsed since the router last entered the stub router mode. The row is only listed if stub router is active and the router entered the stub mode because of a resource limitation. The duration is displayed in DD:HH:MM:SS format. |
| **External LSDB Overflow** | When the number of non-default external LSAs exceeds the configured limit, External LSDB Limit, OSPF goes into LSDB overflow state. In this state, OSPF withdraws all of its self-originated non-default external LSAs. After the Exit Overflow Interval, OSPF leaves the overflow state, if the number of external |

| | |
|---|---|
| | LSAs has been reduced. |
| **External LSA Count** | The number of external (LS type 5) link-state advertisements in the link-state database. |
| **External LSA Checksum** | The sum of the LS checksums of external link-state advertisements contained in the link-state database. |
| **AS_OPAQUE LSA Count** | Shows the number of AS Opaque LSAs in the link-state database. |
| **AS_OPAQUE LSA Checksum** | Shows the sum of the LS Checksums of AS Opaque LSAs contained in the link-state database. |
| **New LSAs Originated** | The number of new link-state advertisements that have been originated. |
| **LSAs Received** | The number of link-state advertisements received determined to be new instantiations. |
| **LSA Count** | The total number of link state advertisements currently in the link state database. |
| **Maximum Number of LSAs** | The maximum number of LSAs that OSPF can store. |
| **LSA High Water Mark** | The maximum size of the link state database since the system started. |
| **AS Scope LSA Flood List Length** | Length of global flood list for LSAs with AS scope. |
| **Retransmit List Entries** | The total number of LSAs waiting to be acknowledged by all neighbors. An LSA may be pending acknowledgment from more than one neighbor. |
| **Maximum Number of Retransmit Entries** | The maximum number of LSAs that can be waiting for acknowledgment at any given time. |
| **Retransmit Entries High Water Mark** | The highest number of LSAs that have been waiting for acknowledgment. |
| **NSF Helper Support** | Whether this router is configured to act as a graceful restart helpful neighbor. Possible values are: Helper Support Always, Disabled, or Planned. |
| **NSF Helper Strict LSA Checking** | As a graceful restart helpful neighbor, whether to terminate the helper relationship if a topology change occurs during a neighbor's graceful restart. |

### 6.3.1.2. *Show ip ospf abr*

This command displays the internal OSPF routing table entries to Area Border Routers (ABR). This command takes no options.

**Format** show ip ospf abr [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Type** | The type of the route to the destination. It can be either:<br>**intra** — Intra-area route<br>**inter** — Inter-area route |
| **Router ID** | Router ID of the destination. |
| **Cost** | Cost of using this route. |
| **Area ID** | The area ID of the area from which this route is learned. |
| **Next Hop** | Next hop toward the destination. |
| **Next Hop Intf** | The outgoing router interface to use when forwarding traffic to the next hop. |

### 6.3.1.3. *Show ip ospf area*

This command displays information about the area. The <areaid> identifies the OSPF area that is being displayed.

**Format** show ip ospf area <areaid> [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **AreaID** | The area id of the requested OSPF area. |
| **External Routing** | A number representing the external routing capabilities for this area. |
| **SPF Runs** | The number of times that the intra-area route table has been calculated using this area's link-state database. |
| **Area Border Router Count** | The total number of area border routers reachable within this area. |

| | |
|---|---|
| **Area LSA Count** | Total number of link-state advertisements in this area's link-state database, excluding AS External LSA's. |
| **Area LSA Checksum** | A number representing the Area LSA Checksum for the specified AreaID excluding the external (LS type 5) link-state advertisements. |
| **Flood List Length** | Length of the area's LSA flood list. |
| **Import Summary LSAs** | Shows whether to import summary LSAs. |

The following OSPF NSSA specific information displays only if the area is configured as an NSSA:

| Fields | Definition |
|---|---|
| **Import Summary LSAs** | Shows whether to import summary LSAs into the NSSA. |
| **Redistribute into NSSA** | Shows whether to redistribute information into the NSSA. |
| **Default Information Originate** | Shows whether to advertise a default route into the NSSA. |
| **Default Metric** | The metric value for the default route advertised into the NSSA. |
| **Default Metric Type** | The metric type for the default route advertised into the NSSA. |
| **Translator Role** | The NSSA translator role of the ABR, which is always or candidate. |
| **Translator Stability Interval** | The amount of time that an elected translator continues to perform its duties after it determines that its translator status has been deposed by another router. |
| **Translator State** | Shows whether the ABR translator state is disabled, always, or elected. |

### 6.3.1.4. *Show ip ospf asbr*

This command displays the internal OSPF routing table entries to Autonomous System Boundary Routers (ASBR). This command takes no options.

**Format** show ip ospf asbr [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Type** | The type of the route to the destination. It can be one of the following values:<br><br>**intra** — Intra-area route<br><br>**inter** — Inter-area route |
| **Router ID** | Router ID of the destination. |
| **Cost** | Cost of using this route. |
| **Area ID** | The area ID of the area from which this route is learned. |
| **Next Hop** | Next hop toward the destination. |
| **Next Hop Intf** | The outgoing router interface to use when forwarding traffic to the next hop. |

### 6.3.1.5. *Show ip ospf database*

This command displays information about the link state database when OSPF is enabled. If you do not enter any parameters the command displays the LSA headers for all areas. Use the optional <areaid> parameter to display database information about a specific area. Use the optional parameters to specify the type of link state advertisements to display.

**Format** show ip ospf [<areaid>] database [vrf <vrf-name>] [asbr-summary | external | network | nssa-external | opaque-area | opaque-as | opaque-link | router | self-originate | summary]] [<lsid>] [{adv-router [<ipaddr>] | self-originate}]

| Fields | Definition |
|---|---|
| **vrf-name** | Specify the virtual router for which to display information |
| **adv-router** | Display the LSAs that are restricted by the advertising router. To specify a router, enter the IP address of the router. |
| **asbr-summary** | Use asbr-summary to show the autonomous system boundary router (ASBR) summary LSAs. |
| **external** | Use external to display the external LSAs. |
| **network** | Use network to display the network LSAs. |
| **nssa-external** | Use nssa-external to display NSSA external LSAs. |
| **opaque-area** | Use opaque-area to display area opaque LSAs. |
| **opaque-as** | Use opaque-as to display AS opaque LSAs. |
| **opaque-link** | Use opaque-link to display link opaque LSAs. |

| | |
|---|---|
| **router** | Use router to display router LSAs. |
| **summary** | Use summary to show the LSA database summary information. |
| **lsid** | Use <lsid> to specify the link state ID (LSID). The value of <lsid> can be an IP address or an integer in the range of 0-4294967295. |
| **adv-router** | Use adv-router to show the LSAs that are restricted by the advertising router. |
| **self-originate** | Use self-originate to display the LSAs in that are self originated. |

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

The information below is only displayed if OSPF is enabled.

| Fields | Definition |
|---|---|
| **Link Id** | A number that uniquely identifies an LSA that a router originates from all other self originated LSAs of the same LS type. |
| **Adv Router** | The Advertising Router. Is a 32 bit dotted decimal number representing the LSDB interface. |
| **Age** | A number representing the age of the link state advertisement in seconds. |
| **Sequence** | A number that represents which LSA is more recent. |
| **Chksm** | The total number LSA checksum. |
| **Options** | This is an integer. It indicates that the LSA receives special handling during routing calculations. |
| **Rtr Opt** | Options are valid for router links only. |

### 6.3.1.6. *Show ip ospf database database-summary*

Use this command to display the number of each type of LSA in the database for each area and for the router. The command also displays the total number of LSAs in the database.

**Format** show ip ospf database database-summary

**Default** None

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Router** | Total number of router LSAs in the OSPF link state database. |
| **Network** | Total number of network LSAs in the OSPF link state database. |
| **Summary Net** | Total number of summary network LSAs in the database. |
| **Summary ASBR** | Number of summary ASBR LSAs in the database. |
| **Type-7 Ext** | Total number of Type-7 external LSAs in the database. |
| **Opaque Link** | Number of opaque link LSAs in the database. |
| **Opaque Area** | Number of opaque area LSAs in the database. |
| **Type-5 Ext** | Total number of Type-5 external LSAs in the database. |
| **Self-Originated Type-5 Ext** | Total number of self originated Type-5 external LSAs in the database. |
| **Subtotal** | Number of entries for the identified area. |
| **Opaque AS** | Number of opaque AS LSAs in the database. |
| **Total** | Number of entries for all areas. |

### 6.3.1.7. *Show ip ospf interface*

This command displays the OSPF information for the specific interface.

**Format** show ip ospf interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>}

**Default** None

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **IP Address** | The IP address for the specified interface. |
| **Subnet Mask** | A mask of the network and host portion of the IP address for the OSPF interface. |

| | |
|---|---|
| **Secondary IP Address(es)** | The secondary IP addresses if any are configured on the interface. |
| **OSPF Admin Mode** | States whether OSPF is enabled or disabled on a router interface. |
| **OSPF Area ID** | The OSPF Area ID for the specified interface. |
| **OSPF Network Type** | The type of network on this interface that the OSPF is running on. |
| **Router Priority** | A number representing the OSPF Priority for the specified interface. |
| **Retransmit Interval** | A number representing the OSPF Retransmit Interval for the specified interface. |
| **Hello Interval** | A number representing the OSPF Hello Interval for the specified interface. |
| **Dead Interval** | A number representing the OSPF Dead Interval for the specified interface. |
| **LSA Ack Interval** | A number representing the OSPF LSA Acknowledgment Interval for the specified interface. |
| **Transit Delay** | A number representing the OSPF Transit Delay for the specified interface. |
| **Authentication Type** | The OSPF Authentication Type for the specified interface are: none, simple, and encrypt. |
| **Metric Cost** | The cost of the OSPF interface. |
| **Passive Status** | Shows whether the interface is passive or not. |
| **OSPF MTU-ignore** | Indicates whether to ignore MTU mismatches in database descriptor packets sent from neighboring routers. |
| **Flood Blocking** | Indicates if flood blocking is enabled or disabled. |

The information below will only be displayed if OSPF is enabled.

| **Fields** | **Definition** |
|---|---|
| **State** | The OSPF Interface States are: down, loopback, waiting, point-to-point, designated router, and backup designated router. |
| **Designated Router** | The router ID representing the designated router. |
| **Backup Designated Router** | The router ID representing the backup designated router. |
| **Number of Link Events** | The number of link events. |
| **Local Link LSAs** | The number of Link Local Opaque LSAs in the link-state database. |
| **Local Link LSA Checksum** | The sum of LS Checksums of Link Local Opaque LSAs in the link-state database. |

| | |
|---|---|
| **Prefix Suppression** | Displays whether prefix-suppression is enabled, disabled, or unconfigured on the given interface. |

### 6.3.1.8. *Show ip ospf interface brief*

This command displays brief information for the IFO object or virtual interface tables.

**Format** show ip ospf interface brief [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Messages**

| Fields | Definition |
|---|---|
| **Interface** | Valid slot and port number separated by a forward slash. |
| **OSPF Admin Mode** | States whether OSPF is enabled or disabled on a router interface. |
| **OSPF Area ID** | The OSPF Area ID for the specified interface. |
| **Router Priority** | A number representing the OSPF Priority for the specified interface. |
| **Cost** | The metric cost of the OSPF interface. |
| **Hello Interval** | A number representing the OSPF Hello Interval for the specified interface. |
| **Dead Interval** | A number representing the OSPF Dead Interval for the specified interface. |
| **Retransmit Interval** | A number representing the OSPF Retransmit Interval for the specified interface. |
| **Retransmit Delay Interval** | A number representing the OSPF Transit Delay for the specified interface. |
| **LSA Ack Interval** | A number representing the OSPF LSA Acknowledgment Interval for the specified interface. |

### 6.3.1.9. *Show ip ospf interface stats*

This command displays the statistics for a specific interface. The information below will only be displayed if OSPF is enabled.

**Format** show ip ospf interface stats {<slot/port> | loopback <loopback-id> | vlan <vlan-id>}

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Messages**

| Fields | Definition |
|---|---|
| **OSPF Area ID** | The area id of this OSPF interface. |
| **Area Border Router Count** | The total number of area border routers reachable within this area. This is initially zero, and is calculated in each SPF pass. |
| **AS Border Router Count** | The total number of Autonomous System border routers reachable within this area. |
| **Area LSA Count** | The total number of link-state advertisements in this area's link-state database, excluding AS External LSAs. |
| **IP Address** | The IP address associated with this OSPF interface. |
| **OSPF Interface Events** | The number of times the specified OSPF interface has changed its state, or an error has occurred. |
| **Virtual Events** | The number of state changes or errors that occurred on this virtual link. |
| **Neighbor Events** | The number of times this neighbor relationship has changed state, or an error has occurred. |
| **Sent Packets** | The number of OSPF packets transmitted on the interface. |
| **Received Packets** | The number of valid OSPF packets received on the interface. |
| **Discards** | The number of received OSPF packets discarded because of an error in the packet or an error in processing the packet. |
| **Bad Version** | The number of received OSPF packets whose version field in the OSPF header does not match the version of the OSPF process handling the packet. |
| **Source Not On Local Subnet** | The number of received packets discarded because the source IP address is not within a subnet configured on a local interface. |
| **Virtual Link Not Found** | The number of received OSPF packets discarded where the ingress interface is in a non-backbone area and the OSPF header identifies the packet as belonging to the backbone, but OSPF does not have a virtual link to the packet's sender. |
| **Area Mismatch** | The number of OSPF packets discarded because the area ID in the OSPF header is not the area ID configured on the ingress interface. |
| **Invalid Destination Address** | The number of OSPF packets discarded because the packet's destination IP address is not the address of the ingress interface and is not the AllDrRouters |

| | |
|---|---|
| | or AllSpfRouters multicast addresses. |
| **Wrong Authentication Type** | The number of packets discarded because the authentication type specified in the OSPF header does not match the authentication type configured on the ingress interface. |
| **Authentication Failure** | The number of OSPF packets dropped because the sender is not an existing neighbor or the sender's IP address does not match the previously recorded IP address for that neighbor. |
| **No Neighbor at Source Address** | The number of OSPF packets dropped because the sender is not an existing neighbor or the sender's address does not match the previously recorded IP address for that neighbor. |
| **Invalid OSPF Packet Type** | The number of OSPF packets discarded because the packet type field in the OSPF header is not a known type. |
| **Hellos Ignored** | The number of received Hello packets that were ignored by this router from the new neighbors after the limit has been reached for the number of neighbors on an interface or on the system as a whole. |

### 6.3.1.10. *Show ip ospf neighbor*

This command displays information about OSPF neighbors. If you do not specify a neighbor IP address, the output displays summary information in a table. If you specify an interface or tunnel, only the information for that interface or tunnel displays.The <ip-address> is the IP address of the neighbor, and when you specify this, detailed information about the neighbor displays. The information below only displays if OSPF is enabled and the interface has a neighbor.

**Format** show ip ospf neighbor [vrf <vrf-name>] [interface {<slot/port> | vlan <vlan-id>}] [<ip-address>]

**Default** None

**Mode** Privileged EXEC

User EXEC

**Display Message**

If you do not specify an IP address, a table with the following columns displays for all neighbors. If you specify a interface, only the information for that interface displays:

| Fields | Definition |
|---|---|
| **Router ID** | The 4-digit dotted-decimal number of the neighbor router. |
| **Priority** | The OSPF priority for the specified interface. The priority of an interface is a priority integer from 0 to 255. A value of '0' indicates that the router is not eligible to become the designated router on this network. |

| | |
|---|---|
| **IP Address** | The IP address of the neighbor. |
| **Interface** | The interface of the local router in slot/port format. |
| **State** | The state of the neighboring routers. Possible values are:<br>• Down - initial state of the neighbor conversation - no recent information has been received from the neighbor.<br>• Attempt - no recent information has been received from the neighbor but a more concerted effort should be made to contact the neighbor.<br>• Init - an Hello packet has recently been seen from the neighbor, but bidirectional communication has not yet been established.<br>• 2 way - communication between the two routers is bidirectional.<br>• Exchange start - the first step in creating an adjacency between the two neighboring routers, the goal is to decide which router is the master and to decide upon the initial DD sequence number.<br>• Exchange - the router is describing its entire link state database by sending Database Description packets to the neighbor.<br>• Loading - Link State Request packets are sent to the neighbor asking for the more recent LSAs that have been discovered (but not yet received) in the Exchange state.<br>• Full - the neighboring routers are fully adjacent and they will now appear in router-LSAs and network-LSAs. |
| **Dead Time** | The amount of time, in seconds, to wait before the router assumes the neighbor is unreachable. |

If you specify an IP address for the neighbor router, the following fields display:

| Fields | Definition |
|---|---|
| **Interface** | Valid slot and port number separated by a forward slash. |
| **Neighbor IP Address** | The IP address of the neighbor router. |
| **Interface Index** | The interface ID of the neighbor router. |
| **Area ID** | The area ID of the OSPF area associated with the interface. |
| **Options** | An integer value that indicates the optional OSPF capabilities supported by the neighbor. The neighbor's optional OSPF capabilities are also listed in its Hello packets. This enables received Hello Packets to be rejected (i.e., neighbor relationships will not even start to form) if there is a mismatch in |

| | |
|---|---|
| | certain crucial OSPF capabilities. |
| **Router Priority** | The OSPF priority for the specified interface. The priority of an interface is a priority integer from 0 to 255. A value of '0' indicates that the router is not eligible to become the designated router on this network. |
| **Dead Timer Due** | The amount of time, in seconds, to wait before the router assumes the neighbor is unreachable. |
| **Up Time** | Neighbor uptime; how long since the adjacency last reached the Full state. |
| **State** | The state of the neighboring routers. |
| **Events** | The number of times this neighbor relationship has changed state, or an error has occurred. |
| **Retransmitted LSAs** | The number of LSAs retransmitted to this neighbor. |
| **Retransmission Queue Length** | An integer representing the current length of the retransmission queue of the specified neighbor router IDf the specified interface. |

### 6.3.1.11. *Show ip ospf range*

This command displays information about the area ranges for the specified <areaid>. The <areaid> identifies the OSPF area whose ranges are being displayed.

**Format** show ip ospf range <areaid> [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Prefix** | The summary prefix. |
| **Subnet Mask** | The subnetwork mask of the summary prefix. |
| **Type** | **S** (Summary Link) or **E** (External Link) |
| **Action** | **Advertise** or **Suppress** |
| **Cost** | Metric to be advertised when the range is active. If a static cost is not configured, the field displays **Auto**. If the action is **Suppress**, the field displays **N/A**. |

| | |
|---|---|
| **Active** | Whether the range is currently active (**Y** or **N**). |

### 6.3.1.12. *Show ip ospf statistics*

This command displays information about recent Shortest Path First (SPF) calculations. The SPF is the OSPF routing table calculation. The output lists the number of times the SPF has run for each OSPF area. A table follows this information. For each of the 15 most recent SPF runs, the table lists how long ago the SPF ran, how long the SPF took, and the reasons why the SPF was scheduled.

**Format** show ip ospf statistics [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Delta T** | The time since the SPF ran last time. The time is in the format hh:mm:ss, giving the hours, minutes, and seconds. |
| **Intra** | The time taken to compute the intra-area routes, in milliseconds. |
| **Summ** | The time taken to compute the inter-area routes, in milliseconds. |
| **Ext** | The time taken to compute the external routes, in milliseconds. |
| **SPF Total** | The totat time to compute the routes, in milliseconds. The total may exceed the sume of the Intra, Summ, and Ext times. |
| **RIB Update** | The time from the completion of the routing table calculation until all changes have been made in the routing table, named Routing Information Based (RIB). The time is in milliseconds. |
| **Reason** | The reason the SPF was scheduled. Reason codes are as follows:<br>• R - a router LSA has changed<br>• N - a network LSA has changed<br>• SN - a type 3 network summary LSA has changed<br>• SA - a type 4 ASBR summary LSA has changed<br>• X - a type 5 or type 7 external LSA has changed |

### 6.3.1.13. *Show ip ospf stub table*

This command displays the OSPF stub table. The information below will only be displayed if OSPF is initialized on the switch.

**Format** show ip ospf stub table [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Area ID** | A 32-bit identifier for the created stub area. |
| **Type of Service** | The type of service associated with the stub metric. only supports Normal TOS. |
| **Metric Val** | The metric value is applied based on the TOS. It defaults to the least metric of the type of service among the interfaces to other areas. The OSPF cost for a route is a function of the metric value. |
| **Import Summary LSA** | Controls the import of summary LSAs into stub areas. |

### 6.3.1.14. *Show ip ospf traffic*

This command displays the OSPFv2 packets, the LSA statistics, and the OSPFv2 message queue statistics. Packet statistics count packets and LSAs since OSPFv2 counters were cleared last time (using the command **clear ip ospf counters**).

**Format** show ip ospf traffic [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **OSPFv2 Packet Statistics** | The number of packets of each type sent and received since OSPF counters were last cleared. |
| **LSAs Retransmitted** | The number of LSAs retransmitted by this router since OSPF counters were last cleared. |

| | |
|---|---|
| **LS Update Max Recieve Rate** | The maximum rate of LS Update packets received during any 5-second interval since OSPF counters were last cleared. The rate is in packets per second. |
| **LS Update Max Send Rate** | The maximum rate of LS Update packets transmitted during any 5-second interval since OSPF counters were last cleared. The rate is in packets per second. |
| **Number of LSAs Received** | The number of LSAs of each type received since OSPF counters were last cleared. |
| **OSPFv2 Queue Statistics** | For each OSPFv2 message queue, the current count, the high water mark, the number of packets that failed to be enqueued, and the queue limit. The high water marks are not cleared when OSPF counters are cleared. |

### 6.3.1.15. *Show ip ospf virtual-link*

This command displays the OSPF Virtual Interface information for a specific area and neighbor. The <areaid> parameter identifies the area and the <neighbor> parameter identifies the neighbor's Router ID.

**Format** show ip ospf virtual-link [vrf <vrf-name>] <areaid> <neighbor>

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Area ID** | The area ID of the requested OSPF area. |
| **Neighbor Router ID** | The input neighbor Router ID . |
| **Hello Interval** | The configured hello interval for the OSPF virtual interface. |
| **Dead Interval** | The configured dead interval for the OSPF virtual interface. |
| **Transmit Delay** | The configured transit delay for the OSPF virtual interface. |
| **Retransmit Interval** | The configured retransmit interval for the OSPF virtual interface. |
| **Authentication Type** | The configured authentication type of the OSPF virtual interface. |
| **State** | The OSPF Interface States are: down, loopback, waiting, point-to-point, designated router, and backup designated router. This is the state of the OSPF interface. |

| | |
|---|---|
| **Metric** | The OSPF virtual interface metric. |
| **Neighbor State** | The neighbor state. |

### 6.3.1.16. *Show ip ospf virtual-link brief*

This command displays the OSPF Virtual Interface information for all areas in the system.

**Format** show ip ospf virtual-link brief

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Area ID** | The area ID of the requested OSPF area. |
| **Neighbor** | The neighbor interface of the OSPF virtual interface. |
| **Hello Interval** | The configured hello interval for the OSPF virtual interface. |
| **Dead Interval** | The configured dead interval for the OSPF virtual interface. |
| **Retransmit Interval** | The configured retransmit interval for the OSPF virtual interface. |
| **Transit Delay** | The configured transit delay for the OSPF virtual interface. |

### 6.3.1.17. *Show ip ospf lsa-group*

This command displays the number of self-originated LSAs within each LSA group.

**Format** show ip ospf lsa-group [vrf vrf-name]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Total self-originated LSAs** | The number of LSAs originated from self. |

| | |
|---|---|
| **Average LSAs per group** | The average number of self-originated LSAs per group. |
| **Pacing group limit** | The maximum number of self-originated LSAs in one LSA group. If the number of LSAs in a group exceeds this limit, OSPF redistributes LSAs throughout the refresh interval to achieve better balance. |
| **Number of self-originated LSAs within each LSA group** | The detail number of self-originated LSAs. |
| **Group Start Age** | The start time of LSA Group aged. |
| **Group End Age** | The end time of LSA Group aged. |
| **Count** | The number of LSA Group aged. |

## 6.3.2. Configuration commands

### 6.3.2.1. *Router ospf*

Use this command to enter Router OSPF mode.

**Format** router ospf [vrf]

| Fields | Definition |
|---|---|
| **<vrf-name>** | The virtual router on which to enable OSPF routing |

**Default** None

**Mode** Global Config

### 6.3.2.2. *Enable*

Use **enable** command resets the default administrative mode of OSPF in the router (active). **no enable** command sets the administrative mode of OSPF in the router to inactive.

**Format** enable

no enable

**Default** Enabled

**Mode** Router OSPF Config

### 6.3.2.3. *Network area*

Use **network area** command to enable OSPFv2 on an interface and set its area ID if the IP address of an interface is covered by this network command. Use **no network area** command to disable the OSPFv2 on a interface if the IP address of an interface was earlier covered by this network command.

**Format** network <ip-address> <wildcard-mask> area <area-id>

no network <ip-address> <wildcard-mask> area <area-id>

**Default** Disabled

**Mode** Router OSPF Config

### 6.3.2.4. *Ip ospf area*

Use **ip ospf area** command to enable OSPFv2 and set the area ID of an interface. The <*area-id*> is an IP address formatted as a 4-digit dotted-decimal number or a decimal value in the range of <0-4294967295>. This command supersedes the effects of the **network area** command. It can also be used to configure the advertiseability of the secondary addresses on this interface into the OSPFv2 domain. Use **no ip ospf area** command to disable OSPF on an interface.

**Format** ip ospf area <area-id> [secondaries none]

no ip ospf area [secondaries none]

**Default** Disable

**Mode** Interface Config

### 6.3.2.5. *1583 compatibility*

1583 compatibility mode is enabled by default. If all OSPF routers in the routing domain are capable of operating according to RFC 2328, OSPF 1583 compatibility mode should be disabled. **1583compatibility** command enables OSPF 1583 compatibility. **no 1583compatibility** command disables OSPF 1583 compatibility.

**Format** 1583compatibility

no 1583compatibility

**Default** Enable

**Mode** Router OSPF Config

### 6.3.2.6. *Area default-cost*

This command configures the default cost for the stub area. You must specify the area ID and an integer value between 1-16777214.

**Format** area <areaid> default-cost <1-16777214>

**Default** None

**Mode** Router OSPF Config

### 6.3.2.7. *Area nssa*

**area nssa** command configures the specified areaid to function as an NSSA. **no area nssa** command disables nssa from the specified area id.

**Format** area <areaid> nssa

no area <areaid> nssa

**Default** None

**Mode** Router OSPF Config

### 6.3.2.8. *Area nssa default-into-originate*

**area nssa default-info-originate** command configures the metric value and type for the default route advertised into the NSSA. The optional metric parameter specifies the metric of the default route and is to be in a range of 1-16777214. If no metric is specified, the default value is ****. The metric type can be comparable (nssa-external 1) or non-comparable (nssa-external 2). This command disables the default route advertised into the NSSA . **no area nssa default-info-originate** command disables the default route advertised into the NSSA.

**Format** area <areaid> nssa default-info-originate [<metric>] [{comparable | noncomparable}]

no area <areaid> nssa default-info-originate [<metric>] [{comparable | noncomparable}]

**Default** None

**Mode** Router OSPF Config

### 6.3.2.9. *Area nssa no-redistribute*

**area nssa no-redistribute** command configures the NSSA Area Border router (ABR) so that learned external routes will not be redistributed to the NSSA. **no area nssa no-redistribute** command disables the NSSA ABR so that learned external routes are redistributed to the NSSA.

**Format** area <areaid> nssa no-redistribute

no area <areaid> nssa no-redistribute

**Default** None

**Mode** Router OSPF Config

### 6.3.2.10. *Area nssa no-summary*

**area nssa no-summary** command configures the NSSA so that summary LSAs are not advertised into the NSSA. **no area nssa no-summary** command disables nssa from the summary LSAs.

**Format** area <areaid> nssa no-summary

no area <areaid> nssa no-summary

**Default** None

**Mode** Router OSPF Config

### 6.3.2.11. *Area nssa translator-role*

**area nssa translator-role** command configures the translator role of the NSSA. A value of *always* causes the router to assume the role of the translator the instant it becomes a border router and a value of *candidate* causes the router to participate in the translator election process when it attains border router status. **no area nssa translator-role** command disables the nssa translator role from the specified area id.

**Format** area <areaid> nssa translator-role {always | candidate}

no area <areaid> nssa translator-role {always | candidate}

**Default** None

**Mode** Router OSPF Config

### 6.3.2.12. *Area nssa translator-stab-intv*

**area nssa translator-stab-intv** command configures the translator <*stabilityinterval*> of the NSSA. The <*stabilityinterval*> is the period of time that an elected translator continues to perform its duties after it determines that its translator status has been deposed by another router. **no area nssa translator-stab-intv** command disables the nssa translator's <*stabilityinterval*> from the specified area id.

**Format** area <areaid> nssa translator-stab-intv <stabilityinterval>

no area <areaid> nssa translator-stab-intv <stabilityinterval>

**Default** None

**Mode** Router OSPF Config

### 6.3.2.13. *Area range*

**area range** command configures a summary prefix that an area border router (ABR) advertises for a specified area.

**Format** area <areaid> range <ipaddr> <subnetmask> {summarylink | nssaexternallink} [advertise [cost <0-16777215>] | not-advertise | [cost <0-16777215>]]

no area <areaid> range <ipaddr> <subnetmask> {summarylink | nssaexternallink} [advertise | not-advertise | cost]

| Fields | Definition |
|---|---|
| **areaid** | The aread identifier for the area whose networks are to be summarized. |
| **ipaddr subnetmas** | The summary prefix to be advised when the ABR computes a route to one or more networks within this prefixe in this area. |
| **summarylink** | When this keyword is configured, the area range is used when summarizing prefixes advertised in type 3 summary LSAs. |
| **nssaexternallink** | When this keyword is configured, the area range is used when translating type 7 LSAs to type 5 LSAs. |
| **advertise** | When this keyword is configured, the summary prefix is advertised when the area range is active. This is the default action. |
| **not-advertise** | When this keyword is configured, neither the summary prefix nor the contained prefixes are advertised when the are range is active. When this not-advertise option is given, any static cost previously configured is removed from the system configuration. |
| **cost** | When this cost is configured, OSPF sets the metric field in the summary LSA to the configured value rather than setting the metric to the largest cost among the networks covered by the area range. If the cost is set to 16777215 for type 3 summarization, a type 3 summary LSA is not advertised but contained network are suppressed. This behavior is equivalent to specifying the **not-advertise** option. If the range is configured for type 7 to type 5 translation, a type 5 LSA is sent if the metric is set to 16777215; however, other routers will not compute a route from a type 5 LSA with this metric. |

**Default** None

**Mode** Router OSPF Config

### 6.3.2.14. *Area stub*

**area stub** command creates a stub area for the specified area ID. A stub area is characterized by the fact that AS External LSAs are not propagated into the area. Removing AS External LSAs and Summary LSAs can significantly reduce the link state database of routers within the stub area. **no area stub** command deletes a stub area for the specified area ID.

**Format** area <areaid> stub

no area <areaid> stub

**Default** None

**Mode** Router OSPF Config

### 6.3.2.15. *Area stub no-summary*

**area stub no-summary** command configures the Summary LSA mode for the stub area identified by *<areaid>*. Use this command to prevent LSA Summaries from being sent. **no area stub no-summary** command configures the default Summary LSA mode for the stub area identified by *<areaid>*.

**Format** area <areaid> stub no-summary

no area <areaid> stub no-summary

**Default** Disable

**Mode** Router OSPF Config

### 6.3.2.16. *Area virtual-link*

**area virtual-link** command creates the OSPF virtual interface for the specified *<areaid>* and *<neighbor>*. The *<neighbor>* parameter is the Router ID of the neighbor. **no area virtual-link** command deletes the OSPF virtual interface from the given interface, identified by *<areaid>* and *<neighbor>*. The *<neighbor>* parameter is the Router ID of the neighbor.

**Format** area <areaid> virtual-link <neighbor>

no area <areaid> virtual-link <neighbor>

**Default** None

**Mode** Router OSPF Config

### 6.3.2.17. *Area virtual-link authentication*

**area virtual-link authentication** command configures the authentication type and key for the OSPF virtual interface identified by *<areaid>* and *<neighbor>*. The *<neighbor>* parameter is the Router ID of the neighbor. The value for *<type>* is either none, simple, or encrypt. The *[key]* is composed of standard displayable, non-control keystrokes from a Standard 101/102-key keyboard. The authentication key must be 8 bytes or less if the authentication type is simple. If the type is encrypt, the key may be up to 16 bytes. Unauthenticated interfaces do not need an authentication key. If the type is encrypt, a key id in the range of 0 and 255 must be specified.The default value for authentication type is none. Neither the default password key nor the default key id are configured.

**no area virtual-link authentication** command configures the default authentication type for the OSPF virtual interface identified by *<areaid>* and *<neighbor>*. The *<neighbor>* parameter is the Router ID of the neighbor.

**Format** area <areaid> virtual-link <neighbor> authentication {none | {simple <key>} | {encrypt {0 | 7} <key> <keyid>}}

no area <areaid> virtual-link <neighbor> authentication

| Fields | Definition |
|---|---|
| **Entrypt** | 0: Specify key in plain text<br>7: Specify key in encrypted form |

**Default** None

**Mode** Router OSPF Config

### 6.3.2.18. *Area virtual-link dead-interval*

**area virtual-link dead-interval** command configures the dead interval for the OSPF virtual interface on the virtual interface identified by *<areaid>* and *<neighbor>.* The *<neighbor>* parameter is the Router ID of the neighbor. The range for seconds is 1 to 65535. **no area virtual-link dead-interval** command configures the default dead interval for the OSPF virtual interface on the virtual interface identified by *<areaid>* and *<neighbor>*. The *<neighbor>* parameter is the Router ID of the neighbor

**Format** area <areaid> virtual-link <neighbor> dead-interval <seconds>

no area <areaid> virtual-link <neighbor> dead-interval

**Default** 40

**Mode** Router OSPF Config

### 6.3.2.19. *Area virtual-link hello-interval*

**area virtual-link hello-interval** command configures the hello interval for the OSPF virtual interface on the virtual interface identified by *<areaid>* and *<neighbor>*. The *<neighbor>* parameter is the Router ID of the neighbor. The range for seconds is 1 to 65535. **no area virtual-link hello-interval** command configures the

default hello interval for the OSPF virtual interface on the virtual interface identified by **<***areaid***>** and **<***neighbor***>**. The **<***neighbor***>** parameter is the Router ID of the neighbor.

**Format** area <areaid> virtual-link <neighbor> hello-interval <seconds>

no area <areaid> virtual-link <neighbor> hello-interval

**Default** 10

**Mode** Router OSPF Config

### 6.3.2.20. *Area virtual-link retransmit-interval*

**area virtual-link retransmit-interval** command configures the retransmit interval for the OSPF virtual interface on the virtual interface identified by *<areaid>* and *<neighbor>*. The *<neighbor>* parameter is the Router ID of the neighbor. The range for seconds is 0 to 3600. **no area virtual-link retransmit -interval** command configures the default retransmit interval for the OSPF virtual interface on the virtual interface identified by **<***areaid***>** and **<***neighbor***>**. The **<***neighbor***>** parameter is the Router ID of the neighbor.

**Format** area <areaid> virtual-link <neighbor> retransmit-interval <seconds>

no area <areaid> virtual-link <neighbor> retransmit-interval

**Default** 5

**Mode** Router OSPF Config

### 6.3.2.21. *Area virtual-link transmit-delay*

**area virtual-link transmit-delay** command configures the transmit delay for the OSPF virtual interface on the virtual interface identified by **<***areaid***>** and **<***neighbor***>**. The **<***neighbor***>** parameter is the Router ID of the neighbor. The range for seconds is 0 to 3600 (1 hour). **no area virtual-link transmit-delay** command resets the default transmit delay for the OSPF virtual interface to the default value.

**Format** area <areaid> virtual-link <neighbor> transmit-delay <seconds>

no area <areaid> virtual-link <neighbor> transmit-delay

**Default** 1

**Mode** Router OSPF Config

### 6.3.2.22. *Auto-cost*

By default, OSPF computes the link cost of each interface from the interface bandwidth. Faster links have lower metrics,making them more attractive in route selection. The configuration parameters in the **auto-cost reference bandwidth** and **bandwidth** commands give you control over the default link cost. You can

configure for OSPF an interface bandwidth that is independent of the actual link speed. A second configuration parameter allows you to control the ratio of interface bandwidth to link cost. The link cost is computed as the ratio of a reference bandwidth to the interface bandwidth (ref_bw /interface bandwidth), where interface bandwidth is defined by the **bandwidth** command. Because the default reference bandwidth is 100 Mbps, OSPF uses the same default link cost for all interfaces whose bandwidth is 100 Mbps or greater. Use the **auto-cost** command to change the reference bandwidth, specifying the reference bandwidth in megabits per second (Mbps). The reference bandwidth range is 1-4294967 Mbps. The different reference bandwidth can be independently configured for OSPFv2 and OSPFv3.

Use **no auto-cost** command to set the reference bandwidth to the default value.

**Format** auto-cost reference-bandwidth <1 to 4294967>

no auto-cost reference-bandwidth

**Default** 100Mbps

**Mode** Router OSPF Config

### 6.3.2.23. *Bfd*

This command configures BFD for all interfaces.

To reset BFD for interfaces to default, use the no form of this command.

**Format** bfd

no bfd

**Default** Disable

**Mode** Router OSPFv2 Config

### 6.3.2.24. *Capability opaque*

Use **capability opaque** command to enable Opaque Capability on the Router. The information contained in Opaque LSAs may be used directly by OSPF or indirectly by an application wishing to distribute information throughout the OSPF domain. Supports the storing and flooding of Opaque LSAs of different scopes. Use **no capability opaque** command to disable opaque capability on the router.

**Format** capability opaque

no capability opaque

**Default** Disable

**Mode** Router OSPF Config

### 6.3.2.25. *Clear ip ospf*

Use this command to disable and re-enable OSPF.

**Format** clear ip ospf [vrf]

| Fields | Definition |
|---|---|
| **<vrf-name>** | The virtual rotuer on which the OSPF is disabled and re-enabled. |

**Default** None

**Mode** Privileged Exec

### 6.3.2.26. *Clear ip ospf configuration*

Use this command to reset the OSPF configuration to factory defaults.

**Format** clear ip ospf configuration [vrf]

| Fields | Definition |
|---|---|
| **<vrf-name>** | The virtual rotuer on which the OSPF is reset. |

**Default** None

**Mode** Privileged Exec

### 6.3.2.27. *Clear ip ospf counters*

Use this command to reset global and interface statistics.

**Format** clear ip ospf counters [vrf]

| Fields | Definition |
|---|---|
| **<vrf-name>** | The virtual rotuer on which the statistics of OSPF is reset |

**Default** None

**Mode** Privileged Exec

### 6.3.2.28. *Clear ip ospf neighbor*

Use this command to drop the adjacency with all OSPF neighbors. On each neighbor's interface, send a one-way hello.Adjacencies may then be re-established. To drop all adjacencies with a specific router ID, specify the neighbor's Router ID using the optional parameter [neighbor-id].

**Format** clear ip ospf neighbor [neighbor-id] [vrf]

| Fields | Definition |
|---|---|
| **<neighbor-id>** | The neighbor's Router ID |
| **<vrf-name>** | The virtual rotuer on which the adjacency with OSPF neighbors are dropped. |

**Default** None

**Mode** Privileged Exec

### 6.3.2.29. *Clear ip ospf neighbor interface*

To drop adjacency with all neighbors on a specific interface, use the optional parameter [slot/port]. To drop adjacency with a specific router ID on a specific interface, use the optional parameter [ipaddr].

**Format** clear ip ospf neighbor [vrf <vrf-name>] [interface {<slot/port> | vlan <vlan-id>}] [<ipaddr>]

| Fields | Definition |
|---|---|
| **<vrf-name>** | The virtual rotuer on which the adjacency with OSPF neighbors are dropped. |

**Default** None

**Mode** Privileged Exec

### 6.3.2.30. *Clear ip ospf redistribution*

Use this command to flush all self-originated external LSAs. Reapply the redistribution configuration and re-originate prefixes as necessary.

**Format** clear ip ospf redistribution [vrf]

| Fields | Definition |
|---|---|
| **<vrf-name>** | The virtual rotuer on which the adjacency with OSPF neighbors are dropped. |

**Default** None

**Mode** Privileged Exec

### 6.3.2.31. *Clear ip ospf stub-router*

Use this command to exit the stub router mode.

**Format** clear ip ospf stub-router [vrf]

| Fields | Definition |
|---|---|
| **<vrf-name>** | The virtual rotuer on which the OSPF exits stub router mode. |

**Default** None

**Mode** Privileged Exec

### 6.3.2.32. *Default-information originate*

**default-information originate** command is used to control the advertisement of default routes.

**no default-information originate** command is used to control the advertisement of default routes.

**Format** default-information originate [always] [metric <1-16777214>] [metric-type {1 | 2}]
no default-information originate [metric] [metric-type]

**Default** metric—unspecified
type—2

**Mode** Router OSPF Config

### 6.3.2.33. *Default-metric*

**default-metric** command is used to set a default for the metric of distributed routes.

**no default-metric** command is used to set a default for the metric of distributed routes.

**Format** default-metric <1-16777214>
no default-metric

**Default** None

**Mode** Router OSPF Config

### 6.3.2.34. *Distance ospf*

**distance ospf** command sets the route preference value of OSPF in the router. Lower route preference values are preferred when determining the best route. The type of OSPF route can be intra, inter, or external. All the external type routes are given the same preference value. The range of <preference> value is 1 to 255. **no distance ospf** command sets the default route preference value of OSPF routes in the router. The type of OSPF can be intra, inter, or external. All the external type routes are given the same preference value.

**Format** distance ospf {intra-area <1-255> | inter-area <1-255> | external <1-255>}

no distance ospf {intra-area | inter-area | external}

**Default** 110

**Mode** Router OSPF Config

### 6.3.2.35. *Distribute-list out*

Use **distribute-list out** command to specify the access list to filter routes received from the source protocol.

**no distribute-list out** command to specify the access list to filter routes received from the source protocol.

**Format** distribute-list <1-199> out {bgp | static | connected}

no distribute-list <1-199> out {bgp | static | connected}

**Default** None

**Mode** Router OSPF Config

### 6.3.2.36. *Exit-overflow-interval*

**exit-overflow-interval** command configures the exit overflow interval for OSPF. It describes the number of seconds after entering overflow state that a router will wait before attempting to leave the overflow state. This allows the router to again originate non-default AS-external-LSAs. When set to 0, the router will not leave overflow state until restarted. The range for seconds is 0 to 2147483647 seconds. **no exit-overflow-interval** command configures the default exit overflow interval for OSPF.

**Format** exit-overflow-interval <seconds>

no exit-overflow-interval

**Default** 0

**Mode** Router OSPF Config

### 6.3.2.37. *External-lsdb-limit*

**external-lsdb-limit** command configures the external LSDB limit for OSPF. If the value is -1, then there is no limit. When the number of non-default AS-external-LSAs in a router's link-state database reaches the external LSDB limit, the router enters overflow state. The router never holds more than the external LSDB limit non-default AS-external-LSAs in it database. The external LSDB limit MUST be set identically in all routers attached to the OSPF backbone and/or any regular OSPF area. The range for limit is -1 to 2147483647. **no external-lsdb-limit** command configures the default external LSDB limit for OSPF.

**Format** external-lsdb-limit <limit>

no external-lsdb-limit

| Fields | Definition |
|---|---|
| **<limit>** | The range for limit is -1 to 2147483647. If the value is -1, then there is no limitation. |

**Default** -1

**Mode** Router OSPF Config

### 6.3.2.38. *Ip ospf authentication*

**ip ospf authentication** command sets the OSPF Authentication Type and Key for the specified interface. The value of <type> is either none, simple or encrypt. The <key> is composed of standard displayable, non-control keystrokes from a Standard 101/102-key keyboard. The authentication key must be 8 bytes or less if the authentication type is simple. If the type is encrypt, the key may be up to 16 bytes. If the type is encrypt a <keyid> in the range of 0 and 255 must be specified. Unauthenticated interfaces do not need an authentication key or authentication key ID. There is no default value for this command.

**no ip ospf authentication** command sets the default OSPF Authentication Type for the specified interface.

**Format** ip ospf authentication {none | {simple <key>} | {encrypt {0|7} <key> <keyid>}}

no ip ospf authentication

| Fields | Definition |
|---|---|
| Entrypt | 0: Specify key in plain text<br>7: Specify key in encrypted form |

**Default** None

**Mode** Interface Config

### 6.3.2.39. *Ip ospf cost*

**ip ospf cost** command configures the cost on an OSPF interface. The <cost> parameter has a range of 1 to 65535. **no ip ospf cost** command configures the default cost on an OSPF interface.

**Format** ip ospf cost <1–65535>

no ip ospf cost

**Default** 10

**Mode** Interface Config

### 6.3.2.40. *Ip ospf dead-interval*

**ip ospf dead-interval** command sets the OSPF dead interval for the specified interface. The value for <seconds> is a valid positive integer, which represents the length of time in seconds that a router's Hello packets have not been seen before its neighbor routers declare that the router is down. The value for the length of time must be the same for all routers attached to a common network. This value should be some multiple of the Hello Interval (i.e. 4). Valid values range in seconds from 1 to 65535. **no ip ospf dead-interval** command sets the default OSPF dead interval for the specified interface.

**Format** ip ospf dead-interval <seconds>

no ip ospf dead-interval

**Default** 40

**Mode** Interface Config

### 6.3.2.41. *Ip ospf hello-interval*

**ip ospf hello-interval** command sets the OSPF hello interval for the specified interface. The value for seconds is a valid positive integer, which represents the length of time in seconds. The value for the length of time must be the same for all routers attached to a network. Valid values range from 1 to 65535. **no ip ospf hello-interval** command sets the default OSPF hello interval for the specified interface.

**Format** ip ospf hello-interval <seconds>

no ip ospf hello-interval

**Default** 10

**Mode** Interface Config

### 6.3.2.42. *Ip ospf network*

**ip ospf network** command to configure OSPF to treat an interface as a point-to-point rather than broadcast interface. The broadcast option sets the OSPF network type to broadcast. The point-to-point option sets the OSPF network type to point-to-point. OSPF treats interfaces as broadcast interfaces by default. (Loopback interfaces have a special loopback network type, which cannot be changed.) When there are only two routers on the network, OSPF can operate more efficiently by treating the network as a point-to-point network. For point-to-point networks, OSPF does not elect a designated router or generate a network link state advertisement (LSA). Both endpoints of the link must be configured to operate in point-to-point mode..

**no ip ospf network** command to return the OSPF network type to the default.

**Format** ip ospf network {broadcast|point-to-point}

no ip ospf network

**Default** Broadcast

**Mode** Interface Config

### 6.3.2.43. *Ip ospf prefix-suppression*

**ip ospf prefix-suppression** command suppresses the advertisement of the IPv4 prefixes that are associated with an interface, except for those associated with secondary IPv4 addresses. This command takes precedence over the global configuration. If this configuration is not specified, the global prefix-suppression configuration applies.

Prefix-suppression can be disabled at the interface level by using the disable option. The disable option is useful to exclude specific interfaces from performing prefix-suppression when the featue is enabled globally.

**no ip ospf prefix-suppression** command removes prefix-suppression configurations at the interface level. When **no ip ospf prefix-suppression** is issued, global prefix-suppression configuration applies to the interface.

**Format** ip ospf prefix-suppression [disable]

no ip ospf prefix-suppression

**Default** Prefix-suppression is not configured

**Mode** Interface Config

### 6.3.2.44. *Ip ospf priority*

**ip ospf priority** command sets the OSPF priority for the specified router interface. The priority of the interface is a priority integer from 0 to 255. A value of 0 indicates that the router is not eligible to become the designated router on this network. **no ip ospf priority** command sets the default OSPF priority for the specified router interface.

**Format** ip ospf priority <0-255>

no ip ospf priority

**Default** 1, which is the highest router priority

**Mode** Interface Config

### 6.3.2.45. *Ip ospf retransmit-interval*

**ip ospf retransmit** command sets the OSPF retransmit Interval for the specified interface. The retransmit interval is specified in seconds. The value for <seconds> is the number of seconds between link-state advertisement retransmissions for adjacencies belonging to this router interface. This value is also used when retransmitting database description and link-state request packets. Valid values range from 0 to 3600 (1 hour). **no ip ospf retransmit** command sets the default OSPF retransmit Interval for the specified interface.

**Format** ip ospf retransmit-interval <0-3600>

no ip ospf retransmit-interval

**Default** 5

**Mode** Interface Config

### 6.3.2.46. *Ip ospf transmit-delay*

**ip ospf transmit-delay** command sets the OSPF Transit Delay for the specified interface. The transmit delay is specified in seconds. In addition, it sets the estimated number of seconds it takes to transmit a link state update packet over this interface. Valid values for <seconds> range from 1 to 3600 (1 hour). **no ip ospf transmit-delay** command sets the default OSPF Transit Delay for the specified interface.

**Format** ip ospf transmit-delay <1-3600>>

no ip ospf transmit-delay

**Default** 1

**Mode** Interface Config

### 6.3.2.47. *Ip ospf mtu-ignore*

**ip ospf mtu-ignore** command disables OSPF maximum transmission unit (MTU) mismatch detection. OSPF Database Description packets specify the size of the largest IP packet that can be sent without fragmentation on the interface. When a router receives a Database Description packet, it examines the MTU advertised by the neighbor. By default, if the MTU is larger than the router can accept, the Database Description packet is rejected and the OSPF adjacency is not established. **no ip ospf mtu-ignore** command enables the OSPF MTU mismatch detection.

**Format** ip ospf mtu-ignore

no ip ospf mtu-ignore

**Default** Enabled

**Mode** Interface Config

### 6.3.2.48. *Ip ospf bfd*

This command enables BFD for OSPFv2 on the specified interface.

To disable BFD for OSPFv2 on the specified interface, use the no form of this command.

**Format** ip ospf bfd

no ip ospf bfd

**Default** Disabled

**Mode** Interface Config

### 6.3.2.49. *Router-id*

**router-id** command sets a 4-digit dotted-decimal number uniquely identifying the router ospf id. The <ipaddress> is a configured value.

**Format** router-id <ipaddress>

**Default** None

**Mode** Router OSPF Config

### 6.3.2.50. *Redistribute*

**redistribute** command configures OSPF protocol to allow redistribution of routes from the specified source protocol/routers. **no redistribute** command configures OSPF protocol to prohibit redistribution of routes from the specified source protocol/routers.

**Format** redistribute {bgp | static | connected} [metric <0-16777214>] [metric-type {1 | 2}] [tag <0-4294967295>] [subnets]

no redistribute {bgp | static | connected} [metric] [metric-type] [tag] [subnets]

**Default** metric—unspecified

type—2

tag—0

**Mode** Router OSPF Config

### 6.3.2.51. *Maximum-paths*

**maximum-paths** command sets the number of paths that OSPF can report for a given destination where maxpaths is platform dependent. **no maximum-paths** command resets the number of paths that OSPF can report for a given destination back to its default value.

**Format** maximum-paths <maxpaths>

no maximum-paths

**Default** 4

**Mode** Router OSPF Config

### 6.3.2.52. *Passive-interface default*

**passive-interface default** command to enable global passive mode by default for all interfaces. It overrides any interface level passive mode. OSPF will not form adjacencies over a passive interface. **no passive-interface default** command to disable the global passive mode by default for all interfaces. Any interface previously configured to be passive reverts to non-passive mode.

**Format** passive-interface default

no passive-interface default

**Default** Disabled

**Mode** Router OSPF Config

### 6.3.2.53. *Passive-interface*

**passive-interface** command to set the interface or tunnel as passive. It overrides the global passive mode that is currently effective on the interface or tunnel. **no passive-interface** command to set the interface or tunnel as non-passive. It overrides the global passive mode that is currently effective on the interface or tunnel.

**Format** passive-interface {<slot/port> | vlan <vlan-id>}

no passive-interface {<slot/port> | vlan <vlan-id>}

**Default** Disabled

**Mode** Router OSPF Config

### 6.3.2.54. *Timers spf*

Use this command to configure the SPF delay time and hold time. The valid range for both parameters is 0-65535 seconds.

**Format** timers spf <delay-time> <hold-time>

**Default** delay-time—5

hold-time—10

**Mode** Router OSPF Config

### 6.3.2.55. *Max-metric*

Use **max-metric** command to configure OSPF to enable stub router mode. Use **no max-metric** command to disable stub router mode.

If you configure the summary LSA metric to 16,777,215, other routers will skip the summary LSA when they compute routes.

**Format** max-metric router-lsa [on-startup <seconds> [summary-lsa [<metric>]] | summary-lsa [<metric> [on-startup <seconds>]]

no max-metric router-lsa [on-startup] [summary-lsa]

| Fields | Definition |
|---|---|
| **on-startup** | OSPF starts in stub router mode after a reboot. |
| **seconds** | The number of seconds that OSPF remains in stub router mode after a reboot. The range is from 5 to 86,400 seconds. There is no default value. |
| **summary-lsa** | Set the metric in type 3 and 4 summary LSAs to LsInfinity (0xFFFFFF). |
| **metric** | Metric to send in summary LSAs when in stub router mode. Range is 1 to 16,777,215. Default is 16,711,680(0xFF0000). |

**Default** None

**Mode** Router OSPF Config

### 6.3.2.56. *Log-adjacency-changes*

**log-adjacency-changes** command logs OSPFv2 neighbor state changes. **no log-adjacency-changes** command disables logging OSPFv2 neighbor state changes.

**Format** log-adjacency-changes [detail]

no log-adjacency-change

| Fields | Definition |
|---|---|
| **detail** | Log all messages for each adjacency state change, not just when transitions to FULL state and when a backwards transition occur. |

**Default** Disabled

**Mode** Router OSPF Config Mode

### 6.3.2.57. *Prefix-suppression*

Use **max-metric** command to suppress the advertisement of all the IPv4 prefixes except for prefixes that are associated with secondary IPv4 addresses, loopbacks, and passive interfaces from the OSPFv2 router advertisements.

To suppress a loopback or passive interface, use the command *ip ospf prefix-suppresion* in interface config mode. Prefixes associated with secondary IPv4 addresses can never be suppressed.

**no prefix-suppression** command disables prefix-suppression. No prefixes are suppressed from being advertised.

**Format** prefix-suppression

no prefix-suppression

**Default** Disabled

**Mode** Router OSPF Config Mode

### 6.3.2.58. *nsf helper*

Use this command to enable helper neighbor functionality for the OSPF graceful restart on an interface.

Use the no form of the command to disable helper neighbor functionality for the OSPF graceful restart.

**Format** nsf [ietf] [helper]

no nsf [ietf] [helper]

| Fields | Definition |
|---|---|
| **ieft** | This keyword is accepted but not required. |

**Default** Disabled

**Mode** Router OSPF Config Mode

### 6.3.2.59. *nsf helper strict-lsa-checking*

Use this command to require that an OSPF helper neighbor exit helper mode whenever a topology change occurs.

Use the no form of the command to allow OSPF to continue as a helpful neighbor in spite of topology changes.

**Format** nsf {[ietf] [helper] [strict-lsa-checking] | [helper] [strict-lsa-checking]}

no nsf {[ietf] [helper] [strict-lsa-checking] | [helper] [strict-lsa-checking]}

| Fields | Definition |
|---|---|
| **ieft** | This keyword is accepted but not required. |
| **strict-lsa-checking** | Specify that an OSPF helper exits helper mode whenever a topology change occurs. OSPF continues as a helpful neighbor in spite of topology changes if this option is not set. |

**Default** Enabled

**Mode** Router OSPF Config Mode

# 6.4. BOOTP/DHCP Relay Commands

## 6.4.1. Show commands

### 6.4.1.1. *Show bootpdhcprelay*

This command displays the BootP/DHCP Relay information.

**Format** show bootpdhcprelay [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Maximum Hop Count** | Is the maximum allowable relay agent hops. |
| **Minimum Wait Time (Seconds)** | Is the minimum wait time. |
| **Admin Mode** | Represents whether relaying of requests is enabled or disabled. |
| **Circuit ID Option Mode** | Is the DHCP circuit ID option which may be enabled or disabled. |

## 6.4.2. Configuration commands

### 6.4.2.1. *Bootpdhcprelay cidoptmode*

This command enables the circuit ID option mode for BootP/DHCP Relay on the system.

To disable the circuit ID option mode for BootP/DHCP Relay on the system, use the **no** form of this command.

**Format** bootpdhcprelay cidoptmode
no bootpdhcprelay cidoptmode

**Default** Disabled

**Mode** Global Config

### 6.4.2.2. *Bootpdhcprelay maxhopcount*

This command configures the maximum allowable relay agent hops for BootP/DHCP Relay on the system.

To reset the maximum allowable relay agent hops for BootP/DHCP Relay on the system to 4, use the **no** form of this command.

**Format** bootpdhcprelay maxhopcount <hops>

no bootpdhcprelay maxhopcount

| Parameter | Description |
|---|---|
| **hops** | The range of maximum hop count is 1 to 16. |

**Default** 4

**Mode** Global Config

### 6.4.2.3. *Bootpdhcprelay minwaittime*

This command configures the minimum wait time in seconds for BootP/DHCP Relay on the system. When the BOOTP relay agent receives a BOOTREQUEST message, it may use the seconds-since-client-began-booting field of the request as a factor in deciding whether to relay the request or not.

To reset the minimum wait time in seconds for BootP/DHCP Relay on the system to 0, use the **no** form of this command.

**Format** bootpdhcprelay minwaittime <minwaittime>

no bootpdhcprelay minwaittime

| Parameter | Description |
|---|---|
| **minwaittime** | The range of minimum wait time is 0 to 100. |

**Default** 0

**Mode** Global Config

# 6.5. IP Helper Commands

## 6.5.1. Show commands

### 6.5.1.1. *Show ip helper-address*

Use this command to display the IP helper address configuration.

**Format** show ip helper-address [vrf <vrf-name>] [{<slot/port> | vlan <1 - 4093>}]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The relay configuration is applied to packets that arrive on this interface. This field is set to 'any' for global IP helper entries. |
| **UDP Port** | The relay configuration is applied to packets whose destination UDP port is this port. |
| **Discard** | Indicate discard the UDP packets or not. |
| **Hit Count** | The number of times the IP helper entry has been used to relay or discard a packet. |
| **Server Address** | The IPv4 address of the server to which packets are relayed. |

### 6.5.1.2. *Show ip helper statistics*

Use this command to display the number of UDP packets processed and relayed.

**Format** show ip helper statistics [vrf <vrf-name>]

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **DHCP client messages received** | The number of valid messages received form a DHCP client. |
| **DHCP client messages relayed** | The number of DHCP client messages relayed to a server . |
| **DHCP server messages received** | The number of DHCP responses received from the server . |
| **DHCP server messages relayed** | The number of DHCP server messages relayed to a client. |
| **UDP client messages** | The number of valid UDP messages received. |

| | |
|---|---|
| **received** | |
| **UDP client messages relayed** | The number of valid UDP messages relayed. |
| **DHCP message hop count exceeded max** | The number of DHCP client messages received whose hop count is larger than the maximum allowed. |
| **DHCP message with secs field below min** | The number of DHCP client messages received whose Second field is less than the minimum value. |
| **DHCP message with giaddr set to local address** | The number of DHCP client messages received whose gateway address, giaddr, is already set to an IP address configured on one of the relay agent's own IP address. |
| **Packets with expired TTL** | The number of packets received with TTL of 0 or 1 that otherwise have been relayed. |
| **Packets that matched a discard entry** | The number of packets ignored by the relay agent because they match a discard entry. |

## 6.5.2. Configuration commands

### 6.5.2.1. *Ip helper-address (Global Config)*

Use this command to configure the relay of certain UDP broadcast packets received on any interface. This command can be invoked multiple times, either to specify multiple server addresses for a given UDP port number or to specify multiple UDP port numbers handled by a specific server.

To delete the address, use the **no** form of this command.

**Format** ip helper-address <ipaddr> [ <udp-port> | dhcp | domain | isakmp | mobile-ip | nameserver | netbios-dgm | netbios-ns | ntp | pim-auto-rp | rip | tacacs | tftp | time ]

no ip helper-address [<ipaddr> [ <udp-port> | dhcp | domain | isakmp | mobile-ip | nameserver | netbios-dgm | netbios-ns | ntp | pim-auto-rp | rip | tacacs | tftp | time ]]

| Parameter | Description |
|---|---|
| **ipaddr** | The IPv4 unicast or directed broadcast address to which relayed UDP broadcast packets are sent. The server address cannot be an IP address configured on any interface of the local router. |
| **udp-port** | A destination UDP port number from 1 to 65535. |
| **port-name** | The destination UDP port may be optionally specified by its name. Whether a port is specified by its number or its name has no effect on behavior. The names recognized are as follows:<br>• dhcp (port 67)<br>• domain (port 53) |

| | |
|---|---|
| | • isakmp (port 500)<br>• mobile-ip (port 434)<br>• nameserver (port 42)<br>• netbios-dgm (port 138)<br>• netbios-ns (port 137)<br>• ntp (port 123)<br>• pim-auto-rp (port 496)<br>• rip (port 520)<br>• tacacs (port 49)<br>• tftp (port 69)<br>• time (port 37)<br>Other ports must be specified by number. |

**Default** None

**Mode** Global Config

### 6.5.2.2. *Ip helper-address (Interface Config)*

Use this command to configure the relay of certain UDP broadcast packets received on a specific interface or range of interfaces. This command can be invoked multiple times on a routing interface, either to specify multiple server addresses for a given port number or to specify multiple port numbers handled by a specific server.

To delete the address, use the **no** form of this command.

**Format** ip helper-address <ipaddr> [ <udp-port> | dhcp | domain | isakmp | mobile-ip | nameserver | netbios-dgm | netbios-ns | ntp | pim-auto-rp | rip | tacacs | tftp | time ]

no ip helper-address [<ipaddr> [ <udp-port> | dhcp | domain | isakmp | mobile-ip | nameserver | netbios-dgm | netbios-ns | ntp | pim-auto-rp | rip | tacacs | tftp | time ]]

| Parameter | Description |
|---|---|
| **ipaddr** | The IPv4 unicast or directed broadcast address to which relayed UDP broadcast packets are sent. The server address cannot be in a subnet on the interface where the relay entry is configured, and cannot be an IP address configured on any interface of the local router. |
| **udp-port** | A destination UDP port number from 0 to 65535. |
| **port-name** | The destination UDP port may be optionally specified by its name. Whether a port is specified by its number or its name has no effect on behavior. The names recognized are as follows:<br>• dhcp (port 67)<br>• domain (port 53)<br>• isakmp (port 500)<br>• mobile-ip (port 434)<br>• nameserver (port 42) |

| | |
|---|---|
| | • netbios-dgm (port 138)<br>• netbios-ns (port 137)<br>• ntp (port 123)<br>• pim-auto-rp (port 496)<br>• rip (port 520)<br>• tacacs (port 49)<br>• tftp (port 69)<br>• time (port 37)<br>Other ports must be specified by number. |

**Default** None

**Mode** Interface Config

### 6.5.2.3. *Ip helper-address discard*

Use this command to configure the discard of certain UDP broadcast packets received on a specific interface or range of interfaces. This command can be invoked multiple times on a routing interface for a given port number or to specify multiple port numbers handled by a specific server.

To delete the address, use the **no** form of this command.

**Format** ip helper-address discard [<udp-port> | dhcp | domain | isakmp | mobile-ip | nameserver | netbios-dgm | netbios-ns | ntp | pim-auto-rp | rip | tacacs | tftp | time]

no ip helper-address discard [<udp-port> | dhcp | domain | isakmp | mobile-ip | nameserver | netbios-dgm | netbios-ns | ntp | pim-auto-rp | rip | tacacs | tftp | time]

| Parameter | Description |
|---|---|
| **udp-port** | A destination UDP port number from 1 to 65535. |
| **port-name** | The destination UDP port may be optionally specified by its name. Whether a port is specified by its number or its name has no effect on behavior. The names recognized are as follows:<br>• dhcp (port 67)<br>• domain (port 53)<br>• isakmp (port 500)<br>• mobile-ip (port 434)<br>• nameserver (port 42)<br>• netbios-dgm (port 138)<br>• netbios-ns (port 137)<br>• ntp (port 123)<br>• pim-auto-rp (port 496)<br>• rip (port 520)<br>• tacacs (port 49)<br>• tftp (port 69)<br>• time (port 37) |

Other ports must be specified by number.

**Default** None

**Mode** Interface Config

### 6.5.2.4. *Ip helper enable*

This command enables the relay of UDP packets.

To disable the replay of UDP packets, use the **no** form of this command.

**Format** ip helper enable

no ip helper enable

**Default** Disabled

**Mode** Global Config

### 6.5.2.5. *Clear ip helper statistics*

Use this command to clear the statistics data of UDP packets processed and relayed by IP helper.

**Format** clear ip helper statistics [vrf <vrf-name>]

**Mode** Privileged Exec

User Exec

# 6.6. Router Discovery Protocol Commands

## 6.6.1. Show commands

### 6.6.1.1. *Show ip irdp*

This command displays the router discovery information for all interfaces, or a specified interface.

**Format** show ip irdp {<slot/port> | all | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **All** | Show router discovery information for all interfaces. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The relay configuration is applied to packets that arrive on this interface. This field is set to 'any' for global IP helper entries. |
| **UDP Port** | The relay configuration is applied to packets whose destination UDP port is this port. |
| **Discard** | Indicate discard the UDP packets or not. |
| **Hit Count** | The number of times the IP helper entry has been used to relay or discard a packet. |
| **Server Address** | The IPv4 address of the server to which packets are relayed. |

# 6.7. VLAN Routing Commands

## 6.7.1. Configuration commands

### 6.7.1.1. *Interface vlan*

This command creates a VLAN routing interface.

To delete a VLAN routing interface, use the **no** form of this command.

**Format** interface vlan <vlan-id>

no interface vlan <vlan-id>

| Fields | Definition |
|---|---|
| **<vlan-id>** | The VLAN ID used for this interface. The range of VLAN ID is from 1 to 4093. |

**Default** None

**Mode** Global Config

# 6.8. Virtual Router Redundancy Protocol (VRRP) Commands

## 6.8.1. Show commands

### 6.8.1.1. *Show ip vrrp*

This command displays whether VRRP functionality is enabled or disabled. It also displays some global parameters which are required for monitoring.

**Format** show ip vrrp

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Admin Mode** | Displays the administrative mode for VRRP functionality on the switch. |
| **Active-Active Mode** | Displays the Active-Active mode for VRRP functionality on the switch. |
| **Router Checksum Errors** | Represents the total number of VRRP packets received with an invalid VRRP checksum value. |
| **Router Version Errors** | Represents the total number of VRRP packets received with Unknown or unsupported version number. |
| **Router VRID Errors** | Represents the total number of VRRP packets received with invalid VRID for this virtual router. |

### 6.8.1.2. *Show ip vrrp brief*

This command displays information about each virtual router configured on the switch.

**Format** show ip vrrp brief

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Interface** | Valid slot and port number separated by forward slashes. |
| **VRID** | Represents the router ID of the virtual router. |
| **IP Address** | Is the IP Address that was configured on the virtual router. |
| **Mode** | Represents whether the virtual router is enabled or disabled. |
| **State** | Represents the state (Master/backup) of the virtual router. |

### 6.8.1.3. *Show ip vrrp interface*

This command displays all configuration information of a virtual router configured on a specific interface. Note that the information will be displayed only when the IP address of the specific interface is configured.

**Format** show ip vrrp interface {<slot/port> | vlan <vlan-id>} [<vrid>]

| **Fields** | **Definition** |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vrid>** | Represents the router ID of the virtual router. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **VRID** | Represents the router ID of the virtual router. |
| **Primary IP Address** | This field represents the configured IP Address for the Virtual router. |
| **VMAC address** | Represents the VMAC address of the specified router. |
| **Authentication type** | Represents the authentication type for the specific virtual router. |
| **Priority** | Represents the priority value for the specific virtual router. |
| **Configured Priority** | The priority configured through the ip vrrp vrid priority 1-254 command. |
| **Advertisement interval** | Represents the advertisement interval in seconds for the specific virtual router. |

| | |
|---|---|
| **Pre-Empt Mode** | Is the preemption mode configured on the specified virtual router. |
| **Administrative Mode** | Represents the status (Enable or Disable) of the specific router. |
| **Accept Mode** | When enabled, the VRRP Master can accept ping packets sent to one of the virtual router's IP addresses. |
| **State** | Represents the state (Master/backup) of the specific virtual router. |

### 6.8.1.4. *Show ip vrrp interface stats*

This command displays the statistical information about each virtual router configured on the switch.

**Format** show ip vrrp interface stats {<slot/port> | vlan <vlan-id>} [<vrid>]

| **Fields** | **Definition** |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vrid>** | Virtual router ID. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **VRID** | Represents the router ID of the virtual router. |
| **Uptime** | Is the time that the virtual router has been up, in days, hours, minutes and seconds. |
| **Protocol** | Represents the protocol configured on the interface. |
| **State Transitioned to Master** | Represents the total number of times virtual router state has changed to MASTER. |
| **Advertisement Received** | Represents the total number of VRRP advertisements received by this virtual router. |
| **Advertisement Interval Errors** | Represents the total number of VRRP advertisements received for which advertisement interval is different than the configured value for this virtual router. |

| | |
|---|---|
| **Authentication Failure** | Represents the total number of VRRP packets received that don't pass the authentication check. |
| **IP TTL errors** | Represents the total number of VRRP packets received by the virtual router with IP TTL (time to live) not equal to 255. |
| **Zero Priority Packets Received** | Represents the total number of VRRP packets received by virtual router with a priority of '0'. |
| **Zero Priority Packets Sent** | Represents the total number of VRRP packets sent by the virtual router with a priority of '0'. |
| **Invalid Type Packets Received** | Represents the total number of VRRP packets received by the virtual router with invalid 'type' field. |
| **Address List Errors** | Represents the total number of VRRP packets received for which address list does not match the locally configured list for the virtual router. |
| **Invalid Authentication Type** | Represents the total number of VRRP packets received with unknown authentication type. |
| **Authentication Type Mismatch** | Represents the total number of VRRP advertisements received for which 'auth type' not equal to locally configured one for this virtual router. |
| **Packet Length Errors** | Represents the total number of VRRP packets received with packet length less than length of VRRP header. |
| **Advertisement Sent** | Represents the total number of VRRP advertisement packets sent by the virtual router. |

## 6.8.2. Configuration commands

### 6.8.2.1. *Ip vrrp*

This command enables the administrative mode of VRRP in the router.

To disable the administrative mode of VRRP in the router, use the **no** form of this command.

**Format** ip vrrp

no ip vrrp

**Default** Disabled

**Mode** Global Config

### 6.8.2.2. *Ip vrrp master-backup*

This command disables the active active mode of VRRP in the router.

To enable the active active mode of VRRP in the router, use the no form of this command.

**Format** ip vrrp master-backup

no ip vrrp master-backup

**Default** Disabled

**Mode** Global Config

### 6.8.2.3. *Ip vrrp <vrid>*

This command sets the virtual router ID on an interface for Virtual Router configuration in the router.

To remove all VRRP configuration details of the virtual router configured on a specific interface, use the **no** form of this command.

**Format** ip vrrp <1-255>

no ip vrrp <1-255>

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |

**Default** None

**Mode** Interface Config

### 6.8.2.4. *Ip vrrp ip*

This command sets the primary or secondary IP address of the device within a VRRPv2 group.

If the secondary option is not specified, the specified IP address is set as the primary. Also the removing of the primary virtual IP is not allowed. The primary virtual IP of a virtual router can only be modified. The secondary virtual IP can be removed using the no form of the this command.

To remove the secondary address, use the no form of this command.

**Format** ip vrrp <1-255> ip <addr> [secondary]

no ip vrrp <1-255> ip <addr> [secondary]

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |
| **<addr>** | Secondary IP address of the router ID. |

**Default** None

**Mode** Interface Config

### 6.8.2.5. *Ip vrrp mode*

This command enables the virtual router configured on the specified interface. Enabling the status field starts a virtual router. Disabling the status field stops a virtual router.

To disable the virtual router configured on the specified interface, use the **no** form of this command.

**Format** ip vrrp <1-255> mode

no ip vrrp <1-255> mode

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |

**Default** Disabled

**Mode** Interface Config

### 6.8.2.6. *Ip vrrp accept-mode*

Use this command to allow the VRRP Master to accept ping packets sent to one of the virtual router's IP addresses.

To prevent the VRRP Master from accepting ping packets sent to one of the virtual router's IP addresses, use the **no** form of this command.

**Format** ip vrrp <1-255> accept-mode

no ip vrrp <1-255> accept-mode

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |

**Default** Disabled

**Mode** Interface Config

### 6.8.2.7. *Ip vrrp authentication*

This command sets the authorization details value for the virtual router configured on a specified interface.

To set the default authorization detailed value for the virtual router configured on a specified interface, use the **no** form of this command.

**Format** ip vrrp <1-255> authentication <key>

no ip vrrp <1-255> authentication

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |
| **<key>** | A text password used for authentication. |

**Default** No authentication

**Mode** Interface Config

### 6.8.2.8. *Ip vrrp preempt*

This command sets the preemption mode value for the virtual router configured on a specified interface.

To set the default preemption mode value for the virtual router configured on a specified interface, use the **no** form of this command.

**Format** ip vrrp <1-255> preempt

no ip vrrp <1-255> preempt

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |
| **<key>** | A text password used for authentication. |

**Default** Enabled

**Mode** Interface Config

### 6.8.2.9. *Ip vrrp priority*

This command sets the priority value for the virtual router configured on a specified interface.

The router with the highest priority is elected master. If a router is configured with the address used as the address of the virtual router, the router is called the "address owner". The priority of the address owner is always 255 so that the address owner is always master. If the master has a priority less than 255 (it is not the address owner) and you configure the priority of another router in the group higher than the master's priority, the router will take over as master only if preempt mode is enabled.

To set the default priority value for the virtual router configured on a specified interface, use the **no** form of this command.

**Format** ip vrrp <1-255> priority <1-254>

no ip vrrp <1-255> priority

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |
| **<1-254>** | The range of priority is 1 to 254. |

**Default** The default priority value is 100 unless the router is the address owner, in which case its priority is automatically set to 255.

**Mode** Interface Config

### 6.8.2.10. *Ip vrrp timers advertise*

This command sets the advertisement value for a virtual router in seconds.

To set the default advertisement value for a virtual router, use the **no** form of this command.

**Format** ip vrrp <1-255> timers advertise <1-255>

no ip vrrp <1-255> timers advertise

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |
| **<1-255>** | The range of advertisement interval is from 1 to 255 seconds. |

**Default** 1 second

**Mode** Interface Config

### 6.8.2.11. *Ip vrrp track interface*

This command alters the priority of the VRRP router based on the availability of its interfaces. This command is useful for tracking interfaces that are not configured for VRRP. Only IP interfaces are tracked. A tracked interface is up if the IP on that interface is up. Otherwise, the tracked interface is down.

When the tracked interface is down or the interface has been removed from the router, the priority of the VRRP router will be decremented by the value specified in the decrement argument. When the interface is up for IP protocol, the priority will be incremented by the decrement value.

A VRRP configured interface can track more than one interface. When a tracked interface goes down, then the priority of the router will be decreased by 10 (the default priority decrement) for each downed interface. The default priority decrement is changed using the decrement argument. The default priority of the virtual router is 100, and the default decrement priority is 10. By default, no interfaces are tracked. If you specify just the interface to be tracked, without giving the optional priority, then the default priority will be set. The default priority decrement is 10.

To remove the interface from the tracked list or to restore the priority decrement to its default, use the **no** form of this command.

**Format** ip vrrp <1-255> track interface {<slot/port> | vlan <vlan-id>} [decrement <1-254>]

no ip vrrp <1-255> track interface {<slot/port> | vlan <vlan-id>} [decrement]

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **< 1-254 >** | The range of decrement is 1 to 254. |

**Default** Decrement: 10

**Mode** Interface Config

### 6.8.2.12. *Ip vrrp track ip route*

This command tracks the route reachability. When the tracked route is deleted, the priority of the VRRP router will be decremented by the value specified in the decrement argument. When the tracked route is added, the priority will be incremented by the same.

A VRRP configured interface can track more than one route. When a tracked route goes down, then the priority of the router will be decreased by 10 (the default priority decrement) for each downed route. By default no routes are tracked. If you specify just the route to be tracked, without giving the optional priority, then the default priority will be set. The default priority decrement is 10. The default priority decrement is changed using the decrement argument.

To remove the route from the tracked list or to restore the priority decrement to its default, use the **no** form of this command. When removing a tracked IP route from the tracked list, the priority should be incremented by the decrement value if the route is not reachable.

**Format** ip vrrp <1-255> track ip route <ip-address/prefix-length> [decrement <1-254>]

no ip vrrp <1-255> track ip route <ip-address/prefix-length> [decrement]

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |
| **< 1-254 >** | The range of decrement is 1 to 254. |

**Default** Decrement: 10

**Mode** Interface Config

# 6.9. Policy Based Routing (PBR) Commands

## 6.9.1. Show commands

### 6.9.1.1. *Show ip policy*

This command lists the route map associated with each interface.

**Format** show ip policy

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The interface. |
| **Route-map** | The route map. |

### 6.9.1.2. *Show ip prefix-list*

This command displays configuration and status for a prefix list.

**Format** show ip prefix-list [detail | summary] [listname] [prefix/length] [seq sequencenumber] [longer] [first-match]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **detail \| summary** | (Optional) Displays detailed or summarized information about all prefix lists. |
| **listname** | (Optional) The name of a specific prefix list. |
| **prefix/length** | (Optional) The network number and length (in bits) of the network mask. |
| **seq** | (Optional) Applies the sequence number to the prefix list entry. |
| **sequence-number** | (Optional) The sequence number of the prefix list entry. |
| **longer** | (Optional) Displays all entries of a prefix list that are more specific than the |

| | |
|---|---|
| | given network/length |
| **first-match** | (Optional) Displays the entry of a prefix list that matches the given network/length. |

### 6.9.1.3. *Show ipv6 prefix-list*

This command displays configuration and status for a selected prefix list.

**Format** show ipv6 prefix-list [detail | summary] [listname] [ipv6 prefix/prefix length] [seq sequencenumber] [longer] [first-match]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **detail \| summary** | (Optional) Displays detailed or summarized information about all prefix lists. |
| **listname** | (Optional) The name of a specific prefix list. |
| **Ipv6 prefix/prefix length** | (Optional) The network number and length (in bits) of the network mask. |
| **seq** | (Optional) Applies the sequence number to the prefix list entry. |
| **sequence-number** | (Optional) The sequence number of the prefix list entry. |
| **longer** | (Optional) Displays all entries of a prefix list that are more specific than the given network/length |
| **first-match** | (Optional) Displays the entry of a prefix list that matches the given network/length. |

### 6.9.1.4. *Show route-map*

To display a route map, use the show route-map command in Privileged EXEC mode.

**Format** show route-map [routemap]

| Fields | Definition |
|---|---|
| **routemap** | (Optional) Name of a specific route map. |

**Default** None

**Mode** Privileged Exec

## 6.9.2. Configuration commands

### 6.9.2.1. *Ip policy route-map*

Use this command to identify a route map to use for policy-based routing on an interface specified by <route-map-name>. Policy-based routing is configured on the interface that receives the packets, not on the interface from which the packets are sent.

When a route-map applied on the interface is changed, that is, if new statements are added to route-map or match/set terms are added/removed from route-map statement, and also if route-map that is applied on an interface is removed, route-map needs to be removed from interface and added back again in order to have changed route-map configuration to be effective.

In order to disable policy based routing from an interface, use **no** form of this command.

**Format** ip policy route-map <routemap>

no ip policy route-map <routemap>

| Fields | Definition |
|---|---|
| **routemap** | (Optional) Name of a specific route map. |

**Default** None

**Mode** Interface Config

### 6.9.2.2. *Ip prefix-list*

To create a prefix list or add a prefix list entry, use the **ip prefix-list** command in Global Configuration mode.

Prefix lists allow matching of route prefixes with those specified in the prefix list. Each prefix list includes of a sequence of prefix list entries ordered by their sequence numbers. A router sequentially examines each prefix list entry to determine if the route's prefix matches that of the entry. An empty or nonexistent prefix list permits all prefixes. An implicit deny is assume if a given prefix does not match any entries of a prefix list. Once a match or deny occurs the router does not go through the rest of the list.

A prefix list may be used within a route map to match a route's prefix using the command "match ip address"

Up to 128 prefix lists may be configured. The maximum number of statements allowed in prefix list is 64.

To delete a prefix list or a statement in a prefix list, use the **no** form of this command. The command **no ip prefix-list list-name** deletes the entire prefix list. To remove an individual statement from a prefix list, you must specify the statement exactly, with all its options.

**Format** ip prefix-list <list-name> {[seq {seq number}] {permit | deny} prefix/length [ge length] [le length] | renumber [renumber-interval [first-statement-number]]}

no ip prefix-list <list-name> [seq {seq number}] {permit | deny} prefix/length [ge length] [le length]

| Fields | Definition |
|---|---|
| **list-name** | The text name of the prefix list. Up to 32 characters. |
| **seq number** | (Optional) The sequence number for this prefix list statement. Prefix list statements are ordered from lowest sequence number to highest and applied in that order. If you do not specify a sequence number, the system will automatically select a sequence number five larger than the last sequence number in the list. Two statements may not be configured with the same sequence number. The value ranges from 1 to 4,294,967,294. |
| **permit** | Permit routes whose destination prefix matches the statement. |
| **deny** | Deny routes whose destination prefix matches the statement. |
| **prefix/length** | Specifies the match criteria for routes being compared to the prefix list statement. The network can be any valid IP prefix. The length is any IPv4 prefix length from 0 to 32. |
| **ge length** | (Optional) If this option is configured, then a prefix is only considered a match if its network mask length is greater than or equal to this value. This value must be longer than the network length and less than or equal to 32. |
| **le length** | (Optional) If this option is configured, then a prefix is only considered a match if its network mask length is less than or equal to this value. This value must be longer than the ge length and less than or equal to 32. |
| **renumber** | (Optional) Provides the option to renumber the sequence numbers of the IP prefix list statements with a given interval starting from a particular sequence number. The valid range for renumber-interval is 1 - 100, and the valid range for first-statement-number is 1 - 1000. |

**Default** No prefix lists are configured by default. When neither the **ge** nor the **le** option is configured, the destination prefix must match the network/length exactly. If the **ge** option is configured without the **le** option, any prefix with a network mask greater than or equal to the **ge** value is considered a match. Similarly, if the **le** option is configured without the **ge** option, a prefix with a network mask less than or equal to the **le** value is considered a match.

**Mode** Global Config

### 6.9.2.3. *Ip prefix-list description*

To apply a text description to a prefix list, use the **ip prefix-list description** command in Global Configuration mode.

To remove the text description, use the **no** form of this command.

**Format** ip prefix-list <list-name> description <text>

no ip prefix-list <list-name> description

| Fields | Definition |
|---|---|
| **list-name** | The text name of the prefix list. Up to 32 characters. |
| **description text** | Text description of the prefix list. Up to 80 characters. |

**Default** No description is configured by default.

**Mode** Global Config

### 6.9.2.4. *Ipv6 prefix-list*

To create a IPv6 prefix list or add a prefix list entry, use the **ipv6 prefix-list** command in Global Configuration mode. An IPv6 prefix list can contain only IPv6 addresses.

Prefix lists allow matching of route prefixes with those specified in the prefix list. Each prefix list includes of a sequence of prefix list entries ordered by their sequence numbers. A router sequentially examines each prefix list entry to determine if the route's prefix matches that of the entry. For IPv6 routes, only IPv6 prefix lists are matched. An empty or nonexistent prefix list permits all prefixes. An implicit deny is assume if a given prefix does not match any entries of a prefix list. Once a match or deny occurs the router does not go through the rest of the list.

An IPv6 prefix list may be used within a route map to match a route's prefix using the command "match ipv6 address" A route map may contain both IPv4 and IPv6 prefix lists. If a route being matched is an IPv6 route, only the IPv6 prefix lists are matched.

Up to 128 prefix lists may be configured. The maximum number of statements allowed in prefix list is 64. These numbers indicate only IPv6 prefix lists. IPv4 prefix lists may be configured in appropriate numbers independently.

To delete a IPv6 prefix list or a statement in a prefix list, use the **no** form of this command. The command **no ipv6 prefix-list list-name** deletes the entire prefix list. To remove an individual statement from a prefix list, you must specify the statement exactly, with all its options.

**Format** ipv6 prefix-list <list-name> {[seq {seq number}] {permit | deny} ip6-prefix/prefix-length [ge length] [le length] | description <text> | renumber [renumber-interval [first-statement-number]]}

no ipv6 prefix-list <list-name> {[seq {seq number}] {permit | deny} ip6-prefix/prefix-length [ge length] [le length] | description}

| Fields | Definition |
|---|---|
| **list-name** | The text name of the prefix list. Up to 32 characters. |
| **seq number** | (Optional) The sequence number for this prefix list statement. Prefix list statements are ordered from lowest sequence number to highest and applied in that order. If you do not specify a sequence number, the system will automatically select a sequence number five larger than the last sequence number in the list. Two statements may not be configured with the |

| | |
|---|---|
| | same sequence number. The value ranges from 1 to 4,294,967,294. |
| **permit** | Permit routes whose destination prefix matches the statement. |
| **deny** | Deny routes whose destination prefix matches the statement. |
| **ipv6-prefix/prefix-length** | Specifies the match criteria for routes being compared to the prefix list statement. The ipv6-prefix can be any valid IPv6 prefix where the address is specified in hexadecimal using 16-bit values between colons. The prefix-length is the length of the IPv6 prefix, given as a decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the decimal value. |
| **ge length** | (Optional) If this option is configured, specifies a prefix length greater than or equal to the ipv6-prefix/prefix-length. It is the lowest value of a range of the length. |
| **le length** | (Optional) If this option is configured, specifies a prefix length less than or equal to the ipv6-prefix/prefix-length. It is the highest value of a range of the length. |
| **renumber** | (Optional) Provides the option to renumber the sequence numbers of the IPv6 prefix list statements with a given interval starting from a particular sequence number. |

**Default** No prefix lists are configured by default. When neither the **ge** nor the **le** option is configured, the destination prefix must match the network/length exactly. If the **ge** option is configured without the **le** option, any prefix with a network mask greater than or equal to the **ge** value is considered a match. Similarly, if the **le** option is configured without the **ge** option, a prefix with a network mask less than or equal to the **le** value is considered a match.

**Mode** Global Config

### 6.9.2.5. *Route-map*

To create a route map and enter Route Map Configuration mode, use the **route-map** command in Global Configuration mode. One use of a route map is to limit the redistribution of routes to a specified range of route prefixes. The redistribution command specifies a route map which refers to a prefix list. The prefix list identifies the prefixes that may be redistributed. It accepts up to 64 route maps.

To delete a route map or one of its statements, use the **no** form of this command.

**Format** route-map <map-tag> [permit|deny] [sequence-number]

no route-map <map-tag> [sequence-number]

| Fields | Definition |
|---|---|
| **map-tag** | Text name of the route map. Route maps with the same name are grouped together in order of their sequence numbers. A route map name may be up to 32 characters long. |

| | |
|---|---|
| **permit** | (Optional) Permit routes that match all of the match conditions in the route map. Not support in the **no** form. |
| **deny** | (Optional) Deny routes that match all of the match conditions in the route map. Not support in the **no** form. |
| **sequence-number** | (Optional) An integer used to order the set of route maps with the same name. Route maps are ordered from lowest to greatest sequence number, with lower sequence numbers being considered first. If no sequence number is specified, three cases would happen:<br>● If there is no route map existed, a route map with sequence number 10 and permit action will be created.<br>● If there is already one route map in system, the existed route map will be edited.<br>● If there is already more than one route map in system, need to specify the sequence number.<br>. The range is 0 to 65,535. |

**Default** No route maps are configured by default. If no permit or deny tag is given, permit is the default.

**Mode** Global Config

### 6.9.2.6. *Match as-path*

This route map match term matches BGP autonomous system paths against an AS path access list. If you enter a new **match as-path** term in a route map statement that already has a **match as-path** term, the AS path list numbers in the new term are added to the existing match term, up to the maximum number of lists in a term. A route is considered a match if it matches any one or more of the AS path access lists the match term refers to.

To delete the match as-path term that matches BGP autonomous system paths against an AS path access list, use the **no** form of this command.

**Format** match as-path <as-path-list-number>

no match as-path

| Fields | Definition |
|---|---|
| **as-path-list-number** | An integer from 1 to 500 identifying the AS path access list to use as match criteria. |

**Default** None

**Mode** Route Map Config

### 6.9.2.7. *Match community*

To configure a route map to match based on a BGP community list, use the **match community** command in Route Map Configuration mode. If the community list returns a permit action, the route is considered a

match. If the match statement refers to a community list that is not configured, no routes are considered to match the statement.

To delete a match term from a route map, use the **no** form of this command. The command no match community list exact-match removes the match statement from the route map. (It does not simply remove the exact-match option.) The command no match community removes the match term and all its community lists.

**Format** match community <community-list> [community-list...] [exact-match]

no match community <community-list> [community-list...] [exact-match]

| Fields | Definition |
|---|---|
| **community-list** | The name of a standard community list. Up to eight names may be included in a single match term. |
| **exact-match** | (Optional) When this option is given, a route is only considered a match if the set of communities on the route is an exact match for the set of communities in one of the statements in the community list. |

**Default** None

**Mode** Route Map Config

### 6.9.2.8. *Match ip address prefix-list*

To configure a route map to match based on a destination prefix, use the **match ip address** command in Route Map Configuration mode. If you specify multiple prefix lists in one statement, then a match occurs if a prefix matches any one of the prefix lists. If you configure a match ip address statement within a route map section that already has a match ip address statement, the new prefix lists are added to the existing set of prefix lists, and a match occurs if any prefix list in the combined set matches the prefix.

To delete a match statement from a route map, use the **no** form of this command.

**Format** match ip address prefix-list < list-name> [list-name...]

no match ip address prefix-list <list-name> [list-name...]

| Fields | Definition |
|---|---|
| **list-name** | The name of a prefix list used to identify the set of matching routes. Up to eight prefix lists may be specified. |

**Default** No match criteria are defined by default

**Mode** Route Map Config

### 6.9.2.9. *Match ip address <acl-id | acl-name>*

Use this command to configure a route map in order to match based on the match criteria configured in an IP access-list. Note that an IP ACL must be configured before it is linked to a route-map. Actions present in an IP ACL configuration are applied with other actions involved in route-map. If an IP ACL referenced by a route-map is removed or rules are added or deleted from that ACL, the configuration is rejected.

If there are a list of IP access-lists specified in this command and the packet matches at least one of these access-list match criteria, the corresponding set of actions in route-map are applied to packet.

If there are duplicate IP access-list numbers/names in this command, the duplicate configuration is ignored.

To delete a match statement from a route map, use the **no** form of this command.

**Format** match ip address <acl-id | acl-name> [...acl-id | acl-name ]

no match ip address <acl-id | acl-name> [...acl-id | acl-name ]

| Fields | Definition |
|---|---|
| **acl-id** | The access-list number that identifies an access-list configured through access-list CLI configuration commands. This number is 1 to 99 for standard access list number. This number is 100 to 199 for extended access list number. |
| **acl-name** | The access-list name that identifies named IP ACLs. Access-list name can be up to 31 characters in length. A maximum of 16 ACLs can be specified in this 'match' clause. |

**Default** No match criteria are defined by default

**Mode** Route Map Config

### 6.9.2.10. *Match ipv6 address*

To configure a route map to match based on a destination prefix, use the **match ip address** command in Route Map Configuration mode. prefix-list <prefix-list-name> identifies the name of an IPv6 prefix list used to identifythe set of matching routes. Up to eight prefix lists may be specified. If you specify multiple prefix lists in one statement, then a match occurs if a prefix matches any one of the prefix lists. If you configure a match ipv6 address statement within a route map section that already has a match ipv6 address statement, the new prefix lists are added to the existing set of prefix lists, and a match occurs if any prefix list in the combined set matches the prefix.

To delete a match statement from a route map, use the **no** form of this command.

**Format** match ipv6 address prefix-list <list-name> [list-name...]

no match ipv6 address prefix-list <list-name> [list-name...]

| Fields | Definition |
|---|---|
| **list-name** | The name of a prefix list used to identify the set of matching routes. Up to eight prefix lists may be specified. |

**Default** No match criteria are defined by default

**Mode** Route Map Config

### 6.9.2.11. *Match length*

Use this command to configure a route map to match based on the Layer 3 packet length between specified minimum and maximum values. min specifies the packet's minimum Layer 3 length, inclusive, allowed for a match. max specifies the packet's maximum Layer 3 length, inclusive, allowed for a match. Each route-map statement can contain one 'match' statement on packet length range.

To delete a match statement from a route map, use the **no** form of this command.

**Format** match length <min> <max>

no match length

**Default** No match criteria are defined by default

**Mode** Route Map Config

### 6.9.2.12. *Match mac-list*

Use this command to configure a route map in order to match based on the match criteria configured in an MAC access-list.

A MAC ACL is configured before it is linked to a route-map. Actions present in MAC ACL configuration are applied with other actions involved in route-map. When a MAC ACL referenced by a route-map is removed, the route-map rule is also removed and the corresponding rule is not effective. When a MAC ACL referenced by a route-map is removed or rules are added or deleted from that ACL, the configuration is rejected.

To delete a match statement from a route map, use the **no** form of this command.

**Format** match mac-list <mac-list-name> [mac-list-name]

no match mac-list <mac-list-name> [mac-list-name]

| Fields | Definition |
|---|---|
| **mac-list-name** | The mac-list name that identifies MAC ACLs. MAC Access-list name can be up to 31 characters in length. |

**Default** No match criteria are defined by default

**Mode** Route Map Config

### 6.9.2.13. *Set as-path*

To prepend one or more AS numbers to the AS path in a BGP route, use the **set as-path** command in Route Map Configuration mode. This command is normally used to insert one or more instances of the local AS number at the beginning of the AS_PATH attribute of a BGP route. Doing so increases the AS path length of the route. The AS path length has a strong influence on BGP route selection. Changing the AS path length can influence route selection on the local router or on routers to which the route is advertised.

When prepending an inbound route, if the first segment in the AS_PATH of the received route is an AS_SEQUENCE, as-path-string is inserted at the beginning of the sequence. If the first segment is an AS_SET, as-path-string is added as a new segment with type AS_SEQUENCE at the beginning of the AS path. When prepending an outbound route to an external peer, as-path-string follows the local AS number, which is always the first ASN.

To remove a set command from a route map, use the **no** form of this command.

**Format** set as-path prepend <as-path-string>

no set as-path prepend

| Fields | Definition |
|---|---|
| **as-path-string** | A list of AS path numbers to insert at the beginning of the AS_PATH attribute of matching BGP routes. To prepend more than one AS number, separate the ASNs with a space and enclose the string in quotes. Up to ten AS numbers may be prepended. |

**Default** None

**Mode** Route Map Config

### 6.9.2.14. *Set comm-list delete*

To remove BGP communities from an inbound or outbound UPDATE message, use the **set comm-list delete** command in Route Map Configuration mode. A route map with this **set** command can be used to remove selected communities from inbound and outbound routes. When a community list is applied to a route for this purpose, each of the route's communities is submitted to the community list one at a time. Communities permitted by the list are removed from the route. Because communities are processed individually, a community list used to remove communities should not include the exact-match option on statements with multiple communities. Such statements can never match an individual community.

When a route map statement includes both set community and **set comm-list delete** terms, the **set comm-list delete** term is processed first, and then the **set community** term (meaning that, communities are first removed, and then communities are added).

To delete the set command from a route map, use the **no** form of this command.

**Format** set comm-list <community-list-name> delete

no set comm-list

| Fields | Definition |
|---|---|
| **community-list-name** | A standard community list name. |

**Default** None

**Mode** Route Map Config

### 6.9.2.15. *Set community*

To modify the communities attribute of matching routes, use the **set community** command in Route Map Configuration mode. The **set community** command can be used to assign communities to routes originated through BGP's network and redistribute commands, and to set communities on routes received from a specific neighbor or advertised to a specific neighbor. It can also be used to remove all communities from a route.

To remove a subset of the communities on a route, use the command "**set comm-list delete**".

To remove a set term from a route map, use the **no** form of this command.

**Format** set community {<community-number> {[additive] | [no-advertise] | [no-export]} | no-advertise | no-export | none}

no set community

| Fields | Definition |
|---|---|
| **community-number** | One to sixteen community numbers, either as a 32-bit integers or in AA:NN format. Communities are separated by spaces. The well-known communities no advertise and no-export are also accepted. |
| **additive** | (Optional) Communities are added to those already attached to the route. |
| **no-advertise** | Matching route not to be advertised to any BGP peer. |
| **no-export** | Matching route not to be advertised to external BGP peer |
| **none** | Removes all communities from matching routes |

**Default** None

**Mode** Route Map Config

### 6.9.2.16. *Set interface*

If network administrator does not want to revert to normal forwarding but instead want to drop a packet that does not match the specified criteria, a set statement needs to be configured to route the packets to interface null 0 as the last entry in the route-map. **set interface null0** needs to be configured in a separate statement. It should not be added along with any other statement having other match/set terms.

A route-map statement that is used for PBR is configured as permit or deny. If the statement is marked as deny, traditional destination-based routing is performed on the packet meeting the match criteria. If the statement is marked as permit, and if the packet meets all the match criteria, then set commands in the route-map statement are applied. If no match is found in the route-map, the packet is not dropped; instead the packet is forwarded using the routing decision taken by performing destination-based routing.

To remove a set term from a route map, use the **no** form of this command.

**Format** set interface null0

no set interface null0

| Fields | Definition |
|---|---|
| **null0** | Specify the destination interface to be null interface |

**Default** None

**Mode** Route Map Config

## 6.9.2.17. *Set ip next-hop*

Use this command to specify the adjacent next-hop router in the path toward the destination to which the packets should be forwarded. If more than one IP address is specified, the ECMP rule is used to route the packets.

This command affects all incoming packet types and is always used if configured. If configured next-hop is not present in the routing table, an ARP request is sent from the router.

In a route-map statement, 'set ip next-hop' and 'set ip default next-hop' terms are mutually exclusive. However, a 'set ip default next-hop' can be configured in a separate route-map statement.

To remove a set command from a route map, use the **no** form of this command.

**Format** set ip [global |{vrf *<vrf-name>*}] next-hop <next-hop-address> [...next-hop-address]

no set ip [global |{vrf *<vrf-name>*}] next-hop <next-hop-address> [...next-hop-address]

| Fields | Definition |
|---|---|
| **vrf-name** | Virtual Routing/Forwarding instance name |
| **next-hop-address** | The IP address of the next hop to which packets are output. It must be the address of an adjacent router. A maximum of 16 next-hop IP addresses can be specified in this 'set' clause. |

**Default** None

**Mode** Route Map Config

## 6.9.2.18. *Set ip default next-hop*

Use this command to set a list of default next-hop IP addresses. If more than one IP address is specified, the ECMP rule is used.

A packet is routed to the next hop specified by this command only if there is no explicit route for the packet's destination address in the routing table. A default route in the routing table is not considered an explicit route for an unknown destination address.

In a route-map statement, 'set ip next-hop' and 'set ip default next-hop' terms are mutually exclusive. However, a 'set ip next-hop' can be configured in a separate route-map statement.

To remove a set command from a route map, use the **no** form of this command.

**Format** set ip default [global |{vrf <*vrf-name*>}] next-hop <next-hop-address> [...next-hop-address]

no set ip default [global |{vrf <*vrf-name*>}] next-hop <next-hop-address> [...next-hop-address]

| Fields | Definition |
|---|---|
| **vrf-name** | Virtual Routing/Forwarding instance name |
| **next-hop-address** | The IP address of the next hop to which packets are output. It must be the address of an adjacent router. A maximum of 16 next-hop IP addresses can be specified in this 'set' clause. |

**Default** None

**Mode** Route Map Config

### 6.9.2.19. *Set ip precedence*

Use this command to set the three IP precedence bits in the IP packet header. With three bits, you have eight possible values for the IP precedence; values 0 through 7 are defined. This command is used when implementing QoS and can be used by other QoS services, such as weighted fair queuing (WFQ) and weighted random early detection (WRED).

To reset the three IP precedence bits in the IP packet header to the default, use the **no** form of this command.

**Format** set ip precedence 0-7

no set ip precedence

| Fields | Definition |
|---|---|
| **0** | Sets the routine precedence. |
| **1** | Sets the priority precedence. |
| **2** | Sets the immediate precedence. |
| **3** | Sets the Flash precedence. |
| **4** | Sets the Flash override precedence. |

| | |
|---|---|
| **5** | Sets the critical precedence. |
| **6** | Sets the internetwork control precedence. |
| **7** | Sets the network control precedence. |

**Default** None

**Mode** Route Map Config

### 6.9.2.20. *Set ipv6 next-hop*

Use this command to set the IPv6 next hop of a route. When used in a route map applied to UPDATE messages received from a neighbor, the command sets the next hop address for matching IPv6 routes received from the neighbor. When used in a route map applied to UPDATE messages sent to a neighbor, the command sets the next hop address for matching IPv6 routes sent to the neighbor. If the address is a link local address, the address is assumed to be on the interface where UPDATE is received or sent. If the command specifies a global IPv6 address, the address is not required to be on a local subnet.

To remove a set command from a route map, use the **no** form of this command.

**Format** set ipv6 next-hop <next-hop-ipv6-address>

no set ipv6 next-hop

| Fields | Definition |
|---|---|
| **Next-hop-ipv6-address** | The IPv6 address set as the Network Address of Next Hop field in the MP_NLRI attribute of an UPDATE message. |

**Default** None

**Mode** Route Map Config

### 6.9.2.21. *Set local-preference*

To set the local preference of specific BGP routes, use the **set local-preference** command in Route Map Configuration mode. The local preference is the first attribute used to compare BGP routes. Setting the local preference can influence which route BGP selects as the best route.

When used in conjunction with a 'match as-path' or 'match ip address' command, this command can be used to prefer routes that transit certain ASs or to make the local router a more preferred exit point to certain destinations.

To remove a set command from a route map, use the **no** form of this command.

**Format** set local-preference <value>

no set local-preference

| Fields | Definition |
|---|---|
| **value** | A local preference value, from 0 to 4,294,967,295 (any 32-bit integer). |

**Default** None

**Mode** Route Map Config

### 6.9.2.22. *Set metric*

To set the metric of a route, use the **set metric** command in Route Map Configuration mode. This command sets the Multi Exit Discriminator (MED) when used in a BGP context. When there are multiple peering points between two autonomous systems (AS), setting the MED on routes advertised by one router can influence the other AS to send traffic through a specific peer.

To remove a set command from a route map, use the **no** form of this command.

**Format** set metric <value>

no set metric

| Fields | Definition |
|---|---|
| **value** | A metric value, from 0 to 4,294,967,295 (any 32-bit integer). |

**Default** None

**Mode** Route Map Config

### 6.9.2.23. *Clear ip prefix-list*

To reset IP prefix-list counters, use the **clear ip prefix-list** command in Privileged EXEC mode. This command is used to clear prefix-list hit counters. The hit count is a value indicating the number of matches to a specific prefix list entry.

**Format** clear ip prefix-list [[list-name] [prefix/length]]

| Fields | Definition |
|---|---|
| **list-name** | (Optional) Name of the prefix list from which the hit count is to be cleared. |
| **prefix/length** | (Optional) Network number and length (in bits) of the network mask. If this option is specified, hit counters are only cleared for the matching statement. |

**Default** None

**Mode** Privileged Exec

### 6.9.2.24. *Clear ipv6 prefix-list*

To reset IPv6 prefix-list counters, use the **clear ipv6 prefix-list** command in Privileged EXEC mode. This command is used to clear IPv6 prefix-list hit counters. The hit count is a value indicating the number of matches to a specific prefix list entry.

**Format** clear ipv6 prefix-list [[list-name] [ipv6-prefix/prefix-length]]

| Fields | Definition |
|---|---|
| **list-name** | (Optional) Name of the prefix list from which the hit count is to be cleared. |
| **ipv6-prefix/prefix-length** | (Optional) IPv6 prefix number and length (in bits) of the network mask. If this option is specified, hit counters are only cleared for the matching statement. |

**Default** None

**Mode** Privileged Exec

# 6.10. Border Gateway Protocol (BGP) Commands

## 6.10.1. Show commands

### 6.10.1.1. *Show ip bgp*

This command displays information relevant to the BGP router.

**Format** show ip bgp

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. Each time phase 2 of the BGP decision process runs to select new BGP routes, this number is incremented. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session.<br>• S — The table entry is stale route |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a network router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |
| **Network** | Destination prefix. |

| | |
|---|---|
| **Next Hop** | The route's BGP next hop. |
| **Metric** | Multi Exit Discriminator. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.2. *Show ip bgp <prefix/length>*

This command displays the BGP routing table entries which are filtered the display output with a prefix/length.

**Format** show ip bgp [vrf *vrf-name*] <prefix/length> [longer-prefixes | shorter-prefixes [length]]

| **Fields** | **Definition** |
|---|---|
| **vrf-name** | Display BGP route table whithin a VRF instance. |
| **prefix/length** | The destination IP prefix and prefix length entered to filter the output to display only a particular host or network in the BGP routing table. |
| **longer-prefixes** | Display the specified prefix and any longer prefixes within the same range. |
| **shorter-prefixes [length]** | Used with the *prefix/length* option to show routes whose prefix length is shorter than prefix length, and optionally longer than a specified *length*. This option may not be given if the *longer-prefixes* option is given. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **Prefix/Prefix Length** | The destination IP prefix and prefix length entered to filter the output to display only a particular host or network in the BGP routing table. |
| **Generation ID** | Incremented each time phase 2 of the decision process runs and whenever an aggregate address changes. Used to track changes to the BGP route table. |
| **Advertised to Update Groups** | The outbound update groups that this route is advertised to. |
| **Best Path** | Show best path information as following. |

| | |
|---|---|
| **Non-Best Paths** | Show non-best path information as following. |
| **Local Preference** | Local preference value as set with the set local-preference route-map configuration command or received from the peer. The default value is 100. |
| **AS Path** | An Autnonomous System path is a list of all the autonomous systems that a specific route passes through to reach one destination. |
| **Origin** | Indicates the origin of the entry. It can be **IGP**, **EGP**, and **Incomplete**. Value of the ORIGIN attribute. |
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **Type** | Type of peer (internal or external). |
| **IGP Cost** | The cost of Interior Gateway Protocol (IGP) to the BGP NEXT HOP. |
| **Peer (Peer ID)** | The IP Address of the Peer's BGP interface (The Router ID of the Peer's BGP). |
| **BGP Next Hop** | IP address of the next system that is used when forwarding a packet to the destination network. |
| **Atomic Aggregate** | Include atomic-aggregate routes or not. |
| **Aggregator (AS, Router ID)** | The information (AS number and router ID) of the speaker that aggregated the routes. |
| **Communities** | Valid value is a BGP community number in the range from 1 to 4294967200, or AA:NN (autonomous system-community number/2-byte number), no-peer, no-export, no-export-subconfed, or no-advertise. |
| **Originator** | The value of the ORIGINATOR attribute, if the attribute is attached to the path. |
| **Cluster list** | The value of the CLUSTER LIST attribute, if the attribute is attached to the path. |

### 6.10.1.3. *Show ip bgp aggregate-address*

This command displays information about the aggregate-address. If a VRF instance is specified, the aggregate addresses configured in that VRF instance are displayed.

**Format** show ip bgp [vrf *vrf-name*] aggregate-address

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Aggregation of routes with different MED values is allowed** | The aggregate-different-meds is enabled. |
| **Prefix/Len** | Destination IP prefix and prefix length. |
| **AS Set** | Indicates whether an empty AS path is advertised with the aggregate address (N) or an AS SET is advertised with the set of AS numbers for the paths contributing to the aggregate (Y). |
| **Summary Only** | Indicates whether the individual networks are suppressed (Y) or advertised (N). |
| **Active** | Indicates whether the aggregate address is currently begin advertised. |

### 6.10.1.4. *Show ip bgp community*

This command display routes that belong to specified BGP communities. If a VRF instance is specified, the routes belonging to the community within that VRF instance are displayed.

**Format** show ip bgp [vrf *vrf-name*] community [<community-number>] [exact-match] [no-advertise] [no-export]

| Fields | Definition |
|---|---|
| **vrf-name** | Display routes belonging to communities whithin a VRF instance. |
| **< community-number >** | Valid value is a community number in the range from 1 to 4294967295, or AA:NN (autonomous system-community number/2-byte number). |
| **exact-match** | Destination IP prefix and prefix length. |
| **no-advertise** | Display only routes that are not advertised to any peer. |
| **no-export** | Display only routes that are not exported outside of the local AS. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session. |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a **network** router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |
| **Network** | Destination IP address. |
| **Next Hop** | IP address of the next system that is used when forwarding a packet to the destination network. An entry of 0.0.0.0 indicates that the router has some non-BGP routes to this network. |
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command or received from the peer. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.5. *Show ip bgp community-list*

This command display routes that are permitted by the Border Gateway Protocol (BGP) community list.

**Format** show ip bgp community-list <community-list-name> [exact-match]

| Fields | Definition |
|---|---|
| **community-list-name** | Community list name. The community list name can be standard or expanded. |
| **exact-match** | Displays only routes that are an exact match for the set of communities in the matching community list statement. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session. |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a **network** router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |
| **Network** | Destination IP address. |
| **Next Hop** | IP address of the next system that is used when forwarding a packet to the destination network. An entry of 0.0.0.0 indicates that the router has some |

| | |
|---|---|
| | non-BGP routes to this network. |
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command or received from the peer. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.6. *Show ip bpg filter-list*

Use this command to display routes that conform to a specified filter list.

**Format** show ip bgp filter-list as-path-list

| **Fields** | **Definition** |
|---|---|
| **as-path-list** | Filter the output to the set of routes that match a given AS Path list. It can be a number from 1 to 500. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| **Fields** | **Definition** |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session.<br>• S – The table entry stale route. |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the |

| | |
|---|---|
| | table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a **network** router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |
| **Network** | Destination IP address. |
| **Next Hop** | IP address of the next system that is used when forwarding a packet to the destination network. An entry of 0.0.0.0 indicates that the router has some non-BGP routes to this network. |
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command or received from the peer. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.7. *Show ip bgp neighbors*

This command displays information about Border Gateway Protocol (BGP) and TCP connections to neighbors. If a VRF instance is specified, the routes information for the neighbors within that VRF instance are displayed.

**Format** show ip bgp [vrf *vrf-name*] neighbors [<ip-address> [advertised-routes | policy | received-routes | rejected-routes | routes] | policy]

| Fields | Definition |
|---|---|
| **vrf-name** | Display routes whithin a VRF instance. |
| **ip-address** | Displays information about the IPv4 neighbor. If this argument is omitted, information about all neighbors is displayed. |
| **Policy** | Display inbound and outbound policies for all neighbors or the specified neighbor. |
| **Advertised-routes** | Display routes advertised to a neighbor. |
| **Received-routes** | Display routes received from a neighbor. |
| **Rejected-routes** | Display routes rejected by inbound policy. |
| **Routes** | Display routes accepted by inbound policy. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Remote Address** | The IP Address of the Peer's BGP interface. |
| **Remote AS** | Autonomous system number of the neighbor. |
| **BFD Enabled to Detect Fast Fallover** | Specify if BFD has been enabled for BGP neighbors. |
| **Peer ID** | Router ID of the neighbor. |
| **Peer Admin Status** | States whether BGP is enabled or disabled of the neighbor. |
| **Peer State** | Finite state machine (FSM) stage of session negotiation. |
| **Local Interface Address** | The IPv4 address used as the source IP address in packets sent to this neighbor. |
| **Local Port** | The port number of the local port. |
| **Remote Port** | The port number of the remote port. |
| **Connection Retry Interval** | Time interval, in seconds, at which the device resend messages to this neighbor. |
| **Neighbor Capabilities** | BGP capabilities advertised and received from this neighbor. |
| **IPv4 Unicast Support** | Support IPv4 unicast packets or not. The valid value will be Both, Sent, Received or None. |
| **VPNv4 Unicast Support** | Support VPNv4 unicast packets or not. The valid value will be Both, Sent, Received or None. |
| **IPv6 Unicast Support** | Support IPv6 unicast packets or not. The valid value will be Both, Sent, Received or None. |
| **BGP Graceful-Restart Mode** | BGP Graceful-Restart mode. Enabled or Disabled. |
| **BGP Graceful-Restart Restart-Time** | BGP graceful restart helper restart timer. |
| **Template Name** | Name of a locally configured peer policy template. |
| **Update Source** | The configured value for the source IP address of packets sent to this neighbor. This field is only included in the output if the update source is configured. |
| **Configured Hold Time** | Configured time for this neighbor, in seconds, that BGP will maintain the |

| | |
|---|---|
| | session with this neighbor without receiving a messages. |
| **Configured Keep Alive Time** | Configured time interval for this neighbor, in seconds, at which keepalive messages are transmitted to this neighbor. |
| **Negotiated Hold Time** | Negotiated time with this neighbor, in seconds, that BGP will maintain the session with this neighbor without receiving a messages. |
| **Negotiated Keep Alive Time** | Negotiated time interval with this neighbor, in seconds, at which keepalive messages are transmitted to this neighbor. |
| **MD5 Password** | The TCP MD5 password, if one is configured, in plain text. |
| **eBGP-MultiHop** | Configured TTL value of the external BGP for this neighbor. |
| **Last Error ()** | Last error from received or sent for this neighbor. |
| **Last SubError** | Last sub error for this neighbor. |
| **Time Since Last Error** | The time stamps in which the last error occurred. |
| **Established Transitions** | The number of connections established. |
| **Flap Count** | Total number of times the neighbor flaps. |
| **Established Time** | The time from the last connection established. |
| **Time Since Last Update** | The time from the last Update message received. |
| **IPv4 Outbound Update Group** | The corresponding index number of the IPv4 update group. |
| **IPv6 Outbound Update Group** | The corresponding index number of the IPv6 update group. |
| **BFD Enabled to Detect Fast Fallover** | Indicate if the BFD is enabled for this BGP neighbor. |
| **Msgs Sent** | Total number of transmitted messages. |
| **Msgs Rcvd** | Total number of received messages. |
| **Open** | Number of open messages sent and received. |
| **Update** | Number of update messages sent and received. |
| **Keepalive** | Number of keepalive messages sent and received. |
| **Notification** | Number of notification (error) messages sent and received. |
| **Refresh** | Number of route refresh request messages sent and received. |
| **Total** | Total number of messages sent and received. |

| | |
|---|---|
| **Received UPDATE Queue Size** | The statistics of received UPDATE queue (Size, High, Limit, Drops). |
| **IPv4 Prefix Statistics** | The statistics of the IPv4 prefix. |
| **VPNv4 Perfix Statistics** | The statistics of the VPNv4 prefix. |
| **IPv6 Prefix Statistics** | The statistics of the IPv6 prefix. |
| **Prefixes Advertised** | Number of prefixes advertised. |
| **Prefixes Withdrawn** | Number of prefixes withdrawn. |
| **Prefixes Current** | Number of prefixes current kept. |
| **Prefixes Accepted** | Number of prefixes accepted. |
| **Prefixes Rejected** | Number of prefixes rejected. |
| **Max NLRI per Update** | Maximum number of network layer reachability attributes in UPDATEs. |
| **Min NLRI per Update** | Minimum number of network layer reachability attributes in UPDATEs. |
| **L2VPN EVPN Support** | Support L2VPN EVPN or not. The valid value will be Advertised, Received or None. |
| **Next-Hop-Unchanged** | Whether next hop unchanged is enabled or disabled. |
| **L2VPN Prefix Statistics** | The statistics of the L2VPN prefix. |

### 6.10.1.8. *Show ip bgp prefix-list*

This command displays information about a prefix list or prefix list entries.

**Format** show ip bgp prefix-list <prefix-list-name>

| **Fields** | **Definition** |
|---|---|
| **prefix-list-name** | Filter the output to the set of routes that match a given prefix list.. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| **Fields** | **Definition** |
|---|---|

| | |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session.<br>• S — The table entry stale route. |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a **network** router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |
| **Network** | Destination IP address. |
| **Next Hop** | IP address of the next system that is used when forwarding a packet to the destination network. An entry of 0.0.0.0 indicates that the router has some non-BGP routes to this network. |
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command or received from the peer. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.9. *Show ip bgp route-reflection*

This command displays all global configuration related to IPv4 route reflection, including the cluster ID and whether client-to-client route reflection is enabled, and lists all the neighbors that are configured as route reflector clients. If a VRF instance is specified, the routes within that VRF instance are displayed.

If a route reflector client is configured with an outbound route map, the output warns that the set statements in the route map are ignored when reflecting routes to this client.

**Format** show ip bgp [vrf *vrf-name*] route-reflection

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Cluster ID** | The cluster ID used by this router. The value configured with the *bgp cluster-id* command is displayed. If no cluster-ID is configured, the local router ID is shown and tagged as default. |
| **Client-to-client Reflection** | Display Enabled when this router reflectors routes received from it clients to its other clients; otherwise display Disabled. |
| **Clients** | A list of this router's internal peers that have been configured as router reflector clients. |
| **Non-client Internal Peer** | A list of this router's internal peers that are not configured as route reflector clients. Routes from non-client peers are reflected to clients and vice-versa. |

### 6.10.1.10. *Show ip bgp summary*

This command displays the status of all Border Gateway Protocol (BGP) connections. If a VRF instance is specified, the configuration and status for the routes within that VRF instance are displayed.

**Format** show ip bgp [vrf *vrf-name*] summary

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **IPv4 Routing** | Whether IPv4 routing is globally enabled. |
| **BGP Admin Mode** | Shows whether the administrative mode of BGP in the router is enabled or disabled. |
| **BGP Operational Mode** | Shows whether the BGP is operated in enabled or disabled. |
| **BGP Router ID** | Router ID for the current BGP. |

| | |
|---|---|
| **Local AS Number** | Autonomous system number of the current BGP. |
| **Number of Network Entries** | Number of unique prefix entries in the BGP database. |
| **Number of AS Paths** | Number of path entries in the BGP database. |
| **Dynamic Neighbors Current/High/Limit** | The limit number of BGP dynamic neighbors |
| **Neighbor** | IP address of the neighbor. |
| **ASN** | Autonomous system number of the neighbor. |
| **MsgRcvd** | Number of messages received from the neighbor. |
| **MsgSent** | Number of messages sent to the neighbor. |
| **State** | The area ID of the OSPF area associated with the interface. |
| **Up/Down Time** | The length of time that the BGP session has been in the Established state, or the current status if not in the Established state. |
| **Pfx Rcvd** | The number of prefixes that have been received from a neighbor. |

### 6.10.1.11. *Show ip bgp template*

This command displays peer policy template configurations.

**Format** show ip bgp template [<template-name>]

| **Fields** | Definition |
|---|---|
| **template-name** | Displays the configurations in a specific template. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| **Fields** | Definition |
|---|---|
| **template-name** | Name of the peer template. |
| **AF** | Address Family (IPv4 or IPv6). |
| **Configuration** | The configuration information of the peer template. |

### 6.10.1.12. *Show ip bgp traffic*

This command displays global BGP message counters. If a VRF instance is specified, the counters within that VRF instance are displayed.

**Format** show ip bgp [vrf *vrf-name*] traffic

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| **Fields** | Definition |
|---|---|
| **Time Since Counters Cleared** | How long ago the SPF ran. The time is in the format hh:mm:ss, giving the hours, minutes, and seconds since the SPF run. |
| **BGP Message Statistics** | The statistics of BGP messages sent/received. |
| **Recd** | Total number of received messages. |
| **Sent** | Total number of transmitted messages. |
| **Open** | Number of open messages sent and received. |
| **Update** | Number of update messages sent and received. |
| **Notification** | Number of notification (error) messages sent and received. |
| **Keepalive** | Number of keepalive messages sent and received. |
| **Refresh** | Number of route refresh request messages sent and received. |
| **Total** | Total number of messages sent and received. |
| **Max Received UPDATE rate** | Maximum rate of received UPDATE messages. |
| **Max Send UPDATE rate** | Maximum rate of sent UPDATE messages. |
| **BGP Queue Statistics** | The queue statistics of BGP protocol thread. |
| **Events** | Holds configuration events, timer expiration events and TCP status reports. |
| **Keepalive Tx** | Keepalive timer event expirations. |
| **Dec Proc** | Holds events to trigger one of the 3 phases of the decision proces. |

| | |
|---|---|
| **Rx Data** | Incoming data. |
| **RTO Notifications** | RTO notifications. Redistributed routes and next hop resolution changes. |
| **MIB Queries** | BGP MIB path queries. |
| **Current** | Number of messages in queue currently. |
| **Max** | Maximum number of messages in queue. |
| **Drops** | Number of messages dropped. |
| **Limit** | Maximum size of queue. |

### 6.10.1.13. *Show ip bgp update-group*

This command displays information about the Border Gateway Protocol (BGP) update groups. If a VRF instance is specified, the status of the update groups for that VRF instance are displayed.

**Format** show ip bgp [vrf *vrf-name*] update-group [index-group | peeripadd]

| **Fields** | Definition |
|---|---|
| **index-group** | Update group type with its corresponding index number. The range of update-group index numbers is from 1 to 4294967295. |
| **Peeripadd** | IPv4 or IPv6 address of a single neighbor who is a member of an update group. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| **Fields** | **Definition** |
|---|---|
| **Update Group** | Update-group number. |
| **Peer Type** | Update-group type (internal or external). |
| **Minimum Advertisement Interval** | Minimum time, in seconds, between update advertisements. |
| **Send Community** | If the BGP communities are included in route advertisements to members of the group. |

| | |
|---|---|
| **Send Extended Community** | If the BGP extended communites are included in route advertisements to members of the group. |
| **Remove Private ASNs** | If BGP removes private ASNs from paths advertised to members of this update group.<br>Replace if BGP replaces private ASNs with the local ASN.<br>Remove if private ASNs are simply removed.<br>Otherwsie No. |
| **Route Reflector Client** | If peers in this update group are route reflector clients. |
| **Neighbor AS Path Access List Out** | Neighbor AS Path list out. All members of the group use the same. |
| **Neighbor Prefix List Out** | Neighbor prefix list out. All members of the group use the same. |
| **Neighbor Route Map Out** | Neighbor route map out. All members of the group use the same. |
| **Members Added** | Number of members added to the group. |
| **Members Removed** | Number of members removed from the group. |
| **Update Version** | Number of times phase 3 of the decision process has run for the group. |
| **Number of UPDATES Sent** | Number of UPDATE packets sent to this group. |
| **Time Since Last UPDATE** | Number of seconds since last UPDATE sent to group. |
| **Current Prefixes** | Number of prefixes currently advertised to the group. |
| **Current Paths** | Number of paths in update group's Adj-RIB-Out. |
| **Prefixes Advertised** | Number of prefixes advertised. |
| **Prefixes Withdrawn** | Number of prefixes withdrawn. |
| **UPDATE Send Failures** | Number of Tx of UPDATE message failed to one or more group members. |
| **Current Members** | The IPv4 address of all current members of the group. |
| **Version** | The number of times decision process phase 3 had run before this history table entry. |
| **Delta T** | When update send occured. |
| **Duration** | How long the update send process took. |
| **UPD Built** | Number of UPDATE messages constructed during this update send. |
| **UPD Sent** | Number of UPDATE messages transmitted during this update send. Generally each UPDATE built is sent once to each member of the update group. |

| | |
|---|---|
| **Paths Sent** | Number of prefixes advertised during this update send. |
| **Pfxs Adv** | Number of prefixes withdrawn during this update send. |
| **Pfxs Wd** | Number of paths advertised. |

### 6.10.1.14. *Show bgp ipv6*

This command displays IPv6 routes in the BGP routing table.

**Format** show bgp ipv6

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. Each time phase 2 of the BGP decision process runs to select new BGP routes, this number is incremented. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session.<br>• S — The table entry is stale route |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a **network** router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |

| | |
|---|---|
| **Network** | IPv6 Destination prefix. |
| **Next Hop** | The IPv6 route's BGP next hop. |
| **Metric** | Multi Exit Discriminator. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.15. *Show bgp ipv6 <ipv6-prefix/prefix-length>*

This command displays the BGP routing table entries which are filtered the display output with a ipv6-prefix/prefix-length.

**Format** show bgp ipv6 <ipv6-prefix/prefix-length> [longer-prefixes | shorter-prefixes [length]]

| Fields | Definition |
|---|---|
| **ipv6-prefix/length** | The destination IPv6 prefix and prefix length entered to filter the output to display only a particular host or network in the BGP routing table. |
| **longer-prefixes** | Display the specified prefix and any longer prefixes within the same range. |
| **shorter-prefixes [length]** | Used with the *ipv6-prefix/prefix-length* option to show routes whose prefix length is shorter than prefix length, and optionally longer than a specified *length*. This option may not be given if the *longer-prefixes* option is given. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **ipv6-prefix/length** | The destination IPv6 prefix and prefix length entered to filter the output to display only a particular host or network in the BGP routing table. |
| **Generation ID** | Incremented each time phase 2 of the decision process runs and whenever an aggregate address changes. Used to track changes to the BGP route table. |
| **Advertised to Update Groups** | The outbound update groups that this route is advertised to. |
| **Best Path** | Show best path information as following. |

| | |
|---|---|
| **Non-Best Paths** | Show non-best path information as following. |
| **Local Preference** | Local preference value as set with the set local-preference route-map configuration command or received from the peer. The default value is 100. |
| **AS Path** | An Autnonomous System path is a list of all the autonomous systems that a specific route passes through to reach one destination. |
| **Origin** | Indicates the origin of the entry. It can be **IGP**, **EGP**, and **Incomplete**. Value of the ORIGIN attribute. |
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **Type** | Type of peer (internal or external). |
| **IGP Cost** | The cost of Interior Gateway Protocol (IGP) to the BGP NEXT HOP. |
| **Peer (Peer ID)** | The IP Address of the Peer's BGP interface (The Router ID of the Peer's BGP). |
| **BGP Next Hop** | IP address of the next system that is used when forwarding a packet to the destination network. |
| **Atomic Aggregate** | Include atomic-aggregate routes or not. |
| **Aggregator (AS, Router ID)** | The information (AS number and router ID) of the speaker that aggregated the routes. |
| **Communities** | Valid value is a BGP community number in the range from 1 to 4294967200, or AA:NN (autonomous system-community number/2-byte number), **no-peer**, **no-export**, **no-export-subconfed**, or **no-advertise**. |
| **Originator** | The value of the ORIGINATOR attribute, if the attribute is attached to the path. |
| **Cluster list** | The value of the CLUSTER LIST attribute, if the attribute is attached to the path. |

### 6.10.1.16. *Show bgp ipv6 aggregate-address*

This command displays information about the aggregate-address.

**Format** show bgp ipv6 aggregate-address

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Aggregation of routes with different MED values is allowed** | The aggregate-different-meds is enabled. |
| **Prefix/Len** | Destination IPv6 prefix and prefix length. |
| **AS Set** | Indicates whether an empty AS path is advertised with the aggregate address (N) or an AS SET is advertised with the set of AS numbers for the paths contributing to the aggregate (Y). |
| **Summary Only** | Indicates whether the individual networks are suppressed (Y) or advertised (N). |
| **Active** | Indicates whether the aggregate address is currently begin advertised. |

### 6.10.1.17. *Show bgp ipv6 community*

This command display routes that belong to specified BGP communities.

**Format** show bgp ipv6 community [<community-number>] [exact-match] [no-advertise] [no-export] [no-export-subconfed]

| Fields | Definition |
|---|---|
| **< community-number >** | Valid value is a community number in the range from 1 to 4294967295, or AA:NN (autonomous system-community number/2-byte number). |
| **exact-match** | Display only routes that are members of those communities specified in the command. |
| **no-advertise** | Display only routes that are not advertised to any peer. |
| **no-export** | Display only routes that are not exported outside of the local AS. |
| **no-export-subconfed** | Display only routes that are not sent outside of the local AS or subconfeds. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session. |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a **network** router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |
| **Network** | Destination IP address. |
| **Next Hop** | IPv6 address of the next system that is used when forwarding a packet to the destination network. |
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command or received from the peer. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.18. *show bgp ipv6 community-list*

This command display IPv6 routes that are permitted by the Border Gateway Protocol (BGP) community list.

**Format** show bgp ipv6 community-list <community-list-name> [exact-match]

| Fields | Definition |
|---|---|
| **community-list-name** | Community list name. The community list name can be standard or expanded. |
| **exact-match** | Displays only routes that are an exact match for the set of communities in the matching community list statement. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session. |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a **network** router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |
| **Network** | Destination IP address. |
| **Next Hop** | IP address of the next system that is used when forwarding a packet to the destination network. An entry of 0.0.0.0 indicates that the router has some non-BGP routes to this network. |

| | |
|---|---|
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command or received from the peer. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.19. *show ip bgp vpnv4*

This command displays BGP VPNv4 routes.

**Format** show ip bgp vpnv4 <prefix/length> | all | {rd <as-number>:<value> | <ip-address>:<value>} | vrf <vrfname>

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. Each time phase 2 of the BGP decision process runs to select new BGP routes, this number is incremented. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session.<br>• S — The table entry is stale route |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and |

| | |
|---|---|
| | was advertised with a network router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |
| **Network** | Destination prefix. |
| **Next Hop** | The route's BGP next hop. |
| **Metric** | Multi Exit Discriminator. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.20. *show ip bgp listen range*

This command displays IPv4 BGP listen ranges as well as peers discovered.

**Format** show ip bgp listen range

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Listen Range** | The IP address range to listen BGP peers |
| **Inherited Template** | The peer template inherited |
| **Member** | The IP address of the BGP peer discovered |
| **ASN** | The AS number which the BGP peer belongs to |
| **State** | The neighboring state of the BGP peer discovered |

### 6.10.1.21. *Show ip protocols bgp*

This command displays setting of IPv4 BGP configuration. If the virtual router is specified, the summary of the configuration and status running in the specified virtual router is listed. If no virtual router is specified, the configuration and status for the default router are displayed.

**Format** show ip protocol [vrf vrf-name] bgp

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Routing Protocol** | Routing protocol of these setting. It's always BGP in this case. |
| **BGP Router ID** | Setting of BGP router ID |
| **Local AS Number** | AS Number of this device. |
| **BGP Admin Mode** | Whether BGP protocol is enabled. (Enabled or Disabled). |
| **BGP GR-Enabled Mode** | Whether BGP Graceful Restart Enabled Mode is enabled. (Enabled or Disabled) |
| **BGP GR-Aware Mode** | Whether BGP Graceful Restart Aware Mode is enabled. (Enabled or Disabled) |
| **BGP GR restart-time** | Setting of BGP Graceful Restart Timer. |
| **BGP GR stalepath-time** | Setting of BGP Graceful Stale Path Timer. |
| **Maximum Paths** | The maximum number of next hops in an internal or external BGP route. |
| **Always compare MED** | Whether BGP is configured to compare the MEDs for routers received from peers in different ASs. |
| **Maximum AS Path Length** | Limit on the length of AS paths that BGP accepts from its neighbors. |
| **Fast Internal Failover** | Whether BGP immediately brings down an iBGP adjacency if the routing table manager reports that the peer address is no longer reachable. |
| **Fast External Failover** | Whether BGP immediately brings down a eBGP adjacency if the routing table manager reports that the peer address is no longer reachable.. |
| **Distance** | The administrative distance for intra-area, inter-area, and external routes. |
| **Prefix List In** | The global prefix list used to filter inbound routers from all neighbors. |
| **Prefix List Out** | The global prefix list used to filter outbound routers from all neighbors. |

| | |
|---|---|
| **Networks Originated** | The set of networks originated through a network command. Those networks that are actually advertised to neighbors are marked “active”. |

### 6.10.1.22. *Show bgp ipv6 filter-list*

Use this command to display routes that conform to a specified filter list.

**Format** show bgp ipv6 filter-list as-path-list

| Fields | Definition |
|---|---|
| **as-path-list** | Filter the output to the set of routes that match a given AS Path list. It can be a number from 1 to 500. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **BGP table version** | The BGP Table Version is the main number used. This number is the same as the Generation ID of any BGP prefix for a specific address family and is used to track changes to the BGP route table. |
| **Local Route ID** | A 32-bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **Status Codes** | Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:<br>• s — The table entry is suppressed.<br>• * — The table entry is valid.<br>• > — The table entry is the best entry to use for that network.<br>• i — The table entry was learned via an internal BGP (iBGP) session.<br>• S — The table entry stale route. |
| **Origin codes** | Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:<br>• i — Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a **network** router configuration command.<br>• e — Entry originated from an Exterior Gateway Protocol (EGP).<br>• ? — Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP. |

| | |
|---|---|
| **Network** | Destination IPv6 address. |
| **Next Hop** | IPv6 address of the next system that is used when forwarding a packet to the destination network. |
| **Metric** | The value of the interautonomous system metric. Value of the MED attribute, if included. |
| **LocPref** | Local preference value as set with the **set local-preference** route-map configuration command or received from the peer. The default value is 100. |
| **Path** | Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path. |

### 6.10.1.23. *Show bgp ipv6 neighbors*

This command displays information about Border Gateway Protocol (BGP) and TCP connections to neighbors.

**Format** show bgp ipv6 neighbors [<ip-address> [advertised-routes | policy | received-routes | rejected-routes | routes] | policy | {autodetect interface <interface-name>}]

| Fields | Definition |
|---|---|
| **ip-address** | Displays information about the IPv6 neighbor. If this argument is omitted, information about all neighbors is displayed. |
| **Policy** | Display inbound and outbound policies for all neighbors or the specified neighbor. |
| **advertised-routes** | Display routes advertised to a neighbor. |
| **received-routes** | Display routes received from a neighbor. |
| **rejected-routes** | Display routes rejected by inbound policy. |
| **Routes** | Display routes accepted by inbound policy. |
| **Autodetect** | Display information about the autodetected IPv6 neighbor on the specified *interface-name*. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Remote Address** | The IP Address of the Peer's BGP interface. |
| **Autodetect Status** | Display only if the peer is configured as “autodetect”. The field shows one of the following statuses: “Peer is detected”, “Peer is not detected”, or “Multiple peers are detected”. |
| **Remote AS** | Autonomous system number of the neighbor. |
| **Allow my ASN occurences** | The allowas-in count for a given peer. |
| **Peer ID** | Router ID of the neighbor. |
| **Peer Admin Status** | States whether BGP is enabled or disabled of the neighbor. |
| **Peer State** | Finite state machine (FSM) stage of session negotiation. |
| **Local Interface Address** | The IPv6 address used as the source IP address in packets sent to this neighbor. |
| **Local Port** | The port number of the local port. |
| **Remote Port** | The port number of the remote port. |
| **Connection Retry Interval** | Time interval, in seconds, at which the device resend messages to this neighbor. |
| **Neighbor Capabilities** | BGP capabilities advertised and received from this neighbor. |
| **IPv4 Unicast Support** | Support IPv4 unicast packets or not. The valid value will be Both, Sent, Received or None. |
| **VPNv4 Unicast Support** | Support VPNv4 unicast packets or not. The valid value will be Both, Sent, Received or None. |
| **IPv6 Unicast Support** | Support IPv6 unicast packets or not. The valid value will be Both, Sent, Received or None. |
| **RFC 5549 Support** | Support RFC5549 or not. |
| **BGP Graceful-Restart Mode** | BGP Graceful-Restart mode. Enabled or Disabled. |
| **BGP Graceful-Restart Restart-Time** | BGP graceful restart helper restart timer. |
| **Template Name** | Name of a locally configured peer policy template. |
| **Update Source** | The configured value for the source IP address of packets sent to this neighbor. This field is only included in the output if the update source is configured. |
| **Configured Hold Time** | Configured time for this neighbor, in seconds, that BGP will maintain the session with this neighbor without receiving a messages. |
| **Configured Keep Alive Time** | Configured time interval for this neighbor, in seconds, at which keepalive messages are transmitted to this neighbor. |

| | |
|---|---|
| **Negotiated Hold Time** | Negotiated time with this neighbor, in seconds, that BGP will maintain the session with this neighbor without receiving a messages. |
| **Negotiated Keep Alive Time** | Negotiated time interval with this neighbor, in seconds, at which keepalive messages are transmitted to this neighbor. |
| **MD5 Password** | The TCP MD5 password, if one is configured, in plain text. |
| **eBGP-MultiHop** | Configured TTL value of the external BGP for this neighbor. |
| **Last Error ()** | Last error from received or sent for this neighbor. |
| **Last SubError** | Last sub error for this neighbor. |
| **Time Since Last Error** | The time stamps in which the last error occurred. |
| **Established Transitions** | The number of connections established. |
| **Flap Count** | Total number of times the neighbor flaps. |
| **Established Time** | The time from the last connection established. |
| **Time Since Last Update** | The time from the last Update message received. |
| **IPv4 Outbound Update Group** | The corresponding index number of the IPv4 update group. |
| **IPv6 Outbound Update Group** | The corresponding index number of the IPv6 update group. |
| **BFD Enabled to Detect Fast Fallover** | Indicate if the BFD is enabled for this BGP neighbor. |
| **Msgs Sent** | Total number of transmitted messages. |
| **Msgs Rcvd** | Total number of received messages. |
| **Open** | Number of open messages sent and received. |
| **Update** | Number of update messages sent and received. |
| **Keepalive** | Number of keepalive messages sent and received. |
| **Notification** | Number of notification (error) messages sent and received. |
| **Refresh** | Number of route refresh request messages sent and received. |
| **Total** | Total number of messages sent and received. |
| **Received UPDATE Queue Size** | The statistics of received UPDATE queue (Size, High, Limit, Drops). |
| **IPv4 Prefix Statistics** | The statistics of the IPv4 prefix. |

| | |
|---|---|
| **IPv6 Prefix Statistics** | The statistics of the IPv6 prefix. |
| **Prefixes Advertised** | Number of prefixes advertised. |
| **Prefixes Withdrawn** | Number of prefixes withdrawn. |
| **Prefixes Current** | Number of prefixes current kept. |
| **Prefixes Accepted** | Number of prefixes accepted. |
| **Prefixes Rejected** | Number of prefixes rejected. |
| **Max NLRI per Update** | Maximum number of network layer reachability attributes in UPDATEs. |
| **Min NLRI per Update** | Minimum number of network layer reachability attributes in UPDATEs. |

### 6.10.1.24. *Show bgp ipv6 route-reflection*

This command displays all global configuration related to IPv4 route reflection, including the cluster ID and whether client-to-client route reflection is enabled, and lists all the neighbors that are configured as route reflector clients.
If a route reflector client is configured with an outbound route map, the output warns that the set statements in the route map are ignored when reflecting routes to this client.

**Format** show bgp ipv6 route-reflection

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Cluster ID** | The cluster ID used by this router. The value configured with the *bgp cluster-id* command is displayed. If no cluster-ID is configured, the local router ID is shown and tagged as default. |
| **Client-to-client Reflection** | Display Enabled when this router reflectors routes received from it clients to its other clients; otherwise display Disabled. |
| **Clients** | A list of this router's internal peers that have been configured as router reflector clients. |
| **Non-client Internal Peer** | A list of this router's internal peers that are not configured as route reflector clients. Routes from non-client peers are reflected to clients and vice-versa. |

### 6.10.1.25. *Show bgp ipv6 statistics*

This command displays the recent decision process history.

**Format** show bgp ipv6 statistics

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Delta T** | The time values since decision process ran. Hours:minutes:seconds if the elapsed time is less than 24 hours. Otherwise, days:hours. |
| **Phase** | In which decision process phase that ran. |
| **Upd Grp** | Outbound update group ID. Only set when decProcPhase is 3. |
| **GenId** | Generation ID of BGP routing table when decision process was run. The generation ID is incremented each time phase 2 of the decision process is run and when there is a change to the status of aggregate addresses. |
| **Reason** | Why decision process was triggered. |
| **Peer** | Phase 1 of the decision process can be triggered for a specific peer when a peer's inbound routing policy changes or the peer is reset. When phase 1 is run for a single peer, the peer's IP address is given. |
| **Duration** | How long the decision process phase took, in milliseoncds. |
| **Adds** | Number of routes added during decision process phase. |
| **Mods** | Number of routes modified during decision process phase. Always 0 in phase 1. |
| **Dels** | Number of routes deleted during decision process phase. Always 0 in phase 1. |

### 6.10.1.26. *Show bgp ipv6 summary*

This command displays the status of all Border Gateway Protocol (BGP) connections.

**Format** show bgp ipv6 summary

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **IPv6 Routing** | Whether IPv6 routing is globally enabled. |
| **BGP Admin Mode** | Shows whether the administrative mode of BGP in the router is enabled or disabled. |
| **BGP Operational Mode** | Shows whether the BGP is operated in enabled or disabled. |
| **BGP Router ID** | Router ID for the current BGP. |
| **Local AS Number** | Autonomous system number of the current BGP. |
| **Number of Network Entries** | Number of unique IPv6 prefix entries in the BGP database. |
| **Number of AS Paths** | Number of path entries in the BGP database. |
| **Neighbor** | IPv6 address of the neighbor. |
| **ASN** | Autonomous system number of the neighbor. |
| **MsgRcvd** | Number of messages received from the neighbor. |
| **MsgSent** | Number of messages sent to the neighbor. |
| **State** | The area ID of the OSPF area associated with the interface. |
| **Up/Down Time** | The length of time that the BGP session has been in the Established state, or the current status if not in the Established state. |
| **Pfx Rcvd** | The number of IPv6 prefixes that have been received from a neighbor. |

### 6.10.1.27. *Show bgp ipv6 update-group*

This command displays information about the Border Gateway Protocol (BGP) update groups and their numbers.

**Format** show bgp ipv6 update-group [index-group | peeripadd | autodetect interface <interface-name>]

| Fields | Definition |
|---|---|
| **index-group** | Update group type with its corresponding index number. The range of update-group index numbers is from 1 to 4294967295. |
| **Peeripadd** | IPv4 or IPv6 address of a single neighbor who is a member of an update group. |
| **Autodetect** | The routing interface on which the neighbor's link local IPv6 address is auto detected. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Update Group** | Update-group number. |
| **Peer Type** | Update-group type (internal or external). |
| **Minimum Advertisement Interval** | Minimum time, in seconds, between update advertisements. |
| **Send Community** | If the BGP communities are included in route advertisements to members of the group. |
| **Remove Private ASNs** | If BGP removes private ASNs from paths advertised to members of this update group.<br>Replace if BGP replaces private ASNs with the local ASN.<br>Remove if private ASNs are simply removed.<br>Otherwsie No. |
| **Route Reflector Client** | If peers in this update group are route reflector clients. |
| **Neighbor AS Path Access List Out** | Neighbor AS Path list out. All members of the group use the same. |
| **Neighbor Prefix List Out** | Neighbor prefix list out. All members of the group use the same. |
| **Neighbor Route Map Out** | Neighbor route map out. All members of the group use the same. |
| **Members Added** | Number of members added to the group. |
| **Members Removed** | Number of members removed from the group. |
| **Update Version** | Number of times phase 3 of the decision process has run for the group. |
| **Number of UPDATES Sent** | Number of UPDATE packets sent to this group. |
| **Time Since Last UPDATE** | Number of seconds since last UPDATE sent to group. |
| **Current Prefixes** | Number of prefixes currently advertised to the group. |
| **Current Paths** | Number of paths in update group's Adj-RIB-Out. |
| **Prefixes Advertised** | Number of prefixes advertised. |

| | |
|---|---|
| **Prefixes Withdrawn** | Number of prefixes withdrawn. |
| **UPDATE Send Failures** | Number of Tx of UPDATE message failed to one or more group members. |
| **Current Members** | The IPv4 address of all current members of the group. |
| **Version** | The number of times decision process phase 3 had run before this history table entry. |
| **Delta T** | When update send occured. |
| **Duration** | How long the update send process took. |
| **UPD Built** | Number of UPDATE messages constructed during this update send. |
| **UPD Sent** | Number of UPDATE messages transmitted during this update send. Generally each UPDATE built is sent once to each member of the update group. |
| **Paths Sent** | Number of prefixes advertised during this update send. |
| **Pfxs Adv** | Number of prefixes withdrawn during this update send. |
| **Pfxs Wd** | Number of paths advertised. |

### 6.10.1.28. *Show ipv6 protocols bgp*

This command displays setting of IPv6 BGP configuration.

**Format** show ipv6 protocol bgp

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| **Fields** | Definition |
|---|---|
| **Routing Protocol** | Routing protocol of these setting. It's always BGP in this case. |
| **BGP Router ID** | Setting of BGP router ID |
| **Local AS Number** | AS Number of this device. |
| **BGP Admin Mode** | Whether BGP protocol is enabled. (Enabled or Disabled). |
| **BGP GR-Enabled Mode** | Whether BGP Graceful Restart Enabled Mode is enabled. (Enabled or Disabled) |

| | |
|---|---|
| **BGP GR-Aware Mode** | Whether BGP Graceful Restart Aware Mode is enabled. (Enabled or Disabled) |
| **BGP GR restart-time** | Setting of BGP Graceful Restart Timer. |
| **BGP GR stalepath-time** | Setting of BGP Graceful Stale Path Timer. |
| **Maximum Paths** | The maximum number of next hops in an internal or external BGP route. |
| **Always compare MED** | Whether BGP is configured to compare the MEDs for routers received from peers in different ASs. |
| **Maximum AS Path Length** | Limit on the length of AS paths that BGP accepts from its neighbors. |
| **Fast Internal Failover** | Whether BGP immediately brings down a iBGP adjacency if the routing table manager reports that the peer address is no longer reachable. |
| **Fast External Failover** | Whether BGP immediately brings down a eBGP adjacency if the routing table manager reports that the peer address is no longer reachable.. |
| **Distance** | The administrative distance for intra-area, inter-area, and external routes. |
| **Prefix List In** | The global prefix list used to filter inbound routers from all neighbors. |
| **Prefix List Out** | The global prefix list used to filter outbound routers from all neighbors. |
| **Networks Originated** | The set of networks originated through a network command. Those networks that are actually advertised to neighbors are marked “active”. |

### 6.10.1.29. *Show bgp ipv6 listen range*

This command displays IPv6 BGP listen ranges as well as peers discovered.

**Format** show bgp ipv6 listen range [<ipv6-prefix>/<prefix-length>]

| Fields | Definition |
|---|---|
| **listen range** | Display all listen subnet ranges that have been created. |
| **<ipv6-prefix>/<prefix-length>** | Display information about specified listen range. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Listen Range** | The IP address range to listen BGP peers |
| **Inherited Template** | The peer template inherited |
| **Member** | The IP address of the BGP peer discovered |
| **ASN** | The AS number which the BGP peer belongs to |
| **State** | The neighboring state of the BGP peer discovered |

### 6.10.1.30. *Show bgp l2vpn evpn summary*

This command displays a summary of BGP configuration and status of L2VPN address family.

**Format** show bgp l2vpn evpn summary

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **EVPN Control Plane** | Whether EVPN is globally enabled. BGP does not include the L2VPN EVPN AFI/SAFI capability in OPEN messages it sends unless evpn is globally enabled |
| **BGP Admin Mode** | Whether BGP is globally enabled |
| **BGP Router ID** | The configured router ID |
| **Local AS Number** | The router's AS number |
| **Number of Network Entries** | The number of distrinct L2VPN prefixes in the local routing table |
| **Number of AS Paths** | The number of AS paths in the local routing table |
| **Dynamic Neighbors** | Shows current number of created dynamic IPv4 BGP neighbors, high water mark and a limit of dynamic IPv4 BGP neighbors that can be created |
| **L2VPN EVPN Config Peers** | The number of peers are activated for l2vpn |
| **L2VPN EVPN Capable Peers** | The number of peers received L2VPN EVPN AFI/SAFI capability from the neighbors |
| **Retain Route-target All** | Whether retain route-target all is enabled |

| | |
|---|---|
| **Neighbor** | The IP address of a neighbor. A neighbor, that is created with BGP dynamic neighbors feature, will be marked with "*". |
| **ASN** | The neighbor's ASN |
| **MsgRcvd** | The number of BGP messages received from this neighbor |
| **MsgSent** | The number of BGP messages sent to this neighbor |
| **State** | The adjacency state. One of IDLE, CONNECT, ACTIVE, OPEN SENT, OPEN CNFRM, EST |
| **Up/Down Time** | How long the adjacency has been in the ESTABLISHED state, or, if the adjacency is down, how long it has been down. In days:hours:minutes:seconds |
| **Pfx Rcvd** | The number of L2VPN prefixes received from the neighbor |

### 6.10.1.31. *Show bgp l2vpn evpn*

This command displays the EVPN routes in the BGP routing table. The output lists both best and non-best paths to each EVPN route. The route-type filter option shows it's specific type EVPN routes. By passing the IP address and prefixLen argument corresponding to the overlay end-host's IP, it displays the best and non-best paths for the end-host along with the Path attributes. This IP address and it's length argument is available only for Type-2 EVPN routes. By passing the specific Rd value, it displays the best and non-best paths for the end-host along with the Path attributes.

**Format** show bgp l2vpn evpn [{route-type <type-1 ~ type-5> [prefix/lenght]} | [rd rd-value]]

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Network** | Destination EVPN route. It is displayed in the respective formats for EVPN type-2 or type-3 prefixes, as mentioned in the header of the command output |
| **Next Hop** | The route's BGP NEXT HOP |
| **Metric** | Multi Exit Descriminator |
| **LocPref** | The local preference |
| **Path** | The AS path. The value of the ORIGIN attribute follows immediately after the AS PATH |

**Example:**

```
(switch) #show bgp l2vpn evpn

BGP table version is 0, local router ID is 0.0.0.0
Status Codes: s suppressed, * valid, > best, i - internal, S - stale
Origin Codes: i - IGP, e - EGP, ? - incomplete
EVPN type-1 prefix: [1]:[ESI]:[EthTag]:[Label]
EVPN type-2 prefix: [2]:[ESI]:[EthTag]:[MAClen]:[MAC]:[IPlen]:[IP]
EVPN type-3 prefix: [3]:[EthTag]:[IPlen]:[OrigIP]
EVPN type-4 prefix: [4]:[ESI]:[IPlen]:[OrigIP]
EVPN type-5 prefix: [5]:[ESI]:[EthTag]:[IPlen]:[IP]:[GatewayIP]

   Network          Next Hop            Metric     LocPref Path
   ------------------- ---------------- ---------- ------- ----
   Route Distinguisher : 2.2.2.2:100
*>i [2]:[0:0x0]:[10002]:[48]:[00:10:94:10:00:02]
                    0.0.0.0                  100  i
   Route Distinguisher : 1.1.1.1:100
*>  [3]:[10002]:[32]:[13.1.1.1]
                    23.1.1.2                 100 65003 65001 i
```

## 6.10.1.32. *Show bgp l2vpn evpn update-group*

This command displays the status of L2VPN outbound update groups and their members.

**Format** show bgp l2vpn evpn update-group [group-index | peer-address]

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **group-index** | If specified, this option restricts the output to a single update group |
| **peer-address** | If specified, this option restricts the output to the update group containing the peer with the given IPv4 address |

### 6.10.1.33. *Show bgp l2vpn evpn statistics*

This command displays recent decision process history. Phase 1 of the decision process reacts to UPDATE messages received from peers, determining what new routes are accepted and deleting withdrawn routes from the Adj-RIB-In. Phase 2 determines the best path for each destination, updates the BGP route table, and updates the common RIB. Phase 3 is run independently for each outbound update group and determines which routes should be advertised to neighbors in each group. Each entry in the table shows statistics for one phase of the decision process. The table shows the 20 most recent decision process runs, with the most recent information at the end of the table.

**Format** show bgp l2vpn evpn statistics

**Default** None

**Mode** Privileged Exec

User Exec

### 6.10.1.34. *Show bgp l2vpn evpn route-refelction*

This command displays the configuration of the local router as a route reflector. Output and field descriptions are the same as *show ip bgp route-reflection*.

**Format** show bgp l2vpn evpn update-group [group-index | peer-address]

**Default** None

**Mode** Privileged Exec

User Exec

### 6.10.1.35. *Show evpn l2 vni*

This command displays the Layer-2 VIN to an VPN instance.

**Format** show evpn l2 vni [vni-id]

| Fields | Definition |
|---|---|
| **vni-id** | Ethernet VPN ID |

**Default** None

**Mode** Privileged Exec

User Exec

**Example:**

(switch) #show evpn l2 vni

RD:route-distinguish RT:route-target

VNID ..... 100100

VLAN ..... 100

RD Value ..... type - 1; 10.0.0.1:1000

RT Value ..... Mode: Export

type - 1; 192.168.1.1:1000

Mode: Import

type - 1; 192.168.1.1:1000

Advertise-Mac ..... Disable

## 6.10.2. Configuration commands

### 6.10.2.1. *Router bgp*

Use this command to enable BGP, enter the Border Gateway Protocol (BGP) router mode, and identify the AS number of the router. Only a single instance of BGP can be run and the router can only belong to a single AS. **no router bgp** command disables BGP and resets all BGP configuration to default values. Alternatively, you can use *no enable* command in BGP router configuration mode to disable BGP globally without clearing the BGP configuration.

**Format** router bgp <autonomous-system-number>

no router bgp <autonomous-system-number>

| Fields | Definition |
|---|---|
| **autonomous-system-number** | Number of an autonomous system that identifies the router to other BGP routers and tags the routing information that is passed along. Number in the range from 1 to 4294967295. |

**Default** BGP inactive

**Mode** Global Config

### 6.10.2.2. *Enable*

Use **enable** command resets the default administrative mode of BGP in the router (active). **no enable** command sets the administrative mode of BGP in the router to inactive. When you disable BGP, BGP retains its configuration.

**Format** enable

no enable

**Default** Enabled

**Mode** Router BGP Config Mode

### 6.10.2.3. *Aggregate-address*

Use **aggregate-address** command to create an aggregate entry in a Border Gateway Protocol (BGP) database. Use **no aggregate-address** command to disable an aggregate entry in a Border Gateway Protocol (BGP) database.

To be considered a match for an aggregate address, a prefix must be more specific (i.e. have a longer prefix length) than the aggregate address. A prefix whose prefix lengh equals the length of the aggregate address is not considered a match.
BGP accepts up to 128 summary addresses for each address family.

**Format** aggregate-address {<address> <mask> | <ipv6-prefix> <prefix-length>} [as-set] [summary-only]

no aggregate-address {<address> <mask> | <ipv6-prefix> <prefix-length>} [as-set] [summary-only]

| Fields | Definition |
|---|---|
| **Address** | Summary IPv4 address. The default route cannot be configured as an aggregate address. |
| **Mask** | Summary IPv4 mask. The mask cannot be a 32-bit mask (255.255.255.255). The combination of address and mask must be a valid unicast destination prefix. |
| **ipv6-prefix** | Summary IPv6 prefix. Not support under IPv4 VRF address family mode. |
| **prefix-length** | Summary IPv6 prefix length. The range is from 1 to 127. Not support under IPv4 VRF address family mode. |
| **as-set** | if this option is set, the aggregate is advertised with a non-empty AS_PATH. If the AS_PATH of all contained routes is the same, the AS_PATH of the aggregate is the AS_PATH of the contained route. Otherwise, if the contained routes have different AS_PATHs, the AS_PATH attribute includes an AS_SET with each of the AS numbers listed in the AS_PATHs of the aggregate routes. |
| **summary-only** | Filters all more-specific routes within the aggregate address and not being advertised to neighbors. |

**Default** None

Unless the options are specified, the aggregate is advertised with the ATOMIC_AGGREGATE attribute and an empty AS path, and the more specific routes are advertised along with the aggregate.

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.4. *Bgp aggregate-different-meds*

Use **bgp aggregate-different-meds** command to allow aggregation of routes with different MED values. Use **no bgp aggregate-different-meds** command to disable this function.
When this command is issued, the path for an active aggregate address is advertised without a MED attribute. When this command is not issued, if multiple routes match an aggregate address, but have different MEDs, the aggregate takes the MED of the first matching route. Any other matching prefix with the same MED is included in the aggregate. Matching prefixes with different MEDs, are not considered to be part of the aggregate and continue to be advertised as individual routes.

**Format** bgp aggregate-different-meds

no bgp aggregate-different-meds

**Default** Disable

All the routes aggregated by a given aggrerate address must have the same MED value.

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.5. *Bgp always-compare-med*

Use **bgp always-compare-med** command to compare MED values in paths received from peers in different ASs. Use **no bgp always-compare-med** command to disable this function.

**Format** bgp always-compare-med

no bgp always-compare-med

**Default** Disable

MED values are only compared for paths received from peers in the same AS.

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.6. *Bgp bestpath as-path ignore*

This command ignores the AS PATH length in the best path calculation during the decision process. For IPv6 routes, configure this command under the IPv6 Address Family Config mode.

To revert to the default behavior, where AS PATH length is not ignored in the BGP best path calculation, use the no form of this command.

**Format** bgp bestpath as-path ignore

no bgp bestpath as-path ignore

**Default** Disable

AS PATH length is not ignored in the BGP best path calculation.

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.7. *Bgp client-to-client reflection*

Use this command to reflect routes received from its client ot its other clients. To disable client-to-client reflection, use the no form of this command.

**Format** bgp client-to-client reflection

no bgp client-to-client reflection

**Default** Enabled when a router is configured as a route reflector.

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.8. *Bgp cluster-id*

Use this command to specify the cluster ID of a route reflector. The same cluster ID is used for both IPv4 and IPv6 route reflection. To revert the cluster ID to its default, use the no form of this command.

**Format** bgp cluster-id <cluster-id>

no bgp cluster-id

| Fields | Definition |
|---|---|
| **cluster-id** | A non-zero 32-bit identifier that uniquely identifies a cluster of route reflectors and their clients. The cluster ID may be entered in dotted notation like IPv4 address or as an integer. The range is from 1 to 4294967295. |

**Default** Use BGP router ID as the cluster ID if a route reflector does not configure cluster ID.

**Mode** Router BGP Config Mode
IPv4 VRF Address Family

### 6.10.2.9. *Bgp default local-preference*

This command changes the default local preference value. To return the local preference value to the default setting, use the no form of this command.

**Format** bgp default local-preference <number>
no bgp default local-preference

| Fields | Definition |
|---|---|
| **Number** | Local preference value from 0 to 4294967295. |

**Default** 100

**Mode** Router BGP Config Mode
IPv4 VRF Address Family

### 6.10.2.10. *Bgp fast-external-failover*

This command configures Border Gateway Protocol (BGP) routing process to immediately reset external BGP peering sessions if the link used to reach these peers goes down. **no bgp fast-external-failover** command disables this function.

**Format** bgp fast-external-failover
no bgp fast-external-failover

**Default** Enabled

**Mode** Router BGP Config Mode
IPv4 VRF Address Family

### 6.10.2.11. *Bgp fast-internal-failover*

This command configures Border Gateway Protocol (BGP) routing process to immediately reset internal BGP peering sessions if the link used to reach these peers goes down. **no bgp fast-internal-failover** command disables fast failover for internal peers.

**Format** bgp fast-internal-failover

no bgp fast-internal-failover

**Default** Enabled

**Mode** Router BGP Config Mode
IPv4 VRF Address Family

### 6.10.2.12. *Bgp log-neighbor-changes*

This command enables logging of BGP neighbor resets . To disable the logging of changes in BGP neighbor adjacencies, use the **no** form of this command.

Both backward and forward adjacency state changes are logged. Forward state changes, except for transitions to the Established state, are logged at the Informational severity level. Backward state changes and forward changes to Establish state are logged at the Notice serverity level.

**Format** bgp log-neighbor-changes
no bgp log-neighbor-changes

**Default** Disabled

**Mode** Router BGP Config Mode
IPv4 VRF Address Family

### 6.10.2.13. *Bgp router-id*

This command configures a valid IPv4 unicast address uniquely identifying the router bgp id. The <router-id> is a configured value. There is no default BGP router ID. The system does not select a router ID automatically and must configure one manually.

**Format** bgp <router-id>
no bgp <router-id>

| Fields | Definition |
|---|---|
| **router-id** | An IPv4 address for BGP to use as its router ID. Not required to be an address assigned to the router. Setting the router ID to 0.0.0.0 disables BGP. Changing the router ID disables and re-enables BGP, which causes all adjacencies to be reestablished. |

**Default** None

**Mode** Router BGP Config Mode

### 6.10.2.14. *Bgp maxas-limit*

This command specifies Border Gateway Protocol (BGP) a limit on the length of AS PATHs that BGP accepts from its neighbors. If BGP receives a path whose AS PATH attribute is longer than the configured limit, BGP sends a NOTIFICATION and resets the adjacency. To return the router to default operation, use the no form of this command.

**Format** bgp maxas-limit <number>

no bgp maxas-limit

| Fields | Definition |
|---|---|
| **Number** | Maximum number of autonomous system numbers in the AS PATH attribute of the BGP Update message, ranging from 1 to 100. |

**Default** 75

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.15. *Bgp graceful-restart restart-time <restart-time>*

The user is able configure BGP graceful restart helper restart timer by command bgp graceful-restart restart-time in BGP router configuration mode. To reset BGP graceful restart helper restart timer to default value, use no form of this command..

**Format** bgp graceful-restart restart-time <restart-time>

no bgp graceful-restart restart-time <restart-time>

| Fields | Definition |
|---|---|
| **Restart-time** | The setting of the restart timer ranged from 1 to 3600. The timer is used by BGP GR aware node to decide whether restart operation of neighbor BGP GR enabled node is successful. The restart operation is considered failed if the BGP Aware node does not received BGP OPEN message from BGP enabled node after the timer expires. |

**Default** 180 seconds

**Mode** Router BGP Config Mode

### 6.10.2.16. *Bgp graceful-restart stalepath-time <stalepath-time>*

The user is able configure BGP graceful restart helper stale path timer by command bgp graceful-restart stalepath-time in BGP router configuration mode. To reset BGP graceful restart helper restart timer to default value, use no form of this command.

**Format** bgp graceful-restart stalepath-time <stalepath-time>

no bgp graceful-restart stalepath-time <stalepath-time>

| Fields | Definition |
|---|---|
| **Stalepath-time** | The setting of the stale path timer ranged from 1 to 3600. The timer is used by BGP GR aware node to remove state routes learned from neighboring BGP GR enabled node after the timer expires. |

**Default** 300 seconds

**Mode** Router BGP Config Mode

### 6.10.2.17. *bgp listen*

The user is able to activate dynamic neighbors feature and specify the maximum number of IPv4/IPv6 neighbors that can be created, IPv4/IPv6 prefix for listening range, as well as the peer template inherited by command bgp listen in BGP router configuration mode. To de-activate dynamic neighbors feature, use no form of this command.

**Format** bgp listen {limit <max-num>| range <prefix>/<prefix-length> [inherit peer <peer-template-name>] }

no bgp listen {limit <max-num>| range <prefix>/<prefix-length> [inherit peer <peer-template-name>] }

| Fields | Definition |
|---|---|
| **Maximum Peers** | Maximum number of dynamic members in this VRF with specific address family. Number from 1 to 100. Default is 20. |
| **Prefix/Length** | Specify the listen range IP prefix and prefix length to be created. |
| **Template** | Specify the name of a BGP peer template that is to be associated with the specified listen subnet range and inherited with dynamically created neighbors. The template will be inherited with dynamically created neighbors. |

**Default** No subnets are associated with a BGP listen subnet range, and the BGP dynamic neighbor feature is not activated.

**Mode** Router BGP Config Mode

IPv6 Address Family Mode

### 6.10.2.18. *Exit*

This command is used to exit bgp configuration mode.

**Format** exit

**Default** None

**Mode** Router BGP Config Mode

### 6.10.2.19. *Timers bgp*

This command is used to set the keepalive and holdtime timers. To return the router to default operation, use the no form of this command.

**Format** timers bgp <keepalive> <holdtime>

no timers bgp

| Fields | Definition |
|---|---|
| **Keepalive** | The number of seconds this BGP speaker waits for a keepalive message before deciding that the connection is down. We recommend you configure the *keepalive* parameter as 1/3 of the *holdtime* parameter. |
| **Holdtime** | The number of seconds this BGP speaker waits for a keepalive, update, or notification message before deciding that the connection is down. We recommend you configure the holdtime parameter as 3 times the keepalive parameter. |

**Default** The default value of **keepalive** is 60 seconds.

The default value of **holdtime** is 180 seconds.

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.20. *Neighbor default-originate route-map*

This command is used to originate a default route to a specific neighbor. Use the option *if-default-present* to originate the default route only if the default route exists in the routing table. The global default-originate command is overridden by the default-originate setting for a neighbor if enabled.

A route map may be configured to set attributes on the default route sent to the neighbor. If the route map includes a *match ip-address* term, that term is ignored. If the route map includes *match community* or

*match as-path* terms, the default route is not advertised. If there is no route map with the route map name given, the default route is not advertised.

To prevent BGP from originating a default route to a specific neighbor, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} default-originate [if-default-present] [route-map <route-map-name>]

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} default-originate [if-default-present] [route-map]

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **route-map-name** | A route map may be configured to set attributes on the default route advertised to the neighbor. |

**Default** No default route is originated by default.

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

## 6.10.2.21. *Neighbor inherit peer*

This command is used to inherit neighbor configuration parameters from a peer template. Neighbor session and policy parameters can be configured once in a peer template and inherited by multiple neighbors, eliminating the need to configure the same parameters for each neighbor. A neighbor can inherit directly from only one peer template.
To remove the inheritance, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} inherit peer <templatename>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} inherit peer

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |

| | |
|---|---|
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **Templatename** | Name of the peer template whose peer configuration parameters are to be inherited by this neighbor. |

**Default** None

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.22. *Neighbor local-as*

This command is used to advertise the configured local AS number instead of the router's own AS in the routes advertised to the neighbor. This command is only allowed on the external BGP neighbors.
To remove the local AS, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} local-as <as-number> no-prepend replace-as

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} local-as

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **As-number** | The AS number to advertise as the local AS in the AS PATH sent to the neighbor. |
| **no-prepend** | Do not prepend the local-AS in the AS PATH received in the updates from this neighbor. |
| **replace-as** | Replace the router's own AS with the local-AS in the AS PATH sent to the neighbor. |

**Default** None

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

## 6.10.2.23. *Neighbor update-source*

This command is used to configure BGP to use the IP address on the specific routing interface as the source address for the TCP connection with a neighbor.
To use the primary IP address on the outgoing interface to the neighbor for the TCP connection, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} update-source {<slot/port> | loop <loop interface number> | vlan <vlan id>}

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} update-source

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **slot/port** | Valid slot and port number separated by forward slashes. |
| **loop interface number** | The valid value is from 0 to 63. |
| **vlan id** | The valid value is from 1 to 4093. |

**Default** Disable

Use the primary IP address on the outgoing interface to the neighbor.

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

## 6.10.2.24. *Neighbor description*

This command is used to record a text description for a neighbor. This description is informational and has no functional impact.
To remove the description, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} description <description>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} description

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **Description** | Text (up to 80 characters) that describes the neighbor. |

**Default** None

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.25. *Neighbor ebgp-multihop*

This command is used to form neighborship with non-directly-connected external neighbor with configured maximum hop-count allowed to reach it. For internal BGP neighbors, the TTL value remains 64 and cannot be modified. To make the *update-source* config work for external BGP neighbors, *ebgp-multihop* should be configured to increase the TTL value instead of the default TTL of 1.
To remove the neighborship, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} ebgp-multihop <hop-count>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} ebgp-multihop

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |

| | |
|---|---|
| **hop-count** | The maximum hop-count allowed to reach the neighbor. The allowed range is from 1 to 255. |

**Default** 1

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.26. *Neighbor password*

This command is used to enable Message Digest 5 (MD5) authentication on a TCP connection between two BGP peers and configures an authentication key. MD5 must be either be enabled or disabled on both peers. The same password must be configured on both peers.
To disable this function, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} password <string>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} password

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **String** | Case-sensitive password of up to 25 characters in length. |

**Default** None

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.27. *Neighbor connect-retry-interval*

This command is used to configure the initial connection retry time for a specific neighbor. If a neighbor does not response to an initial TCP connection attempt, BGP retries three times. The first retry is after the retry interval configured with *neighbor connect-retry-interval*. Each subsequence retry doubles the previous retry interval. So by default, the TCP connection is retried after 2, 4, and 8 seconds. If none of the retries is

successful, the adjacency is reset to IDLE state and the IDLE hold timer is started. BGP skips the retries and transitions to IDLE state if TCP returns an error, such as destination unreachable, on a connection attempt. To return the router to default initial connection retry time for a specific neighbor, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} connect-retry-interval <connection-retry-interval>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} connect-retry-interval

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **connection-retry-interval** | The valid range is 1 to 65535 seconds. |

**Default** 2 seconds

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.28. *Neighbor maximum-prefix*

This command is used to limit how many prefixes can be received from a neighbor. The prefix limit is compared against the number of prefixes received from neighbor, including prefixes that are rejected by inbound policy. A neighbor that exceeds the limit is shutdown unless the *warning-log* option is configured.

To revert to the default value for the maximum number of prefixes that BGP will accept from a specific neighbor, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} maximum-prefix {<maximum> [<threshold>] [warning-only] | unlimited}

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} maximum-prefix

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address |

| | |
|---|---|
| | family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **Maximum** | Maximum number of prefixes BGP will accept from this neighbor. Range is from 0 to 4294967295. |
| **Unlimited** | Don't restric the number of prefixes from this neighbor. |
| **Threshold** | Integer specifying at what percentage of the maximum BGP starts to write log messages. The range is from 1 to 100. |
| **warning-only** | BGP only discards excess prefixes and writes a log message rather than shutting down the adjacency if BGP receives more than the maximum number of prefixes. |

**Default** **Threshold**: default is 75

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.29. *Neighbor next-hop-self*

This command is used to configure BGP to set the next hop attribute to a local IP address when advertising a route to an internal peer.

Normally BGP retains the next hop attribute received from the external peer. When the next hop attribute in routes from external peers is retained, internal peer must have a route to the external peer's IP address. This is commonly done by configuring the IGP on the boarder router to advertise the external subnet.

To disable this feature, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} next-hop-self

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} next-hop-self

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |

| | |
|---|---|
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |

**Default** None

**Mode** Router BGP Config Mode
IPv6 Address Family Config Mode
IPv4 VRF Address Family

## 6.10.2.30. *Neighbor filter-list*

This command is used to filter advertisements to or from a specific neighbor according to the advertisement's AS path. Only a single AS path list can be configured in each direction for each neighbor. If you invoke the command a second time for a given neighbor, the new AS path list number replaces the previous AS path list number.

If you assign a neighbor filter list to a nonexisted AS path access list, all routes are filtered.

Filtering for IPv6 is independent of filtering configured for IPv4. If an UPDATE message includes both IPv4 and IPv6 NLRI, it could be filtered for IPv4 but accepted for IPv6 or vice versa.

To unconfigure neighbor filter lists, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} filter-list <listnum> {in | out}

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} filter-list <listnum> {in | out}

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **Listnum** | Number to identify an AS path list. The range is from 1 to 500. |
| **In** | Access list is applied to advertisements received from the neighbor. |
| **Out** | Access list is applied to advertisements to be sent to the neighbor. |

**Default** None

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.31. *Neighbor prefix-list*

This command is used to filter advertisements sent to or receive from a specific neighbor based on the destination prefix of each route. Only one prefix list may be defined for each neighbor in each direction. If you assign a prefix list that does not exist, all prefixes are permitted.

To remove an IP filter list, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} prefix-list <listname> {in | out}

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} prefix-list <listname> {in | out}

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **Listname** | Name of a prefix list. The list defines which networks are to be received and which are to be suppressed in routing updates, based upon matching destination prefixes in the prefix list. |
| **In** | Access list is applied to advertisements received from the neighbor. |
| **Out** | Access list is applied to advertisements to be sent to the neighbor. |

**Default** None

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

### 6.10.2.32. *Neighbor remote-as*

This command is used to configure a neighbor and identify the neighbor's autonomous system. The neighbor's AS number must be specified when the neighbor is created. Up to 128 neighbors may be configured.

To remove a neighbor, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} remote-as <as-number>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} remote-as

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **As-number** | Number of an autonomous system to which the neighbor belongs in the range from 1 to 4294967295. |

**Default** None

**Mode** Router BGP Config Mode

### 6.10.2.33. *Neighbor remove-private-as*

This command is used to remove private AS numbers when advertising routes to an external peer. This command can only be applied to external peers. Private AS numbers are removed or replaced whether or not the original AS path includes any non-private AS numbers. The AS path advertised to the external peer always includes at least one instance of the local AS number; therefore, removing private AS numbers never results in advertisement of an empty AS_PATH attribute. AS numbers from 64512 to 65535 inclusive are considered private. Although 65535 is a reserved ASN and not technically part of the private range, it is treated as a private AS when removing or replacing private ASNs.

To stop removing private AS numbers, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} remove-private-as [all replace-as]

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} remove-private-as

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address |

| | |
|---|---|
| | family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **all replace-as** | To retain the original AS path length, replace each private AS number with the local AS number. |

**Default** Private AS numbers are not removed by default

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.34. *Neighbor route-map*

This command is used to apply a route map to incoming or outgoing routes for a specific neighbor. A route map can be used to change the local preference, MED, or AS path of a route.

To remove a route map, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} route-map <route-map-name> { in | out }

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} route-map <route-map-name> { in | out }

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **route-map-name** | Identifier of a configured route map. The route map should be examined to filter the networks to be advertised/received. |
| **In** | Applies route map to incoming routes. |
| **out** | Applies route map to outgoing routes. |

**Default** None

**Mode** Router BGP Config Mode
IPv6 Address Family Config Mode
IPv4 VRF Address Family

### 6.10.2.35. *Neighbor route-reflector-client*

This command is used to configure an internal peer as an IPv4 route reflector client. Configuring the first route reflector client automatically makes this router a route reflector. If you configure multiple route reflectors within a cluster, you must configure each route reflector in the cluster with the same cluster ID. Use the *bgp cluster-id* command to configure a cluster ID. An external peer may not be configured as a route reflector client.

When reflecting a route, BGP ignores the set statements in an outbound route map to avoid causing the receiver to compute routes that are not inconsistent with other routers in the AS.

To remove a route map, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} route-reflector-client

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} route-reflector-client

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |

**Default** Peers are not route reflector clients

**Mode** Router BGP Config Mode
IPv6 Address Family Config Mode
IPv4 VRF Address Family

### 6.10.2.36. *Neighbor shutdown*

This command is used to bring down the adjacency with a specific neighbor. If the adjacency is up when the command is given, the peering session is dropped and all route information learnt from that peer is purged. When an adjacency is administratively shutdown, the adjacency stays down until administratively re-enabled by using *no neighbor shutdown* command.

To administratively reenable the neighbor, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} shutdown

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} shutdown

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |

**Default** Neighbors are not shutdown

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

## 6.10.2.37. *Neighbor timers*

This command is used to override the global timer values and set the keepalive and hold timers for a specific BGP peer. The new values are not applied to adjacencies already in the ESTABLISHED state. A new keepalive or hold time is applied the next time an adjacency is formed.

To revert the keep alive and hold time for a specific peer, use the no form of this command. After executing this command, the BGP peer must be reset before the changes take effect.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} timers <keepalive> <holdtime>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} timers

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |

| | |
|---|---|
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **Keepalive** | Frequency (in seconds) with which the router sends keepalive messages to its peer. The range is from 0 to 65535. |
| **Holdtime** | The time (in seconds) that BGP continues to consider a neighbor to be alive without receiving a BGP KEEPALIVE or UPDATE packet from the neighbor. If no KEEPALIVE is received from a neighbor for longer than this value, BGP drops the adjacency. If the hold time is set to 0, BGP does not enforce a hold time and does not send periodic KEEPALIVE messages. The range is from 0 to 65535. |

**Default** The default value of <keepalive> is 60 seconds.

The default value of <holdtime> is 180 seconds.

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.38. *Neighbor advertisement-interval*

This command is used to configure the minimum time that must elapse between advertisement of the same route to a give neighbor. This value does not limit the rate of route selection but only the rate of route advertisement. If BGP changes the route to a destination multiple times while waiting for the advertisement interval to expire, only the final result is advertised to the neighbor. The interval applies to withdrawals as well as advertisements.

To revert to the default minimum time that must elapse between advertisements of the same route to a given neighbor, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} advertisement-interval <seconds>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} advertisement-interval

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must |

| | |
|---|---|
| | be specified as well. Not support IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |
| **Seconds** | The minimum time between route advertisement, in seconds. Range is from 0 to 600. |

**Default** 30 seconds for external peers and 5 seconds for internal peers

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.39. *Neighbor send-community*

This command is used to configure the router to send the BGP community attributes in Update messages to a specific neighbor.

To revert to default configuration, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} send-community

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} send-community

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support IPv4 VRF addres family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support IPv4 VRF address family mode. |
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |

**Default** The communities attribute is not sent to neighbors

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

### 6.10.2.40. *Neighbor send-community extended*

This command is used to configure the router to send the BGP community attributes in Update messages to a specific neighbor. The BGP community attributes can be configurable.

To disable the exchange of VPNv4 prefixes with the neighbor, use the no form of this command.

**Format** neighbor <ipv4-address> send-community <extended | both>

no neighbor <ipv4-address> send-community <extended | both>

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **extended \| both** | One of the following:<br>● Extended enables the router to send only extended community attributes.<br>● Both enables the router to send both standard and extended community attributes. |

**Default** The communities attribute is not sent to neighbors

**Mode** VPNv4 Address Family Config Mode

### 6.10.2.41. *Neighbor active*

This command is used to enable exchange of IPv6 routes with a neighbor. The neighbor address must be the same IP address used in the neighbor remote-as command to create peer.

When IPv6 is enabled or disabled for a neighbor, the adjacency is brought down and restarted to communicate to the change to the peer. You should completely configure IPv6 policy for the peer before activating the peer.

To disable exchange of IPv6 routes, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} active

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} active

| Fields | Definition |
|---|---|
| **ipv4-address** | IPv4 address of the neighboring router. |
| **ipv6-address** | IPv6 address of the neighboring router. Not support under IPv4 VRF address family mode. |
| **Interface** | If the neighbor's IPv6 address is a link local address, the local interface must be specified as well. Not support under IPv4 VRF address family mode. |

| | |
|---|---|
| **autodetect interface** | The routing interface on which the neighbor's IPv6 link local address is auto detected. |

**Default** None

**Mode** IPv6 Address Family Config Mode
IPv4 VRF Address Family

## 6.10.2.42. *neighbor rfc5549-support*

The enable advertisement of IPv4 routes over IPv6 next hops selectively to an external BGP IPv6 peer, use the command **neighbor rfc5549-support** in BGP Router Configuration mode. This command may only be applied to external BGP peers via single hop.

To disable advertisement/process of RFC 5549 routes for BGP neighbors, use the **no** form of the command.

**Format** neighbor {<ipv6-address> | autodetect interface <slot/port>} rfc5549-support
no neighbor {<ipv6-address> | autodetect interface <slot/port>} rfc5549-support

| Fields | Definition |
|---|---|
| **ipv6-address** | IPv6 address of the neighboring router. |
| **Autodetect interface <slot/port>** | The routing interface on which the neighbor's link local IPv6 address is auto detected. |

**Default** Enabled

**Mode** BGP Router Configuration Mode

## 6.10.2.43. *Distance*

This command is used to set the preference (also known as administrative distance) of BGP routes to specific destinations. Up to 128 instances of this commands are allowed. If a distance command is configured that matches an existing distance command's prefix and wildcard mask, the new command replaces the existing command. There can be overlap between the prefix and wildcard mask configured for different commands. When there is overlap, the command whose prefix and wildcard mask are the longest match for a neighbor's address is applied to routes from that neighbor.

An ECMP route's distance is determined by applying distance commands to the neighbor that provided the best path.

The change to the BGP distances does not affect existing routes. To apply a distance change to existing routes, you must force the routes to be deleted from the routing table and relearned, either by resetting the peers from which the routes are learnt or by disabling and re-enabling BGP.

To return to the default values, use the no form of this command.

**Format** distance <1-255> [<peer-range> <wildcard-mask>] [prefix-list]

no distance <1-255> [<peer-range> <wildcard-mask>] [prefix-list]

| Fields | Definition |
|---|---|
| **1-255** | The preference value for matching routes. The range is from 1 to 255. |
| **peer-range, wildcard-mask** | Routes learned from BGP peers whose address falls within this prefix are assigned the configured preference value. The wildcard-mask is an inverted network mask whose 1 bits indicate the don't care portion of the prefix. |
| **prefix-list** | A prefix list can optionally be specified to limit the preference value to a specific set of destination prefixes learned from matching neighbors. |

**Default** BGP assigns preference values according to the *distance bgp* command, unless overridden for specific neighbors or prefixes by this command

**Mode** Router BGP Config Mode

### 6.10.2.44. *Distance bgp*

This command is used to set the preference (also known as administrative distance) of BGP routes. Different distance values can be configured for routes learnt from external peers, routes learnt from internal peers, and BGP routes locally originated. A route with a lower preference value is preferred to a route with a higher preference value to the same destination. Routes with a preference of 255 may not be selected as best routes and used for forwarding.

The change to the BGP distances does not affect existing routes. To apply a distance change to existing routes, you must force the routes to be deleted from the routing table and relearned, either by resetting the peers from which the routes are learnt or by disabling and re-enabling BGP.

To return to the default values, use the no form of this command.

**Format** distance bgp <external-distance> <internal-distance> <local-distance>

no distance bgp

| Fields | Definition |
|---|---|
| **external-distance** | The preference value for routes learnt from external peers. The range is from 1 to 255. |
| **internal-distance** | The preference value for routes learnt from internal peers. The range is from 1 to 255. |
| **local-distance** | The preference value for locally-originated routes. The range is from 1 to 255. |

**Default** external-distance: 20
internal-distance: 200
local-distance: 200

**Mode** Router BGP Config Mode
IPv6 Address Family Config Mode
IPv4 VRF Address Family

### 6.10.2.45. *Default-information originate*

This command is used to allow BGP to originate a default route. By default, BGP does not originate a defatul route. If a default route is redistributed into BGP, BGP does not advertise the default route unless this command is issued. To disable this function, use the no form of this command.

**Format** default-information originate <always>

no default-information originate

| Fields | Definition |
|---|---|
| **<always>** | Originate a default route even if routing table doesn't have one. Disable by default. |

**Default** Disable

**Mode** Router BGP Config Mode
IPv6 Address Family Config Mode
IPv4 VRF Address Family

### 6.10.2.46. *Maximum-paths*

This command is used to configure the maximum number of next hops BGP may include in an Equal Cost Multipath (ECMP) route derived from paths received from neighbors within or outside the local AS.

Paths are considered for ECMP when their attributes are the same (local preference, AS path, origin, MED, peer type and IGP distance). When BGP uses multiple paths in an ECMP route, BGP still selects one path as the best path and advertises only that path to its peers.

To restore the default value, use the no form of this command.

**Format** maximum-paths [ibgp] <number>
no maximum-paths [ibgp] <number>

| Fields | Definition |
|---|---|
| **Ibgp** | Specifies the maximum number of next hops in a BGP route derived from paths received from neighbors withint the local AS. |
| **Number** | Specifies the maximum number of next hops in a BGP route. The range is from 1 to 32. |

**Default** Single next hop

**Mode** Router BGP Config Mode
IPv6 Address Family Config Mode
IPv4 VRF Address Family

### 6.10.2.47. *Default-metric*

This command is used to configure the value of the Multi Exit Discriminator (MED) attribute for routes redistributed into Border Gateway Protocol (BGP) when no metric has been specified in the command *redistribute* for BGP. To delete the default for the metric of redistributed routes, use the no form of this command.

**Format** default-metric <number>
no default-metric

| Fields | Definition |
|---|---|
| **<number>** | Default metric value applied to the redistributed route. The range of values for this argument is from 1 to 4294967295. |

**Default** No default metric is set and no MED is included in redistributed routes

**Mode** Router BGP Config Mode
IPv6 Address Family Config Mode
IPv4 VRF Address Family

### 6.10.2.48. *Redistribute*

This command is used to redistribute routes from outside into BGP routing domain. BGP can redistribute local (connected), static, and OSPF routes.

A default route cannot be redistributed unless the *default-information originate* command is issued.

If a route map is configured, *match as-path* and *match community* terms are ignored. If no route map is configured with the name given, no prefixes are redistributed.

To disable redistribution, use the no form of this command.

**Format** redistribute <protocol> [metric <0-4294967295>][match {internal | external 1 | external 2 | nssa-external 1 | nssa-external 2}] [route-map <route-map-name>]

no redistribute <protocol> [metric <0-4294967295>][match {internal | external 1 | external 2 | nssa-external 1 | nssa-external 2}] [route-map <route-map-name>]

| Fields | Definition |
|---|---|
| **Protocol** | Source protocol from which routes are being redistributed. It can be one of the following keywords: connected, ospf, static, connected. |
| **metric <0-4294967295>** | When this option is specified, BGP advertises the prefix with the MED path attribute set to the configured value. If this option is not specified but a default metric is configured by *default-information originate* command, the MED is set to the default metric. If a default metric is not configured, the prefix is advertised without a MED attribute. |
| **Match** | Use this option to redistribute specific types of OSPF routes. |
| **route-map-name** | Identifier of a configured route map. The route map should be examined to filter the networks to be redistributed. A route map can be used to set attributes on redistribution routes. |

**Default** BGP redistributes no route

**Mode** Router BGP Config Mode

IPv6 Address Family Config Mode

IPv4 VRF Address Family

## 6.10.2.49. *Distribute-list in*

This command is used to filter routes received in incoming Border Gateway Protocol (BGP) updates based on destination prefix. The distribute list is applied to all routes received from all neighbors. Only routes permitted by the prefix list are accepted. If the command refers to a prefix list which does not exist, the command is accepted and all routes are permitted.

To disable the filter, use the no form of this command.

**Format** distribute-list prefix <list-name> in

no distribute-list prefix <list-name> in

| Fields | Definition |
|---|---|
| **list-name** | Name of a prefix list. The list defines which networks are to be received and which are to be suppressed in routing updates, based upon matching destination prefixes in the prefix list. |

**Default** None

**Mode** Router BGP Config Mode
IPv4 VRF Address Family

### 6.10.2.50. *Distribute-list out*

This command is used to configure a filter that restricts the advertisement of routes based on destination prefix. Only one instance of this command may be defined for each route source (connected, OSPF, or static). One instance of this command may also be configured as a global filter for outbound prefixes. If the command refers to a prefix list which does not exist, the command is accepted and all routes are permitted. When a distribute list is added, changed, or deleted for route redistribution, BGP automatically reconsiders all best routes.

To disable the filter, use the no form of this command.

**Format** distribute-list prefix <list-name> out [<connected | ospf | static>]
no distribute-list prefix <list-name> out [< connected | ospf | static >]

| Fields | Definition |
|---|---|
| **list-name** | Name of a prefix list. The list defines which networks are to be received and which are to be suppressed in routing updates, based upon matching destination prefixes in the prefix list. |
| **connected \| ospf \| static** | When a route source is specified, the distribute list applies to routes redistributed from that source. Only routes that pass the distribute list are redistributed. |

**Default** None

**Mode** Router BGP Config Mode
IPv4 VRF Address Family

### 6.10.2.51. *Ip bgp fast-external-failover {deny|permit}*

This command configures fast external failover behavior for a specific routing interface. This command overrides the global configured fast external failover behavior. If permit is specified, the feature is enabled on the interface, regardless of the global configuration. If the deny is specified, the feature is disabled on the interface, regardless of the global configuration.

To disable the filter, use the no form of this command.

**Format** ip bgp fast-external-failover {deny | permit}
no ip bgp fast-external-failover

| Fields | Definition |
|---|---|
| **Permit** | Enable fast external failover on the interface, regardless of the global configuration of the fearture. |
| **Deny** | Disable fast external failover on the interface, regardless of the global configuration of the fearture. |

**Default** None

**Mode** Interface Config

### 6.10.2.52. *Network*

This command is used to advertise an address prefix. The prefix is only advertised if the common routing table includes a non-BGP route with the same prefix. The route may be a connected route, a static route, or a dynamic route from another routing protocol.

BGP accepts up to 64 networks per address family. The network command may specify a default route.

If a route map is configured to set attributes on the advertised routes, *match as-path* and *match community* terms in the route map are ignored. If there is no route map with the name given, the network is not advertised.

To disable BGP from advertising an address prefix, use the no form of this command.

**Format** network <ipaddress> mask <mask> [route-map <route-map-name>]

no network <ipaddress> mask <mask> [route-map <route-map-name>]

| Fields | Definition |
|---|---|
| **Ipaddress** | An address prefix that BGP will advertise. |
| **Mask** | Network mask for the prefix. |
| **route-map-name** | Identifier of a configured route map. The route map should be examined to filter the networks to be advertised. |

**Default** No networks are advertised

**Mode** Router BGP Config Mode

IPv4 VRF Address Family

### 6.10.2.53. *Network (ipv6 prefix)*

This command is used to advertise an IPv6 prefix. The prefix is only advertised if the common routing table includes a non-BGP route with the same prefix. The route may be a connected route, a static route, or a dynamic route from another routing protocol.

BGP accepts up to 64 networks per address family. The network command may specify a default route.

If a route map is configured to set attributes on the advertised routes, *match as-path* and *match community* terms in the route map are ignored. If there is no route map with the name given, the network is not advertised.

To disable BGP from advertising an IPv6 prefix, use the no form of this command.

**Format** network <ipv6-prefix>/<prefix-length> [route-map <route-map-name>]

no network <ipv6-prefix>/<prefix-length>

| Fields | Definition |
|---|---|
| **ipv6-prefix** | An IPv6 prefix that BGP will advertise. |
| **prefix-length** | The prefix length of the IPv6 prefix. |
| **route-map-name** | Identifier of a configured route map. The route map should be examined to filter the networks to be advertised. |

**Default** No networks are advertised

**Mode** IPv6 Address Family Config Mode

## 6.10.2.54. *Template peer*

This command is used to create a BGP peer template and enter BGP peer template mode for the specified template. Peer template is a configuration feature that allows you to share policies between neighbors. Neighbors can then be configured to inherit parameters from the peer template. A peer template can include both session parameters and peer policies. Peer policies are configured with an address family configuration mode and apply only to that address family. You can configure up to 32 peer templates.

To delete a peer template, use the no form of this command.

**Format** template peer <template name>

no template peer <template name>

| Fields | Definition |
|---|---|
| **template name** | Name of the peer template. The name may be no more than 32 characters. |

**Default** None

**Mode** Router BGP Config Mode

### 6.10.2.55. *Clear ip bgp*

This command is used to resets peering sessions with all or a subnet of BGP peers. The command arguments specify which peering sessions are reset and the type of reset performed.

**Format** Clear ip bgp [vrf <vrf-name>] <* [soft [in | out]] | <1-4294967295> | <neighbor-address> [[interface <<slot/port>| vlan <vland-id>> [soft [in | out]]] | soft [in | out]] | interface <<slot/port>| vlan <vland-id>> [soft [in | out]] | listen range <prefix>/<prefix-length> [soft [in | out]]>

***:** Reset adjacency with every BGP peer.

| Fields | Definition |
|---|---|
| **Vrf-name** | Display BGP route table whithin a VRF instance. |
| **1-4294967295** | Specify the BGP peer's AS number which the adjacency will be reset. |
| **neighbor-address** | Sepcify the IPv4 and IPv6 address of the peer which the adjacency will be reset. |
| **Interface** | Specify the interface for IPv6 link local peer address which the adjacency will be reset. |
| **listen range** | The IP address range to listen BGP peers. |
| **prefix/prefix-length** | Specify the listen range IP prefix and prefix length to be created. |
| **Soft** | By default, adjacencies are torn down and re-established. If this option is specified, RGP resends all updates to neighbors and reprocesses updates from the neighbors. |
| **in/out** | If the **in** option is given, updates from the neighbors are reprocessed. If the **out** option is given, updates are resent to the neighbors. If neither keywords is given, updates are reprocessed in both directions. |

**Default** None

**Mode** Privileged EXEC

User EXEC

### 6.10.2.56. *Clear ip bgp counters*

This command is used to resets all BGP counters to 0. These counters include send and receive packet and prefix counters for all neighbors.

**Format** Clear ip bgp counters

**Default** None

**Mode** Privileged EXEC
User EXEC

## 6.10.2.57. *Ip as-path access-list*

This command is used to create an AS path access list. An AS path access list filters BGP routes on the AS PATH attribute of a BGP route. An AS path access list is an ordered sequence of statements. Each statement specifies a regular expression and a permit or deny action. If the regular expression matches the AS path of the route expressed as an ASCII string, the route is considered as a match and the statement's action is taken. An AS path list has an implicit deny statement at the end. If a path does not match any of the statement in an AS path list, the action is considered to be deny.

Once you have created an AS path list, you cannot delete an individual statement. If you want to remove an individual statement, you must delete the AS path list and recreate it without the statement to be deleted.

Statements are applied in the order in which they are created. New statements are added to the end of the list. The statement with the first matching regular expression is applied.

128 AS path access lists are allowed to be configured with up to 64 statements each.

To enter the question mark within a regular expression, you must first enter **CTRL-V** to prevent the CLI from interpreting the question mark as a request for help.

To delete an AS path access list, use the no form of this command.

**Format** ip as-path access-list <1-500> <deny | permit> <regexp>
no ip as-path access-list <1-500>

| Fields | Definition |
|---|---|
| **1-500** | A number uniquely identifying the list. All AS path access list commands with the same this number are considered part of the same list. |
| **Permit** | Permit the routes whose AS PATH attribute matches the regular expression. |
| **Deny** | Deny the routes whose AS PATH attribute matches the regular expression. |
| **Regexp** | A regular expression used to match the AS PATH attribute of a BGP route where the AS path is treated as an ASCII string.<br>**AS path regular expression syntax:**<br>**asterisk(*):** Matches zero or more sequences of the pattern.<br>**brackets([]):** Designates a range of single-character patterns.<br>**caret(^):** Matches the beginning of the input string. |

**dollar sign($):** Matches the end of the input string.

**hyphen(-):** Separates the end points of a range.

**period(.):** Matches any single character, including white space.

**plus sign(.):** Matches 1 or more sequences of the pattern.

**period(.):** Matches any single character, including white space.

**question mark(?):** Matches 1 or more occurrences of the pattern.

**underscore (_):** Matches a comma (,), left brace ({),right brace (}), left parenthesis, right parenthesis, the beginning of the input string, the end of the input string, or a space.

**Default** None

**Mode** Global Config

### 6.10.2.58. *Ip bgp-community new-format*

This command is used to display BGP standard communities in the new format AA:NN. The new format displays a community number as the ASN followed by a 16-bit AS-specific number.

To display BGP standard communities as 32-bit integers, use the no form of this command.

**Format** ip bgp-community new-format

no ip bgp-community new-format

**Default** None

**Mode** Global Config

### 6.10.2.59. *Ip community-list*

This command is used to create or configure a BGP community list. A community list statement with no community values is considered a match for all routes, regardless of their community membership. So the statement *ip community-list standard testlist permit* is a permit all statement.

A community number may be entered in either format, as a 32-bit integer or a pair of 16-bit integers separated by a colon, regardless of whether the *ip bgp-community new-format* command is active. Up to 16 communities, including the well-known communities, can be listed in a single command. Up to 32 statements may be configured with a given community list name. Up to 128 unique community list names may be configured.

To delete a community list, use the no form of this command.

**Format** ip community-list standard <list-name> {permit | deny} [community] [no-advertise] [no-export] [no-export-subconfed] [no-peer]

no ip community-list standard <list-name>

| Fields | Definition |
|---|---|
| **list-name** | Identifies a named standard community list. The name may contain up to 32 characters. |
| **Permit** | Indicates that matching routes are permitted. |
| **Deny** | Indicates that matching routes are denied. |
| **Community** | Specify a community number formatted as a 32-bit integers or in AA:NN format, where AA is a 2-byte AS number and NN is a 16 bit integer. The range is from 1 to 4294967295 (any 32-bit integer other than 0). Communities are separated by spaces. |
| **no-advertise** | Specify the routes that are not advertised to any peer. |
| **no-export** | Specify the routes that are not exported outside of the local AS. |
| **no-export-subconfed** | Specify the routes that are not exported to other external peers. |
| **no-peer** | Specify the routes that are not exported to other peers. |

**Default** None

**Mode** Global Config

## 6.10.2.60. *Show ip as-path-access-list*

This command is used to display the contents of AS path access lists.

**Format** show ip as-path-access-list [<0-500>]

| Fields | Definition |
|---|---|
| **0-500** | When an AS path list number is specified, the output is limited to the single AS path list specified. |

**Default** None

**Mode** Privileged EXEC

User EXEC

### 6.10.2.61. *Show ip community-list*

This command is used to display community lists. The format of community values is dictated by the command *ip bgp-community new-format*.

**Format** show ip community-list [detail] [<listname>]

| Fields | Definition |
|---|---|
| **listname** | A standard community list name. This option limits the output to a single list. |
| **detail** | Specify to show statistics about community lists. |

**Default** None

**Mode** Privileged EXEC
User EXEC

### 6.10.2.62. *Clear ip community-list*

This command is used to clear community lists.

**Format** clear ip community-list [<list-name>]

| Fields | Definition |
|---|---|
| **listname** | Specify a community list name to be cleared. |

**Default** None

**Mode** Privileged EXEC
User EXEC

### 6.10.2.63. *Rd*

This command is used to specify the route distinquisher (RD) for a VRF instance that is used to create a VPNv4 prefix. An RD creates routing and forwarding tables and specifies the default route distinquisher for a VPN. The RD is added to the beginning of the IPv4 prefixes to change them into globally unique VPNv4 prefixes.

**Format** rd {route-distinquisher}

| Fields | Definition |
|---|---|
| **route-distinquisher** | A route distinquisher can be specified in either of the following formats:<br>● 2-byte ASN-related: Composed of an automonous system number and an arbitraty number: <as-number>:<value><br>● 4-byte ASN-related: Composed of an 4-byte automonous system number and an arbitraty number: <as-number>:<value><br>● IP address-related: Composed of an IP address and an arbitrary number: <ip-address>:<value> |

**Default** A VRF does not associate with any RD

**Mode** Virtual Router Config

**i** This command is effective only if BGP is running on the router. The RD for a VRF cannot be removed or changed once configured. For this reason, this command does not have the **no** form. To change the configured RD value, remove the VRF (using the **no ip vrf** command) and reconfigure the VRF.

### 6.10.2.64. *Route-target*

This command is used to create a list of export, import, or both Route Target (RT) extended communities for the specified VRF instance. Enter the **route-target** command one time for each target extended community. Routes that are learned and carry a specific route-target extended community are imported into all VRFs configured with that extended community as an import route target.

Use no form to remove the route target specified for a VRF instance.

**Format** route-target {export | import | both} {route-target}

no route-target {export | import | both} {route-target}

| Fields | Definition |
|---|---|
| **export** | Exports routing information to the target VPN extended community. |
| **Import** | Imports routing information from the target VPN extended community. |
| **Both** | Exports/imports routing information to/from the target VPN extended community. |
| **route-target** | The route-target extended community attributes to be added to the list of import, export or both (import and export) route-target extended communities.<br><br>The route-target specifies a target VPN extended community. Like a route |

| | |
|---|---|
| | distinquisher, the route-target extended community can be specified in one of the following formats:<br>• 2-byte ASN-related: Composed of an automonous system number and an arbitraty number: <as-number>:<value><br>• 4-byte ASN-related: Composed of an 4-byte automonous system number and an arbitraty number: <as-number>:<value><br>• IP address-related: Composed of an IP address and an arbitrary number: <ip-address>:<value> |

**Default** A VRF does not associate with any RT

**Mode** Virtual Router Config

i This command is effective only if BGP is running on the router.

### 6.10.2.65. *Address-family ipv4*

This command is used to enter IPv4 VRF Address Family Configuration mode to configure BGR VRF parameters. Commands entered in this mode enable peering with BGP neighbors in this VRF instance. All the neighbor-specific commands are given in this mode as well.

To return to the default values, use the no form of this command.

**Format** address-family ipv4 vrf <vrf-name>

no address-family ipv4 vrf <vrf-name>

| Fields | Definition |
|---|---|
| **vrf-name** | Specify the name of the VRF instance. |

**Default** VRF configuration is disabled

**Mode** Router BGP Config Mode

### 6.10.2.66. *Address-family ipv6*

This command is used to enter IPv6 Address Family Configuration mode in order to specify IPv6-specific configuration parameters. Commands entered in this mode can be used to enable exchange of IPv6 routes, specify IPv6 prefixes to be originated, and configure inbound and outbound policies to be applied to IPv6 routes.

To return to the default values, use the no form of this command.

**Format** address-family ipv6

no address-family ipv6

**Default** Exchange of IPv6 routes is disabled

**Mode** Router BGP Config Mode

### 6.10.2.67. *Address-family vpnv4*

This command is used to sets up a routing session to carry VPN IPv4 (VPNv4) addresses across the backbone. When an iBGP neighbor is in this mode, each VPNv4 prefix is made globally unique by the addition of an 8-byte Route distinguisher (RD). Only unicast prefixes are carried to its peer.

The following commands are available in VPNv4 address family configuration mode.
- neighbor ip-address activate
- neighbor ip-address send-community both
- neighbor ip-address send-community extended

To return to the default values, use the no form of this command.

**Format** address-family vpnv4 unicast

no address-family vpnv4 unicast

**Default** The VPNv4 address family is disabled

**Mode** Router BGP Config Mode

### 6.10.2.68. *Address-family l2vpn evpn*

This command is used to enter the Layer-2 VPN EVPN configuration mode (prompt: config-router-af-l2vpn-evpn), from which you can configure routing sessions that support EVPN endpoint provisioning.

The multiprotocol capability for address family EVPN is advertised when the Address Family Identifier (AFI) is enabled under the internal BGP (iBGP) and external BGP (eBGP) neighbors for both IPv4 and IPv6 neighbors.

**Format** address-family l2vpn evpn

**Default** None

**Mode** Router BGP Config Mode

### 6.10.2.69. *Neighbor allowas-in*

This command is used to configure BGP to accept prefixes even if local ASN is part of the AS_PATH attribute. A neighbor can inherit this configuration from a peer template.

To return to the default values, use the no form of this command.

**Format** neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} allowas-in <count>

no neighbor {<ipv4-address> | <ipv6-address> [interface {<slot/port> | vlan {1-4093}}] | autodetect interface <slot/port>} allowas-in

| Fields | Definition |
|---|---|
| **Count** | The maximum number of occurrences of the local ASN allowed in the AS_PATH attribute received in the prefix updates. The range is 1 to 10. |

**Default** Disabled

**Mode** Router BGP Config Mode

### 6.10.2.70. *Neighbor next-hop-unchanged*

This command is used to configure BGP to not change the next hop attribute. In an external BGP (eBGP) session, by default, the router changes the next hop attribute of a BGP route (to its own address) when the router sends out a route. If the BGP next-hop-unchanged feature is enabled, BGP will send routes to an eBGP multihop peer without modifying the next hop attribute.

To return to the default values, use the no form of this command.

**Format** neighbor <ipv4-address> next-hop-unchanged

no neighbor <ipv4-address> next-hop-unchanged

**Default** Disabled

**Mode** L2VPN Address-Family Config Mode

### 6.10.2.71. *Retain route-target all*

This L2 VPN EVPN command is configured on the Spine node to retain and advertise all the EVPN routes without changing their route-targets. That is because there are no local VNIs (VxLAN network identifiers) configured on the Spine node that import the matching route-targets. This setting is applied to all BGP neighbors in the EVPN Address Family mode. The route-targets can be updated in the outbound using the outbound route-maps as usual.

To return to the default values, use the no form of this command.

**Format** retain route-target all

no retain route-target all

**Default** Disabled

**Mode** L2VPN Address-Family Config Mode

### 6.10.2.72. *nv overlay evpn*

This command enables EVPN control plane for VXLAN. Only after enabling this mode does the BGP start advertising or accepting the EVPN routes with the EVPN address-family activated neighbors.

To return to the default values, use the no form of this command.

**Format** nv overlay evpn

no nv overlay evpn

**Default** Disabled

**Mode** Global Config

### 6.10.2.73. *evpn*

This command is configured on the Leaf node to enter the EVPN configuration mode.

**Format** evpn

**Default** None

**Mode** Global Config

### 6.10.2.74. *vni l2*

This command is configured to associate a Layer-2 VNI to an EVPN instance and enter the EVPN-EVI configuration mode.

To remove a Layer-2 VNI association with an EVPN instance, use the no form of this command.

**Format** vni <id> l2

no vni <id> l2

| Fields | Definition |
|---|---|
| **id** | Layer-2 VNI that is being associated with an EVPN instance. The value must be in the range of 1-16777214. |

**Default** None

**Mode** EVPN Config Mode

### 6.10.2.75. *rd l2*

This command is to configure a route distinguisher (RD) for a virtual network identifier (VNI) under the EVPN-EVI configuration mode. A route distinguisher (RD) creates routing and forwarding tables and specifies the RD value for a virtual private network (VPN). The RD is added to the beginning of your IPv4 prefixes to change them into globally unique VPN IPv4 prefixes.

To remove the route distinguisher, use the no form of this command.

**Format** rd <ASN:NN | IPV4:NN> l2

no rd

| Fields | Definition |
|---|---|
| **ASN:NN** | VPN route distinguisher in aa:nn format |
| **IPV6:NN** | VPN route distinguisher in ip:nn format |

**Default** None

**Mode** EVPN-EVI Config Mode

### 6.10.2.76. *route-target (EVPN)*

This command is to export, import, or both export and import a virtual network identifier (**VNI**) from/to a switch. Route-targets are used for enforcing appropriate policy with MP-BGP. Specifically, with explicit route-targets values attached to the prefixes from a given virtual private network (VPN), it is possible to control whether those prefixes should or should not be imported into the routing table of a remote leaf.

To disable export, import, or both operations, use the no form of this command.

**Format** route-target <both | export | import> <ASN:NN | IPV4:NN>

no route-target <both | export | import> <ASN:NN | IPV4:NN>

| Fields | Definition |
|---|---|
| **both** | Both imports and exports routing information to the target VPN extended community |

| | |
|---|---|
| **export** | Exports routing information to the target VPN extended community |
| **import** | Imports routing information from the target VPN extended community |
| **ASN:NN** | VPN route distinguisher in aa:nn format |
| **IPV6:NN** | VPN route distinguisher in ip:nn format |

**Default** None

**Mode** EVPN-EVI Config Mode

### 6.10.2.77. *advertise-mac*

This command is configured to advertise local MAC to the peers. The local MAC is advertised to the peer in control plane using BGP. The MAC addresses learned on one device needs to be learned or distributed to the other devices in a VLAN. EVPN Software MAC Learning feature enables the distribution of the MAC addresses learned on one device to the other devices connected to a network. The MAC addresses are learnt from the remote devices using BGP. Both static and dynamic MAC addresses advertised.

To disable the advertise-mac function, use the no form of this command.

**Format** advertise-mac

no advertise-mac

**Default** Disabled

**Mode** EVPN-EVI Config Mode

## 6.11. VRRPv3 Commands

VRRPv3 provides address redundancy for both IPv4 and IPv6 router addresses. VRRPv3 support in QNOS is similar to VRRP support. The following table provides a summary of the differences.

| VRRPv2 | VRRPv3 |
|---|---|
| Supports redundancy to IPv4 addresses | Supports redundancy to IPv4 and IPv6 addresses |
| Supports authentication | Does not support authentication |
| No concept of link-local address in IPv4 address space | For IPv6 addresses, VRRP IP contains the link-localIPv6 address too |
| The interval time used for sending VRRP | The interval time is in the order of milliseconds |

| | |
|---|---|
| Advertisement packets is in seconds | |
| VRRP MAC address format is 00-00-5E-00-01-{VRID} | VRRP MAC address format for IPv6 VR IP is 00-00-5E-00-02-{VRID} |

i VRRPv2 configuration cannot be modified under VRRPv3 enabled mode.

## 6.11.1. Show commands

### 6.11.1.1. *Show vrrp*

This command displays information for all active VRRPv3 groups (no optional parameters), all active VRRPv3 groups configured in an IPv4 or IPv6 address family, or the active VRRPv3 groups configured in an IPv4 or IPv6 address family for the specified interface.

**Format** show vrrp [{ipv4 | ipv6}] [{<slot/port> | vlan <vlan-id>} <vr-id>]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **ipv4** | (Optional) indicates the Virtual router group belongs to IPv4 address family. |
| **ipv6** | (Optional) indicates the Virtual router group belongs to IPv6 address family. |
| **slot/port** | (Optional) indicates the interface number to which the Virutal router belongs. |
| **vlan-id** | (Optional) indicates the VLAN number to which the Virtual router belongs. |
| **vrid** | (Optional) Virtual router group number. The range is from 1 to 255. |

Example:

(IX2) (config-if-vrrp)#show vrrp

vlan 2 - VRID 2 - Address-Family IPv4

Virtual IP address..... 192.168.2.254
Secondary IP Address(es).....
Virtual MAC Address..... 00:00:5e:00:01:02

Priority..... 100
Configured Priority..... 100
Advertisement Interval..... 100 millisecs
Pre-empt Mode..... Enable
Accept Mode..... Disable
Administrative Mode..... Enable
State..... Master
Master Router IP / Priority..... 192.168.2.250 / 100
Master Advertisement interval..... 100 millisecs
Master Down interval..... 300 millisecs

Track Interface State DecrementPriority BFD-Neighbor
--------------- ----- ----------------- ----------------

Track Route(pfx/len)  Reachable  DecrementPriority
--------------------  --------- ------------------

(IX2) (config-if-vrrp)#

### 6.11.1.2. *Show vrrp brief*

This command displays brief information for all active VRRPv3 groups.

**Format** show vrrp brief

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | Interface on which VRRP is configured. |
| **VRID** | ID of the virtual router. |
| **A-F** | IP address family type (IPv4 or IPv6) this Virtual Router belongs to. |
| **Pri** | Priority range of the virtual router.. |
| **AdvIntvl** | Advertisement interval configured for this virtual router. |
| **Pre** | Preemption state of the virtual router. |

| | |
|---|---|
| **Acc** | Accept Mode of the virtual router |
| **State** | VRRP group state. The state can be one of the following: Init, Backup, Master |
| **VR IP address** | Virtual IP address for a VRRP group. |

Example:

(IX8D) (Config)#show vrrp brief

```
Interface   VRID A-F  Pri AdvIntvl Pre Acc State  VR IP Address
----------- ---- ---- --- -------- --- --- ------ -------------
0/1         1    IPv4 100 1        N   N   Backup 10.255.255.123
```

### 6.11.1.3. *Show vrrp statistics*

This command displays statistical information for a given VRRPv3 group or displays the global statistics. If this command is issued without the optional arguments then the global statistics are displayed.
If the optional arguments are specified, the statistics are displayed for the virtual router corresponding to the given (IP address family, interface and VR-id) combination.

**Format** show vrrp statistics [{ipv4| ipv6} {<slot/port> | vlan <vlan-id>} vrid]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **ipv4** | (Optional) indicates the Virtual router group belongs to IPv4 address family. |
| **ipv6** | (Optional) indicates the Virtual router group belongs to IPv6 address family. |
| **slot/port** | (Optional) indicates the interface number to which the Virtual router belongs. |
| **vlan-id** | (Optional) indicates the VLAN number to which the Virtual router belongs. |
| **vr-id** | (Optional) Virtual router group number. The range is from 1 to 255. |

Example:

(IX8D) (Config)#show vrrp statistics ipv4 0/1 1

Master Transitions..... 0
New Master Reason..... notMaster(0)
Advertisements Received..... 153317
Advertisements Sent..... 0
Advertisement Interval Errors..... 0
IP TTL Errors..... 0
Last Protocol Error Reason..... noError(0)
Zero Priority Packets Received..... 0
Zero Priority Packets Sent..... 0
Invalid Type Packets Received..... 0
Address List Errors..... 0
Packet Length Errors..... 0
Row Discontinuity Time..... 0 days 0 hrs 0 mins 0 secs
Refresh Rate (in milliseconds)..... 0

## 6.11.2. Configuration commands

### 6.11.2.1. *Fhrp version vrrp v3*

To enable Virtual Router Redundancy Protocol version 3 (VRRPv3) configuration on a device, use the **fhrp version vrrp v3** command in global configuration mode.
When VRRPv3 is in use, VRRP version 2 (VRRPv2) is unavailable. If you invoke **no fhrp version vrrp v3**, VRRPv3 is disabled and VRRPv2 is enabled. Also, operational data is reset, and the VRRPv2 configuration is applied. The same guidelines apply when VRRPv2 is in use and the **no ip vrrp** command is issued.

To disable the VRRPv3 and enable VRRPv2 in the router, use the **no** form of this command.

**Format** fhrp version vrrp v3
no fhrp version vrrp v3

**Default** Disabled

**Mode** Global Config

### 6.11.2.2. *vrrp*

This command creates a VRRPv3 group and enters VRRPv3 group configuration mode.
To remove the specified VRRPv3 group, use the **no** form of this command. Before you can use this command, you must disable Virtual Router using the shutdown command in the appropriate VRRP Config mode

**Format** vrrp group-id address-family {ipv4 | ipv6}

no vrrp group-id address-family {ipv4 | ipv6}

| Fields | Definition |
|---|---|
| **<1-255>** | Virutal router group number. The range is from 1 to 255. |
| **Address-family** | Specifies the address-family for this VRRP |
| **ipv4** | (Optional) Specifies IPv4 address |
| **ipv6** | (Optional) Specifies IPv6 address |

**Default** None

**Mode** Interface Config

### 6.11.2.3. *preempt*

This command configures the device to take over as master virtual router for a VRRP group if it has higher priority than the current master virtual route.
To prevent device from taking over as master virtual router for a VRRP group if it has higher priority than the current master virtual route., use the **no** form of this command.

**Format** preempt [delay minimum centiseconds]

no preempt

| Fields | Definition |
|---|---|
| **delay minimum** | Number of seconds that the device will delay before issuing an advertisement claiming master ownership. The default delay is 0 centiseconds. The valid range is 0–3600 centiseconds. |

**Default** Enabled with default delay value of 0

**Mode** VRRPv3 Config

### 6.11.2.4. *accept-mode*

This command controls whether a virtual router in master state will accept packets addressed to the address owner's virtual IP address as its own if it is not the virtual IP address owner.
To reset the accept mode to the default value, use the no form of this command.

**Format** accept-mode

no accept-mode

| Fields | Definition |
|---|---|
| **<1-255>** | The range of virtual router ID is 1 to 255. |

**Default** Disabled

**Mode** VRRPv3 Config

### 6.11.2.5. *priority*

This command sets the priority level of the device within a VRRPv3 group. The priority level controls which device becomes the master virtual router.
To reset the priority level of the device to the default value, use the no form of this command.

**Format** priority <level>

no priority

| Fields | Definition |
|---|---|
| **level** | Priority of the device within the VRRP group. The range is from 1 to 254. |

**Default** 100

**Mode** VRRPv3 Config

### 6.11.2.6. *timers advertise*

This command configures the interval between successive advertisements by the master virtual router in a VRRP group.
The advertisements being sent by the master virtual router communicate the advertisement interval, state, and priority of the current master virtual router. The VRRP **timers advertise** command configures the time between successive advertisement packets and the time before other routers declare the master router to be down. VRRP backup routers learn timer values from the master router advertisements. The timers configured on the master router always override any other timer settings that are used for calculating the master down time interval on VRRP backup routers.
To restore the default value, use the no form of this command.

**Format** timers advertise <milliseconds>

no timers advertise

| Fields | Definition |
|---|---|
| **milliseconds** | Time interval between successive advertisements by the master virtual router. The unit of the interval is in 100 milliseconds. The valid range is 100 to 40000 milliseconds |

**Default** 1 (100 milliseconds)

**Mode** VRRPv3 Config

### 6.11.2.7. *shutdown*

This command disables the VRRP group configuration.
To enable and update the virtual router state after completing configuration.restore the default value, use the no form of this command.

**Format** shutdown

no shutdown

**Default** shutdown

**Mode** VRRPv3 Config

### 6.11.2.8. *address*

This command set the primary or secondary IP address of the device within a VRRPv3 group.
If the primary or secondary option is not specified, the specified IP address is set as the primary. The Virtual IPv6 primary address should be a link-local address only. When a global IPv6 address is given as a primary address for the VRRP IP then the config fails with the following error message – "Error! Primary virtual IPv6 address should be a link-local address only." Also the removing of the primary virtual IP (IPv4 or IPv6) is not allowed. The primary virtual IP of a virtual router can only be modified. The secondary virtual IP can be removed using the no form of the this command. Also, VRRPv3 for IPv6 requires that a primary virtual link-local IPv6 address is configured to allow the group to operate. After the primary link-local IPv6 address is established on the group, you can add the secondary global addresses.
To remove the secondary address, use the no form of this command.

**Format** address <ip-address> [primary | secondary]

no address <ip-address> secondary

| Fields | Definition |
|---|---|
| **ip-address** | IPv4 or IPv6 address, it can be specified in one of the following format: *ipv4-address*, *ipv6-link-local-address*, *ipv6-address>/<prefix-len* |
| **primary** | (Optional) Set primary IP address of the VRRPv3 group. |
| **secondary** | (Optional) Set additional IP address of the VRRPv3 group. |

**Default** None

**Mode** VRRPv3 Config

### 6.11.2.9. *track interface*

This command configures tracking of the interface for the device within a VRRPv3 group. Once interface tracking is configured, the VRRPv3 feature receives notifications when the interface changes state. The decrement option can be set to decrease the priority of the device within a VRRPv3 group by the specified value when the interface goes down.
To disable tracking of the interface for the device within a VRRPv3 group, use the no form of this command.

**Format** track interface {<slot/port> | vlan <vlan-id>} [bfdneighbor <ip-address>] [decrement number]

no track interface {<slot/port> | vlan <vlan-id>} [bfdneighbor <ip-address>] [decrement number]

| Fields | Definition |
|---|---|
| **slot/port** | The interface to track. |
| **vlan-id** | The VLAN to track. |
| **ip-address** | IPv4 address of the BFD nieghbor |
| **decrement number** | (Optional) Specify the VRRP priority decrement for the tracked object. The number is the amount by which priority is decremented. The range is 1–254. |

**Default** Enabled

**Mode** VRRPv3 Config

### 6.11.2.10. *track ip route*

This command configures tracking of the IP route for the device within a Virtual Router Redundancy Protocol (VRRPv3) group. Once IP route tracking is configured, the VRRPv3 feature receives notifications when IP route changes state. The decrement option can be set to decrease the priority of the device within a VRRPv3 group by the specified value when the route becomes unavailable.
To remove the secondary address, use the no form of this command.

**Format** track ip route <ip-address/prefix-len> [decrement number]

no track ip route <ip-address/prefix-len> [decrement number]

| Fields | Definition |
|---|---|
| **ip-address/prefix-len** | Prefix and prefix length of the route to be tracked |
| **decrement number** | (Optional) Specify the VRRP priority decrement for the tracked route. The number is the amount by which priority is decremented. The range is 1–254. |

**Default** Disabled

**Mode** VRRPv3 Config

### 6.11.2.11. *clear vrrp statistics*

This command clears VRRP statistical information for given interface of the device within a VRRPv3 group and IP address family. If this command is issued without the optional arguments then the global statistics and all virtual routers (both IPv4 and IPv6) are reset.
If the optional arguments are specified, the statistics are reset for the virtual router corresponding to the given (IP address family, interface and VR-id) combination.

**Format** clear vrrp statistics [{ipv4| ipv6} {<slot/port> | vlan <vlan-id>} [vrid]]

| Fields | Definition |
|---|---|
| **ipv4** | (Optional) indicates the Virtual router group belongs to IPv4 address family. |
| **ipv6** | (Optional) indicates the Virtual router group belongs to IPv6 address family. |
| **slot/port** | (Optional) indicates the interface number to which the Virtual router belongs. |
| **vlan-id** | (Optional) indicates the VLAN number to which the Virtual router belongs. |
| **vr-id** | (Optional) Virtual router group number. The range is from 1 to 255. |

**Mode** Privileged Exec

# 6.12. Virtual Router Commands

## 6.12.1. Show commands

### 6.12.1.1. *Show ip vrf*

This command shows the information about the virtual router instances.

**Format** show ip vrf [{vrf-name | detail vrf-name | interfaces | memory [vrf-name]}]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Vrf-name** | Name of the virtual router instance |
| **detail** | Displays the configuration and status of the specified virtual router |
| **interfaces** | Displays the list of interfaces and the virtual routers to which they belong |
| **memory** | Displays the runtime memory utilization of the processes running in a virtual router |

## 6.12.2. Configuration commands

### 6.12.2.1. *Ip vrf*

Use this command to create a virtual router with a specified name and enters VRF configuration mode. Alternatively, you can use *no ip vrf* command to delete the virtual router with the specified name.

**Format** ip vrf <vrf-name>

no ip vrf <vrf-name>

| Fields | Definition |
|---|---|
| **vrf-name** | The name of the virtual router. The name is a string of up to 64 characters from an ASCII set. |

**Default** No VRs are defined

**Mode** Global Config

### 6.12.2.2. *Maximum routes*

Use this command to reserve the number of routes allowed and sets the maximum limit on the number of routes for a virtual router instance in the total routing table space for the router, provided there is enough free space in the router's total routing table.
Alternatively, you can use *no maximum routes* command to remove any reservation for the number of routes allowed in the virtual router instance and clears the warning threshold value.

**Format** maximum routes {limit | warn threshold}

no maximum routes

| Fields | Definition |
|---|---|
| **limit** | The number of routes for a virtual router instance in the total routing table space for the router. The limit ranges from 1 to 4294967295. If the limit value is greater than the total router table size, it is limited to the total size. |
| **Warn threshold** | The threshold value ranges from 1 to 100 and indicates the percent of the limit value at which a warning message is to be generated. If no limit value is given the platform maximum is taken as the limit value. |

**Default** Limited by the number of free routes available

**Mode** Virtual Router Config

### 6.12.2.3. *description*

Use this command to configure a descriptive text for a virtual router.
Alternatively, you can use *no description* command to remove the descriptive text configuration for a virtual router.

**Format** description text

no description

| Fields | Definition |
|---|---|
| **text** | The descriptive text for the virtual router. A set of ASCII characters up to 512 characters in length. |

**Default** None

**Mode** Virtual Router Config

### 6.12.2.4. *ip vrf forwarding*

Use this command to associate a routing interface with a virtual router.
Alternatively, you can use *no ip vrf* command to disassociate a routing interface from the configured virtual router and associates it back to the default virtual router.

**Format** ip vrf forwarding vrf-name

no ip vrf forwarding

| Fields | Definition |
|---|---|
| **vrf-name** | The name of the virtual router. |

**Default** Default virtual router

**Mode** Interface Config

# 6.13. Black Hole Detection (BHD) Commands

In networkgin terms, *black holes* refer to the places in the Clos network where incoming or outgoing traffic is silently discarded without informing the source that the data did not reach its intented recipient. Black hole conditions arise when the traffic is directed towards an incorrect path in Clos networks where uRPF is not running.

The Black Hole Detection (BHD) feature helps in getting notification logs intermittently whenever packets are getting black-holed in the network.

## 6.13.1. Show commands

### 6.13.1.1. *Show bhd status*

This command shows the global configuration of black hole detection feature along with the list of ports enabled for BHD.

**Format** show bhd status

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Spine port** | The ports enabled for BHD |
| **BHD Count** | Displays the BHD packet counts |

## 6.13.2. Configuration commands

### 6.13.2.1. *Bhd spine-port enable*

Use this command to enable the port to be monitored for black hole detection. Only port-based routing interface can be enabled as BHD spine ports. Alternatively, you can use *no bhd spine-port enable* command to disable the port to be monitored for black hole detection.

**Format** bhd spine-port enable

no bhd spine-port enable

**Default** Disabled

**Mode** Interface Config

### 6.13.2.2. *Bhd enable*

Use this command to enable the BHD feature globally on the system.
Alternatively, you can use *no bhd enable* command to disable the BHD feature globally on the system.

**Format** bhd enable
no bhd enable

**Default** Disabled

**Mode** Global Config

### 6.13.2.3. *Clear counter bhd*

Use this command to clear the counters of BHD.

**Format** clear counters bhd

**Default** None

**Mode** Privileged Exec

## 6.14. IP Service Level Agreement Commands

The IP service level agreement (SLA) feature allows users to monitor network performance between routers or from a router to a remote IP device. QNOS supports the following measurement capabilities:

- Remote IP reachability tracking
- Round-trip-time threshold monitoring

These metrics are collected by measuring ICMP response time and connectivity.

## 6.14.1. Show commands

### 6.14.1.1. *Show ip sla configuration*

This command shows the configuration values (including all defaults) for a specified IP SLAs operation or all operations.

**Format** show ip sla configuration <operation-number>

| Fields | Definition |
|---|---|
| **operation-number** | IP SLA number of a specific operation associated with the statistics to display. |

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Spine port** | The ports enabled for BHD |
| **BHD Count** | Displays the BHD packet counts |

Example:

(IX2) (config-if-vrrp)#show vrrp

vlan 2 - VRID 2 - Address-Family IPv4

## 6.14.2. Configuration commands

### 6.14.2.1. *Bhd spine-port enable*

Use this command to enable the port to be monitored for black hole detection. Only port-based routing interface can be enabled as BHD spine ports. Alternatively, you can use *no bhd spine-port enable* command to disable the port to be monitored for black hole detection.

**Format** bhd spine-port enable

no bhd spine-port enable

**Default** Disabled

**Mode** Interface Config

### 6.14.2.2. *Bhd enable*

Use this command to enable the BHD feature globally on the system.
Alternatively, you can use *no bhd enable* command to disable the BHD feature globally on the system.

**Format** bhd enable

no bhd enable

**Default** Disabled

**Mode** Global Config

### 6.14.2.3. *Clear counter bhd*

Use this command to clear the counters of BHD.

**Format** clear counters bhd

**Default** None

**Mode** Privileged Exec

# 6.15. IPv6 Policy-Based Routing Commands

## 6.15.1. Show commands

### 6.15.1.1. *Show ipv6 policy*

This command shows the route maps used for policy routing on the router's interfaces.

**Format** show ipv6 policy

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The interface on which the IPv6 route map is used |
| **Route-Map** | The name of the IPv6 route map |

## 6.15.2. Configuration commands

### 6.15.2.1. *Ipv6 policy*

Use this command to configure an IPv6 routing map to use for policy-based IPv6 routing on an interface. To disable policy based routing from an interface, use the no form of this command.

**Note: A route-map statement should contain at least one match condition and one set condition for it to be eligible to be applied to hardware. If not, the route-map is not applied to hardware. Route-map and DiffServ cannot work on the same interface.**

**Format** ipv6 policy route-map <routemap>

no ipv6 policy route-map <routemap>

| Fields | Definition |
|---|---|

| | |
|---|---|
| **routemap** | Route map name to be attached to an interface. |

**Default** None

**Mode** Interface Config

### 6.15.2.2. *Match ipv6 address*

Use this command to configure a route map to match based on the match criteria configured in an IPv6 access-list. To delete a match statement from a route map, use the no form of this command.

**Format** match ipv6 address <acl-name>

no match ipv6 address

**Default** No match criteria are defined by default

**Mode** Route Map Config

### 6.15.2.3. *Clear counter bhd*

Use this command to clear the counters of BHD.

**Format** clear counters bhd

**Default** None

**Mode** Privileged Exec

# 7. IP Multicast Commands

## 7.1. Internet Group Management Protocol (IGMP) Commands

This section provides a detailed explanation of the IGMP commands. The commands are divided into the following different groups:

Show commands are used to display device settings, statistics and other information.

Configuration commands are used to configure features and options of the switch. For every configuration command there is a show command that will display the configuration setting.

### 7.1.1. Show commands

#### 7.1.1.1. *Show ip igmp*

This command displays the system-wide IGMP information.

**Format** show ip igmp

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **IGMP Admin Mode** | This field displays the administrative status of IGMP. This is a configured value. |
| **IGMP Router-Alert check** | This field displays the administrative status of Router-Alert validation for IGMP packets. |
| **Interface** | Valid slot and port number separated by forward slashes. |
| **Interface Mode** | This field indicates whether IGMP is enabled or disabled on the interface. This is a configured value. |
| **Operational-Status** | This field indicates the current state of IGMP on this interface. Possible values are Operational or Non-Operational. |

#### 7.1.1.2. *Show ip igmp groups*

This command displays the registered multicast groups on the interface. If “detail” is specified this command displays the registered multicast groups on the interface in detail.

**Format** show ip igmp groups {<slot/port> | vlan <vlan-id>} [detail]

| Fields | Definition |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is from 1 to 4093. |
| **[detail]** | Display details of subscribed multicast groups. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **IP Address** | This displays the IP address of the interface participating in the multicast group. |
| **Subnet Mask** | This displays the subnet mask of the interface participating in the multicast group. |
| **Interface Mode** | This displays whether IGMP is enabled or disabled on this interface.<br>*// The following fields are not displayed if the interface is not enabled:* |
| **Querier Status** | This displays whether the interface has IGMP in Querier mode or Non-Querier mode. |
| **Groups** | This displays the list of multicast groups that are registered on this interface.<br>*If detail is specified, the following fields are displayed:* |
| **Multicast IP Address** | This displays the IP Address of the registered multicast group on this interface. |
| **Last Reporter** | This displays the IP Address of the source of the last membership report received for the specified multicast group address on this interface. |
| **Up Time** | This displays the time elapsed since the entry was created for the specified |

multicast group address on this interface.

| | |
|---|---|
| **Expiry Time** | This displays the amount of time remaining to remove this entry before it is aged out. |
| **Version1 Host Timer** | This displays the time remaining until the local router assumes that there are no longer any IGMP version 1 multicast members on the IP subnet attached to this interface. This could be an integer value or "-----" if there is no Version 1 host present. |
| **Version2 Host Timer** | This displays the time remaining until the local router assumes that there are no longer any IGMP version 2 multicast members on the IP subnet attached to this interface.This could be an integer value or "-----" if there is no Version 2 host present. |
| **Group Compatibilty Mode** | The group compatibility mode (v1, v2 or v3) for this group on the specified interface. |

### 7.1.1.3. *Show ip igmp interface*

This command displays the IGMP information for the interface.

**Format** show ip igmp interface {<slot/port> | vlan <vlan-id>}

| **Fields** | **Definition** |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is from 1 to 4093. |

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **Interface** | Valid slot and port number separated by forward slashes. |
| **IP Address** | This displays the IP address of the interface participating in the multicast group. |

| | |
|---|---|
| **Subnet Mask** | This displays the subnet mask of the interface participating in the multicast group. |
| **IGMP Admin Mode** | This field displays the administrative status of IGMP. This is a configured value |
| **Interface Mode** | This field indicates whether IGMP is enabled or disabled on the interface. This is a configured value. |
| **IGMP Version** | This field indicates the version of IGMP running on the interface. This value can be configured to create a router capable of running either IGMP version 1 or 2. |
| **Query Interval (secs)** | This field indicates the frequency at which IGMP Host-Query packets are transmitted on this interface. This is a configured value. |
| **Query Max Response Time (secs)** | This field indicates the maximum query response time advertised in IGMPv2 queries on this interface. This is a configured value. |
| **Robustness** | This field displays the tuning for the expected packet loss on a subnet. If a subnet is expected to be have a lot of loss, the Robustness variable may be increased for that interface. This is a configured v.  alue. |
| **Startup Query Interval (secs)** | This value indicates the interval between General Queries sent by a Querier on startup. This is a configured value. |
| **Startup Query Count** | This value is the number of Queries sent out on startup, separated by the Startup Query Interval. This is a configured value. |
| **Last Member Query Interval (secs)** | This value indicates the Maximum Response Time inserted into Group-Specific Queries sent in response to Leave Group messages. This is a configured value |
| **Last Member Query Count** | This value is the number of Group-Specific Queries sent before the router assumes that there are no local members. This is a configured value. |

### 7.1.1.4. *Show ip igmp interface membership*

This command displays the list of interfaces that have registered in the multicast group.

**Format** show ip igmp interface membership <multiipaddr> [detail]

| Fields | Definition |
|---|---|
| **< multiipaddr >** | A multicast IP address. |

| | |
|---|---|
| **[detail]** | Display details of subscribed multicast groups. |

**Default** None

**Mode** Privileged EXEC

User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | Valid slot and port number separated by forward slashes. |
| **Interface IP** | This displays the IP address of the interface participating in the multicast group. |
| **State** | This displays whether the interface has IGMP in Querier mode or Non-Querier mode. |
| **Group Compatibility Mode** | The group compatibility mode (v1, v2 or v3) for the specified group on this interface. |
| **Source Filter Mode** | The source filter mode (Include/Exclude) for the specified group on this interface. This is "-----" for IGMPv1 and IGMPv2 Membership Reports. |

If detail is specified, the following fields are displayed:

| Fields | Definition |
|---|---|
| **Interface** | Valid slot and port number separated by forward slashes. |
| **Group Compatibility Mode** | The group compatibility mode (v1, v2 or v3) for the specified group on this interface. |
| **Source Filter Mode** | The source filter mode (Include/Exclude) for the specified group on this interface. This is "-----" for IGMPv1 and IGMPv2 Membership Reports. |
| **Source Hosts** | This displays the list of unicast source IP Addresses in the group record of the IGMPv3 Membership Report with the specified multicast group IP Address. This is "-----" for IGMPv1 and IGMPv2 Membership Reports. |
| **Expiry Time** | This displays the amount of time remaining to remove this entry before it is aged out. This is "- ----" for IGMPv1 and IGMPv2 Membership Reports. |

### 7.1.1.5. *Show ip igmp interface stats*

This command displays the IGMP statistical information for the given interface. The statistics are only displayed when the interface is enabled for IGMP.

**Format** show ip igmp interface stats {<slot/port> | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is from 1 to 4093. |

**Default** None

**Mode** Privileged EXEC
User EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Querier Status** | This field indicates the status of the IGMP router, whether it is running in Querier mode or Non-Querier mode. |
| **Querier IP Address** | This field displays the IP Address of the IGMP Querier on the IP subnet to which this interface is attached. |
| **Querier Up Time** | This field indicates the time since the interface Querier was last changed. |
| **Querier Expiry Time** | This field displays the amount of time remaining before the Other Querier Present Timer expires. If the local system is the querier, the value of this object is zero. |
| **Wrong Version Queries** | This field indicates the number of queries received whose IGMP version does not match the IGMP version of the interface. |
| **Number of Joins** | This field displays the number of times a group membership has been added on this interface. |
| **Number of Groups** | This field indicates the current number of membership entries for this interface. |

## 7.1.2. Configuration commands

### 7.1.2.1. *Ip igmp*

This command sets the administrative mode of IGMP in the router to active.

To set the administrative mode of IGMP in the router to inactive, use the no form of this command.

**Format** ip igmp
no ip igmp

**Default** Disable

**Mode** Global Config
Interface Config

### 7.1.2.2. *Ip igmp router-alart-check*

This command is used to enables Router-Alert validation for IGMP packets.

To disables Router-Alert validation for IGMP packets, use the no form of this command.

**Format** ip igmp router-alert-check
no ip igmp router-alert-check

**Default** Disable

**Mode** Global Config

### 7.1.2.3. *Ip igmp version*

This command configures the version of IGMP for an interface.

To reset the version of IGMP for this interface to the default value, use the no form of this command.

**Format** ip igmp version {1 | 2 | 3}
no ip igmp version

| Fields | Definition |
|---|---|
| **<1- 3>** | The IGMP version number. |

**Default** 3

**Mode** Interface Config

### 7.1.2.4. *Ip igmp last-member-query-count*

This command sets the number of Group-Specific Queries sent by the interface before the router assumes that there are no local members on the interface.

To reset the number of Group-Specific Queries to the default value, use the no form of this command.

**Format** ip igmp last-member-query-count <1-20>

no ip igmp last-member-query-count

| Fields | Definition |
|---|---|
| **<1-20>** | The range for last-member-query-count is from 1 to 20. |

**Default** 2

**Mode** Interface Config

### 7.1.2.5. *Ip igmp last-member-query-interval*

This command configures the Maximum Response Time being inserted into Group-Specific Queries sent in response to Leave Group messages on the interface.

To reset the Maximum Response Time being inserted into Group-Specific Queries sent in response to Leave Group messages on the interface to the default value, use the no form of this command.

**Format** ip igmp last-member-query-interval <1-25>

no ip igmp last-member-query-interval

| Fields | Definition |
|---|---|
| **1-25** | The range for last-member-query-interval is from 1 to 25 seconds. |

**Default** 1 second

**Mode** Interface Config

### 7.1.2.6. *Ip igmp query-interval*

This command configures the query interval for the specified interface. This is the frequency at which IGMP Host-Query packets are transmitted on this interface.

To reset the query interval for the specified interface to the default value, use the no form of this command.

**Format** ip igmp query-interval <1-31744>

no ip igmp query-interval

| Fields | Definition |
|---|---|
| **1-31744** | The range for query-interval is from 1 to 31744 seconds. |
| **IGMP version 3** | range 1-31744, version 2: range 1-3600, version 1: range 1-3600 |

**Default** 125 seconds

**Mode** Interface Config

### 7.1.2.7. *Ip igmp query-max-response-time*

This command configures the maximum response time interval for the specified interface, which is the maximum query response time advertised in IGMPv2 queries on this interface.The time interval is specified in tenths of a second.

To reset the maximum response time interval for the specified interface to the default value, use the no form of this command.

**Format** ip igmp query-max-response-time <1-3174>

no ip igmp query-max-response-time

| Fields | Definition |
|---|---|
| **1-3174** | The range for query-max-response-time is from 1 to 3174 seconds. |
| **IGMP version 3** | range 1-3174, version 2: range 1-25, version 1: range 1-25 |

**Default** 10 seconds

**Mode** Interface Config

### 7.1.2.8. *Ip igmp robustness*

This command configures the robustness that allows tuning of the interface. The robustness is the tuning for the expected packet loss on a subnet. If a subnet is expected to have a lot of loss, the Robustness variable may be increased for the interface.

To reset the robustness value to the default value, use the no form of this command.

**Format** ip igmp robustness <1-255>

no ip igmp robustness

| Fields | Definition |
|---|---|
| **1-255** | The range for robustness is from 1 to 255. |

**Default** 2

**Mode** Interface Config

### 7.1.2.9. *Ip igmp startup-query-count*

This command sets the number of Queries sent out on startup, separated by the Startup Query Interval on the interface.

To reset the number of Queries sent out on startup to the default value, use the no form of this command.

**Format** ip igmp startup-query-count <1-20>

no ip igmp startup-query-count

| Fields | Definition |
|---|---|
| **1-20** | The range for startup-query-count is from 1 to 20. |

**Default** 2

**Mode** Interface Config

### 7.1.2.10. *Ip igmp startup-query-interval*

This command sets the interval between General Queries sent by a Querier on startup on the interface. The time interval value is in seconds.

To reset the interval between General Queries sent by a Querier on startup on the interface to the default value, use the no form of this command.

**Format** ip igmp startup-query-interval <1-300>

no ip igmp startup-query-interval

| Fields | Definition |
|---|---|

| | |
|---|---|
| **1-300** | The range for startup-query-interval is from 1 to 300 seconds. |

**Default** 31

**Mode** Interface Config

## 7.2. MLD Commands

This section provides a detailed explanation of the MLD commands. The commands are divided into the following different groups:

Show commands are used to display device settings, statistics and other information.

Configuration commands are used to configure features and options of the switch. For every configuration command there is a show command that will display the configuration setting.

### 7.2.1. Show commands

#### 7.2.1.1. *Show ipv6 mld groups*

Use this command to display information about multicast groups that MLD reported. The information is displayed only when MLD is enabled on at least one interface. If MLD was not enabled on even one interface, there is no group information to be displayed.

**Format** show ipv6 mld groups {<slot/port> | vlan <vlan-id> | <group-address>}

| Fields | Definition |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is from 1 to 4093. |
| **<group-address>** | The address of the multicast group. |

**Default** None

**Mode** Privileged Exec

**Display Message**

The following fields are displayed as a table when <slot/port> is specified.

| **Fields** | **Definition** |
|---|---|
| **Group Address** | The address of the multicast group. |
| **Interface** | Interface through which the multicast group is reachable. |
| **Up Time** | Time elapsed in hours, minutes, and seconds since the multicast group has been known. |
| **Expiry Time** | Time left in hours, minutes, and seconds before the entry is removed from |

| | |
|---|---|
| | the MLD membership table. |

When <group-address> is specified, the following fields are displayed for each multicast group and each interface.

| Fields | Definition |
|---|---|
| **Interface** | Interface through which the multicast group is reachable. |
| **Group Address** | The address of the multicast group. |
| **Last Reporter** | The IP Address of the source of the last membership report received for this multicast group address on that interface. |
| **Filter Mode** | The filter mode of the multicast group on this interface. The values it can take are *include* and *exclude*. |
| **Version 1 Host Timer** | The time remaining until the router assumes there are no longer any MLD version-1 Hosts on the specified interface. |
| **Group Compat Mode** | The compatibility mode of the multicast group on this interface. The values it can take are *MLDv1* and MLDv2 |

The following table is displayed to indicate all the sources associated with this group.

| Fields | Definition |
|---|---|
| **Source Address** | The IP address of the source. |
| **Uptime** | Time elapsed in hours, minutes, and seconds since the source has been known. |
| **Expiry Time** | Time left in hours, minutes, and seconds before the entry is removed. |

### 7.2.1.2. *Show ipv6 mld interface*

Use this command to display MLD-related information for the specific interface.

**Format** show ipv6 mld interface [{<slot/port> | vlan <vlan-id>}]

| Fields | Definition |
|---|---|

| | |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is from 1 to 4093. |

**Default** None

**Mode** Privileged Exec

**Display Message**

The following information is displayed for each of the interfaces or for only the specified interface.

| Fields | Definition |
|---|---|
| **Interface** | The interface number in slot/port format. |
| **MLD Global Admin Mode** | Displays the configured administrative status of MLD. |
| **MLD Interface Admin Mode** | Displays the configured administrative status of MLD on the interface. |
| **MLD Operational Mode** | The operational status of MLD on the interface. |
| **MLD Version** | Indicates the version of MLD configured on the interface. |
| **Query Interval** | Indicates the configured query interval for the interface. |
| **Query Max Response Time** | Indicates the configured maximum query response time (in seconds) advertised in MLD queries on this interface. |
| **Robustness** | Displays the configured value for the tuning for the expected packet loss on a subnet attached to the interface. |
| **Startup Query interval** | This valued indicates the configured interval between General Queries sent by a Querier on startup. |
| **Startup Query Count** | This value indicates the configured number of Queries sent out on startup, separated by the Startup Query Interval. |
| **Last Member Query Interval** | This value indicates the configured Maximum Response Time inserted into Group-Specific Queries sent in response to Leave Group messages. |
| **Last Member Query Count** | This value indicates the configured number of Group-Specific Queries sent before the router assumes that there are no local members. |

The following information is displayed if the operational mode of the MLD interface is enabled.

| Fields | Definition |
|---|---|
| **Querier Status** | This value indicates whether the interface is an MLD querier or non-querier on the subnet it is associated with. |
| **Querier IP Address** | The IP address of the MLD querier on the subnet the interface is associated with. |
| **Querier Up Time** | Time elapsed in seconds since the querier state has been updated. |
| **Querier Expiry Time** | Time left in seconds before the Querier loses its title as querier. |
| **Wrong Version Queries** | Indicates the number of queries received whose MLD version does not match the MLD version of the interface. |
| **Number of Joins Received** | The number of times a group membership has been added on this interface. |
| **Number of Groups** | The current number of membership entries for this interface. |

### 7.2.1.3. *Show ipv6 mld traffic*

Use this command to display MLD statistical information for the router.

**Format** show ipv6 mld traffic

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Valid MLD Packets Received** | The number of valid MLD packets received by the router. |
| **Valid MLD Packets Sent** | The number of valid MLD packets sent by the router. |
| **Queries Received** | The number of valid MLD queries received by the router. |
| **Queries Sent** | The number of valid MLD queries sent by the router. |
| **Reports Received** | The number of valid MLD reports received by the router. |
| **Reports Sent** | The number of valid MLD reports sent by the router. |

| | |
|---|---|
| **Leaves Received** | The number of valid MLD leaves received by the router. |
| **Leaves Sent** | The number of valid MLD leaves sent by the router. |
| **Bad Checksum MLD Packets** | The number of bad checksum MLD packets received by the router. |
| **Malformed MLD Packets** | The number of malformed MLD packets received by the router. |

## 7.2.2. Configuration commands

### 7.2.2.1. *Ipv6 mld query-interval*

Use this command to set the MLD router's query interval for the interface. The query-interval is the amount of time between the general queries sent when the router is the querier on that interface.

To reset the query interval for the specified interface to the default value, use the no form of this command.

**Format** ipv6 mld query-interval <1-31744>

no ipv6 mld query-interval

| Fields | Definition |
|---|---|
| **1-31744** | The range for query-interval is 1 to 31744 seconds. |
| **MLD version 2** | range 1-31744, version 1: range 1-3600 |

**Default** 125

**Mode** Interface Config

### 7.2.2.2. *Ipv6 mld query-max-response-time*

Use this command to set the MLD querier's maximum response time for the interface and this value is used in assigning the maximum response time in the query messages that are sent on that interface.

To reset the maximum response time interval for the specified interface to the default value, use the no form of this command.

**Format** ipv6 mld query-max-response-time <1-8387>

no ipv6 mld query-max-response-time

| Fields | Definition |
|---|---|
| **1-8387** | The range for query-max-response-time is 1 to 8387 seconds. |
| **MLD version 2** | range 1-8387, version 1: range 1-65 |

**Default** 10 seconds

**Mode** Interface Config

### 7.2.2.3. *Ipv6 mld last-member-query-interval*

Use this command to set the last member query interval for the MLD interface, which is the value of the maximum response time parameter in the group specific queries sent out of this interface.

To reset the Maximum Response Time being inserted into Group-Specific Queries sent in response to Leave Group messages on the interface to the default value, use the no form of this command.

**Format** ipv6 mld last-member-query-interval <1-65>

no ipv6 mld last-member-query-interval

| Fields | Definition |
|---|---|
| **1-65** | The range for last-member-query-interval is from 1 to 65 seconds. |

**Default** 1 seconds

**Mode** Interface Config

### 7.2.2.4. *Ipv6 mld last-member-query-count*

Use this command to set the number of listener-specific queries sent before the router assumes that there are no local members on the interface.

To reset the number of Group-Specific Queries to the default value, use the no form of this command.

**Format** ipv6 mld last-member-query-count <1-20>

no ipv6 mld last-member-query-count

| Fields | Definition |
|---|---|
| **1-20** | The range for last-member-query-count is from 1 to 20. |

**Default** 2

**Mode** Interface Config

### 7.2.2.5. *Ipv6 mld router*

Use this command, in the administrative mode of the router, to enable MLD in the router.

To set the administrative mode of MLD in the router to inactive, use the no form of this command.

**Format** ipv6 mld router
no ipv6 mld router

**Default** Disable

**Mode** Global Config
Interface Config

### 7.2.2.6. *Clear Ipv6 mld counters*

The user can go to the CLI Privilege Configuration Mode to clear MLD counters on the system.

**Format** clear ipv6 mld counters [{<slot/port> | vlan <vlan-id>}]

| Fields | Definition |
|---|---|
| **<slot/port>** | Specify the interface. |
| **<vlan-id>** | Specifies the VLAN interface. The range of the VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec

### 7.2.2.7. *Clear Ipv6 mld traffic*

The user can go to the CLI Privilege Configuration Mode to clear MLD traffec on the system.

**Format** clear ipv6 mld traffic

**Default** None

**Mode** Privileged Exec

### 7.2.2.8. *Ipv6 mld version*

This command configures the version of MLD for an interface.

To reset the version of MLD for this interface to the default value, use the no form of this command.

**Format** ipv6 mld version {1 | 2}

no ipv6 mld version

| Fields | Definition |
|---|---|
| **1 - 2** | The mld version number. |

**Default** 2

**Mode** Interface Config

# 7.3. Multicast Commands

## 7.3.1. Show commands

### 7.3.1.1. *Show ip mcast*

This command displays the system-wide multicast information

**Format** show ip mcast

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Admin Mode** | This field displays the administrative status of multicast. This is a configured value. |
| **IPv4 Protocol State** | This field indicates the current state of the IPv4 multicast protocol. Possible values are Operational or Non-Operational. |
| **IPv6 Protocol State** | This field indicates the current state of the IPv6 multicast protocol. Possible values are Operational or Non-Operational. |
| **IPv4 Table Max Size** | The max number of the entries allowed in the multicast table. |
| **IPv6 Table Max Size** | The max number of the IPv6 entries allowed in the multicast table. |
| **IPv4 Protocol** | This field displays the multicast protocol running on the router. Possible values are PIMDM or PIMSM |
| **IPv6 Protocol** | This field displays the multicast IPv6 protocol running on the router. |
| **IPv4 Multicast Forwarding Cache Entry Count** | This field displays the number of entries in the multicast table. |
| **IPv6 Multicast Forwarding Cache Entry Count** | This field displays the number of entries in the IPv6 multicast table. |

### 7.3.1.2. *Show ip mcast boundary*

This command displays all the configured administrative scoped multicast boundaries.

**Format** show ip mcast boundary {<slot/port> | all | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **<slot/port >** | Interface number. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<all>** | All interface. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | Valid slot and port number separated by forward slashes. |
| **Group IP** | The group IP address. |
| **Mask** | The group IP mask. |

### 7.3.1.3. *Show ip mcast interface*

This command displays the multicast information for the specified interface.

**Format** show ip mcast interface {<slot/port> | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **<slot/port >** | Interface number. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Interface** | Valid slot and port number separated by forward slashes. |
| **TTL** | This field displays the time-to-live value for this interface. |

### 7.3.1.4. *Show ip mcast mroute*

This command displays a summary or all the details of the multicast table.

**Format** show ip mcast mroute {detail | summary}

| Fields | Definition |
|---|---|
| **Detail** | displays the multicast routing table details. |
| **Summary** | displays the multicast routing table summary. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

If the "**detail**" parameter is specified, the following fields are displayed:

| Fields | Definition |
|---|---|
| **Source IP** | This field displays the IP address of the multicast data source. |
| **Group IP** | This field displays the IP address of the destination of the multicast packet. |
| **Expiry Time (secs)** | This field displays the time of expiry of this entry in seconds. |
| **Up Time (secs)** | This field displays the time elapsed since the entry was created in seconds. |
| **RPF Neighbor** | This field displays the IP address of the RPF neighbor. |
| **Flags** | This field displays the flags associated with this entry. |

If the "**summary**" parameter is specified, the following fields are displayed:

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Source IP** | This field displays the IP address of the multicast data source. |
| **Group IP** | This field displays the IP address of the destination of the multicast packet. |
| **Protocol** | This field displays the multicast routing protocol by which this entry was created. |
| **Incoming Interface** | This field displays the interface on which the packet for this source/group arrives. |
| **Outgoing Interface List** | This field displays the list of outgoing interfaces on which this packet is forwarded. |

### 7.3.1.5. *Show ip mcast mroute group*

This command displays the multicast configuration settings such as flags, timer settings, incoming and outgoing interfaces, RPF neighboring routers, and expiration times of all the entries in the multicast mroute table containing the given <groupipaddr>.

**Format** show ip mcast mroute group <groupipaddr> {detail |summary}

| Fields | Definition |
|---|---|
| **< groupipaddr >** | the IP Address of the destination of the multicast packet. |
| **Detail** | Display the multicast routing table details. |
| **Summary** | Display the multicast routing table summary. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

If the **detail** parameter is specified the follow fields are displayed:

| Fields | Definition |
|---|---|
| **Source IP** | This field displays the IP address of the multicast data source. |
| **Group IP** | This field displays the IP address of the destination of the multicast packet. |

| | |
|---|---|
| **Expiry Time (secs)** | This field displays the time of expiry of this entry in seconds. |
| **Up Time (secs)** | This field displays the time elapsed since the entry was created in seconds. |
| **RPF Neighbor** | This field displays the IP address of the RPF neighbor. |
| **Flags** | This field displays the flags associated with this entry. |

If the **summary** parameter is specified the follow fields are displayed:

| Fields | Definition |
|---|---|
| **Source IP** | This field displays the IP address of the multicast data source. |
| **Group IP** | This field displays the IP address of the destination of the multicast packet. |
| **Protocol** | This field displays the multicast routing protocol by which this entry was created. |
| **Incoming Interface** | This field displays the interface on which the packet for this group arrives. |
| **Outgoing Interface List** | This field displays the list of outgoing interfaces on which this packet is forwarded. |

### 7.3.1.6. *Show ip mcast mroute source*

This command displays the multicast configuration settings such as flags, timer settings, incoming and outgoing interfaces, RPF neighboring routers, and expiration times of all the entries in the multicast mroute table containing the given <sourceipaddr>.

**Format** show ip mcast mroute source <sourceipaddr> {summary | detail}

| Fields | Definition |
|---|---|
| **< sourceipaddr >** | the IP Address of the multicast data source. |
| **summary** | display the multicast routing table summary |
| **Detail** | Display the multicast routing table details. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

If the **detail** parameter is specified the follow fields are displayed:

| Fields | Definition |
|---|---|
| **Source IP** | This field displays the IP address of the multicast data source. |
| **Group IP** | This field displays the IP address of the destination of the multicast packet. |
| **Expiry Time (secs)** | This field displays the time of expiry of this entry in seconds. |
| **Up Time (secs)** | This field displays the time elapsed since the entry was created in seconds. |
| **RPF Neighbor** | This field displays the IP address of the RPF neighbor. |
| **Flags** | This field displays the flags associated with this entry. |

If the **summary** parameter is specified the follow fields are displayed:

| Fields | Definition |
|---|---|
| **Source IP** | This field displays the IP address of the multicast data source. |
| **Group IP** | This field displays the IP address of the destination of the multicast packet. |
| **Protocol** | This field displays the multicast routing protocol by which this entry was created. |
| **Incoming Interface** | This field displays the interface on which the packet for this source arrives. |
| **Outgoing Interface List** | This field displays the list of outgoing interfaces on which this packet is forwarded. |

### 7.3.1.7. *Show ip mcast mroute static*

This command displays all the static routes configured in the static mcast table, if it is specified, or display the static route associated with the given <sourceipaddr>.

**Format** show ip mcast mroute static [<sourceipaddr>]

| Fields | Definition |
|---|---|

| | |
|---|---|
| **< sourceipaddr >** | the IP Address of the multicast data source. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Source IP** | This field displays the IP address of the multicast data source. |
| **Source Mask** | This field displays the IP address Mask of the multicast data source. |
| **RPF Address** | This field displays the IP address of the RPF next-hop toward the source. |
| **Preference** | This field displays the administrative distance for this static mroute. |

## 7.3.2. Configuration commands

### 7.3.2.1. *Ip multicast*

This command sets the administrative mode of the IP multicast forwarder in the router to active. For multicast routing to become operational, IGMP must be currently enabled. An error message will be displayed on the CLI if multicast routing is enabled while IGMP is disabled. However, the IP multicast mode configuration is stored in the multicast configuration file and is automatically enabled once IGMP is enabled.

To set the administrative mode of the IP multicast forwarder in the router to inactive, use the no form of this command.

**Format** ip multicast
no ip multicast

**Default** None

**Mode** Global Config

### 7.3.2.2. *Ip mcast boundary*

This command adds an administrative scope multicast boundary specified by <groupipaddr> and <mask> for which this multicast administrative boundary is applicable. <groupipaddr> is a group IP address and <mask> is a group IP mask.

To remove an administrative scope multicast boundary specified by <groupipaddr> and <mask> for which this multicast administrative boundary is applicable, use the no form of this command.

**Format** ip mcast boundary <groupipaddr> <mask>

no ip mcast boundary <groupipaddr> <mask>

| Fields | Definition |
|---|---|
| **<groupipaddr>** | the multicast group address for the start of the range of addresses to be excluded. The address must be in the range of 239.0.0.0 through 239.255.255.255. |
| **<mask>** | mask to be applied to the multicast group address. |

**Default** None

**Mode** Interface Config

### 7.3.2.3. *Ip multicast ttl-threshold*

This command applies the given <ttl-threshold> to a routing interface. The <ttl-threshold> is the TTL threshold which is to be applied to the multicast Data packets which are to be forwarded from the interface.

To reset the <ttl-threshold> for the routing interface to the default value, use the no form of this command.

**Format** ip multicast ttl-threshold <0 - 255>

no ip multicast ttl-threshold

| Fields | Definition |
|---|---|
| **0 - 255** | the TTL threshold. The range is from 0 to 255. |

**Default** 1

**Mode** Interface Config

# 7.4. IPv4 Protocol Independent Multicast (PIM) Commands

## 7.4.1. Show commands

### 7.4.1.1. *Show ip pim*

This command displays the system-wide information for PIM-SM.

**Format** show ip pim

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **PIM Mode** | Indicates the PIM mode is sparse (PIM-SM) |
| **Data Threshold Rate (Kbps)** | Rate (in kbps) of SPT Threshold |
| **Interface** | slot/port, or VLAN ID |
| **Interface Mode** | Indicates whether PIM is enabled or disabled on this interface |
| **Operational Status** | The current state of PIM on this interface: Operational or Non-Operational. |

### 7.4.1.2. *Show ip pim bsr-router*

This command displays the bootstrap router (BSR) information.

**Format** show ip pim bsr-router {candidate | elected}

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **BSR Address** | IP address of the BSR |

| | |
|---|---|
| **BSR Priority** | Priority as configured in the „ip pim bsr-candidate“ command |
| **BSR Hash Mask Length** | Length of a mask (maximum 32 bits) that is to be ANDed with the group address before the hash function is called. This value is configured in the ip pim bsrcandidate command |
| **C-BSR Advertisement Interval(secs)** | Indicates the configured C-BSR Advertisement interval with which the router, acting as a C-BSR, will periodically send the C-BSR advertisement messages. |
| **Next Bootstrap Message(hh:mm:ss)** | Time (in hours, minutes, and seconds) in which the next bootstrap message is due from this BSR |

### 7.4.1.3. *Show ip pim interface*

This command displays the interface information for PIM on the specified interface. If no interface is specified, the command displays the status parameters for all PIM-enabled interfaces.

**Format** show ip pim interface [{<slot/port> | loopback <loopback-id> | vlan <vlan-id>}]

| Fields | Definition |
|---|---|
| **<slot/port>** | Interface number. |
| **<loopback-id>** | The loopback interface. The range is 0 to 63. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | slot/port, loopback ID, or VLAN ID |
| **Mode** | Indicates the PIM mode enabled on the interface is sparse |
| **Hello Interval** | The frequency at which PIM hello messages are transmitted on this interface. By default, the value is 30 seconds |
| **Join Prune Interval** | The join/prune interval for the PIM router. The interval is in seconds |

| | |
|---|---|
| **DR Priority** | The priority of the Designated Router configured on the interface. |
| **BSR Border** | Identifies whether this interface is configured as a bootstrap router border interface |
| **Neighbor Count** | The number of PIM neighbors learned on this interface. This is a dynamic value and is shown only when a PIM interface is operational |
| **Designated Router** | The IP address of the elected Designated Router for this interface. This is a dynamic value and will only be shown when a PIM interface is operational. |

### 7.4.1.4. *Show ip pim neighbor*

This command displays PIM neighbors discovered by PIMv2 Hello messages. If the interface number is not specified, this command displays the neighbors discovered on all the PIM enabled interfaces.

**Format** show ip pim neighbor [{<slot/port> | vlan <vlan-id>}]

| **Fields** | **Definition** |
|---|---|
| **<slot/port>** | Interface number. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **Neighbor Address** | The IP address of the neighbor on an interface |
| **Interface** | slot/port, or VLAN ID |
| **Up Time** | The time since this neighbor has become active on this interface |
| **Expiry Time** | The expiry time of the neighbor on this interface |
| **DR Priority** | The DR Priority configured on this Interface (PIM-SM only) |
| **BSR Border** | Identifies whether this interface is configured as a bootstrap router border |

| | |
|---|---|
| | interface |

i DR Priority is applicable only when sparse-mode configured routers are neighbors. Otherwise, NA is displayed in this field

### 7.4.1.5. *Show ip pim rp mapping*

Use this command to display all active group-to-RP mappings of which the router is a aware (either configured or learned from the bootstrap router (BSR)). Use the optional parameters to limit the display to a specific RP address or to view group-to-candidate RP or group to Static RP mapping information.

**Format** show ip pim rp mapping [{<rp-address> | candidate | static}]

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **RP Address** | The IP address of the RP for the group specified |
| **Group Address** | The IP address and prefix length of the multicast group |
| **Group Mask** | The subnet mask associated with the group |
| **Origin** | Indicates the mechanism (BSR or static) by which the RP was selected |
| **Expiry Time** | The expiry time of the RP mapping |
| **C-RP Advertisement Interval(secs)** | Indicates the configured C-RP Advertisement interval with which the router, acting as a C-RP, will periodically send the C-RP advertisement messages. |
| **Next Candidate RP Advertisement (hh:mm:ss)** | Time (in hours, minutes, and seconds) in which the next C-RP Advertisement is due from this Router |

### 7.4.1.6. *Show ip pim rp-hash*

This command displays which rendezvous point (RP) is being used for a specified group.

**Format** show ip pim rp-hash <group-address>

| Fields | Definition |
|---|---|
| **<group-address>** | the multicast group address for the start of the range of addresses to be excluded. The address must be in the range of 239.0.0.0 through 239.255.255.255. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **RP Address** | The IP address of the RP for the group specified |
| **Type** | Indicates the mechanism (BSR or static) by which the RP was selected |

### 7.4.1.7. *Show ip pim ssm*

This command displays the configured source specific IP multicast addresses. If no SSM Group range is configured, this command output is No SSM address range is configured.

**Format** show ip pim ssm

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Group Address** | The IP multicast address of the SSM group |
| **Prefix Length** | The network prefix length |

### 7.4.1.8. *Show ip pim statistic*

This command displays statistics for the received PIM control packets per interface. This command displays statistics only if PIM sparse mode is enabled.

**Format** show ip pim statistics [{<slot/port> | vlan <vlan-id>}]

| Fields | Definition |
|---|---|
| **<slot/port >** | Interface number. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Intf** | The PIM-enabled routing interface. |
| **Stat** | Rx: Packets received, Tx: Packets transmitted. |
| **Hello** | The number of PIM Hello messages. |
| **Register** | The number of PIM Register messages. |
| **Reg-Stop** | The number of PIM Register-stop messages. |
| **Join/Pru** | The number of PIM Join/Prune messages. |
| **BSR** | The number of PIM Boot Strap messages. |
| **Assert** | The number of PIM Assert messages. |
| **CRP** | The number of PIM Candidate RP Advertisement messages. |

### 7.4.1.9. *Show ip mfc*

This command displays mroute entries in the multicast forwarding (MFC) database.

**Format** show ip mfc

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **MFC IPv4 Mode** | Enabled when IPv4 Multicast routing is operational. |
| **MFC IPv6 Mode** | Enabled when Ipv6 Multicast routing is operational. |
| **MFC Entry Count** | The number of entries present in MFC. |
| **Current multicast IPv4 protocol** | The current operating IPv4 multicast routing protocol. |
| **Current multicast IPv6 protocol** | The current operating IPv6 multicast routing protocol. |
| **Total software forwarded packets** | Total number of multicast packets forwarded in software. |
| **Source address** | Source address of the multicast route entry. |
| **Group address** | Group address of the multicast route entry. |
| **Packets forwarded in software for this entry** | Number of multicast packets that are forwarded in software for a specific multicast route entry. |
| **IPv4 Protocol** | Multicast routing protocol that has added a specific entry. |
| **Expiry Time (secs)** | Expiry time for a specific Multicast Route entry in seconds. |
| **Up Time (secs)** | Up Time in seconds for a specific Multicast Routing entry. |
| **Incoming interface** | Incoming interface for a specific Multicast Route entry. |
| **Outgoing interface list** | Outgoing interface list for a specific Multicast Route entry. |

## 7.4.2. Configuration commands

### 7.4.2.1. *Ip pim bsr-candidate*

This command is used to configure the router to announce its candidacy as a bootstrap router (BSR).

To remove a configured candidate bootstrap router (C-BSR), use the no form of this command.

**Format** ip pim bsr-candidate interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>} <hash-mask-length> [<priority>] [interval <1-16383>]

no ip pim bsr-candidate interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<loopback-id>** | The loopback interface. The range is 0 to 63. |
| **<hash-mask-length>** | BSR hash-mask length. The range of the mask is 0 to 32. |
| **<priority>** | BSR priority. The range of the priority is 0 to 255. |
| **<interval>** | BSR candidate advertisement interval. The range of the priority is 1 to 16383. |

**Default** Disable

**Mode** Global Config

i This command takes effect only when PIM-SM is configured as the PIM mode

### 7.4.2.2. *Ip pim rp-address*

This command is used to statically configure the RP address for one or more multicast groups. The parameter rp-address is the IP address of the RP. The parameter groupaddress is the group address supported by the RP. The parameter groupmask is the group mask for the group address. The optional keyword override indicates that if there is a conflict, the RP configured with this command prevails over the RP learned by BSR.

To remove a configured RP address for one or more multicast groups, use the no form of this command.

**Format** ip pim rp-address <rp-address> <group-address> <group-mask> [override]

no ip pim rp-address <rp-address> <group-address> <group-mask>

| Fields | Definition |
|---|---|
| **<rp-address>** | Specifies the rp address. |
| **<group-address>** | Specifies the group address. |
| **<group-mask>** | Specifies the group mask. |

| | |
|---|---|
| **[overide]** | Indicates that if there is a conflict, the RP configured with this command prevails over the RP learned by BSR. |

**Default** 0

**Mode** Global Config

i This command takes effect only when PIM-SM is configured as the PIM mode

### 7.4.2.3. *Ip pim rp-candidate*

This command is used to configure the router to advertise itself as a PIM candidate rendezvous point (RP) to the bootstrap router (BSR).

To disable the router to advertise itself as a PIM candidate rendezvous point (RP) to the bootstrap router (BSR), use the no form of this command.

**Format** ip pim rp-candidate interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>} <group-address> <group-mask> [interval <1-16383>]

no ip pim rp-candidate interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>} <group-address> <group-mask>

| Fields | Definition |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<loopback-id>** | The loopback interface. The range is 0 to 63. |
| **<group-address>** | Specifies the group address. |
| **<group-mask>** | Specifies the group mask. |
| **[interval]** | Indicates the RP candidate advertisement interval. The range is from 1 to 16383. The default value is 60 seconds. |

**Default** None

**Mode** Global Config

i This command takes effect only when PIM-SM is configured as the PIM mode

### 7.4.2.4. *Ip pim sparse*

This command enables the administrative mode of PIM-SM in the router.

To set the administrative mode of IPv4 PIM-SM in the router to inactive, use the no form of this command.

**Format** ip pim sparse

no ip pim sparse

**Default** Disable

**Mode** Global Config

### 7.4.2.5. *Ip pim-spt-threshold*

Use this command to configure the Data Threshold rate for the last-hop router to switch to the shortest path. The possible values are 0 or Infinity.

To reset the Data Threshold rate for the last-hop router to switch to the shortest path to the default value, use the no form of this command.

**Format** ip pim spt-threshold {0 | Infinity}

no ip pim spt-threshold

| Fields | Definition |
|---|---|
| **<0>** | This is 0 kilobits per seconds. |
| **<Infinity>** | This command will disable the function. |

**Default** 0

**Mode** Global Config

i This command takes effect only when PIM-SM is configured as the PIM mode

### 7.4.2.6. *Ip pim ssm*

Use this command to define the Source Specific Multicast (SSM) range of IP multicast addresses.

To disable the specified Source Specific Multicast (SSM) range, use the no form of this command.

**Format** ip pim ssm {default | <group-address> <group-mask>}

no ip pim ssm {default | <group-address> <group-mask>}

| Fields | Definition |
|---|---|
| **Default** | Defines the SSM range access list 232/8. |
| **<group-address>** | Specifies the group address. |
| **<group-mask>** | Specifies the group-mask. |

**Default** Disable

**Mode** Global Config

### 7.4.2.7. *Ip pim*

This command administratively enables PIM on an interface or range of interfaces.

To set the administrative mode of PIM on an interface to disabled, use the no form of this command.

**Format** ip pim

no ip pim

**Default** Disable

**Mode** Interface Config

### 7.4.2.8. *Ip pim bsr-border*

Use this command to prevent bootstrap router (BSR) messages from being sent or received through an interface or range of interfaces.

To disable the interface from being the BSR border, use the no form of this command.

**Format** ip pim bsr-border

no ip pim bsr-border

**Default** Disable

**Mode** Interface Config

i This command takes effect only when PIM-SM is configured as the PIM mode

### 7.4.2.9. *Ip pim dr-priority*

Use this command to set the priority value for which a router is elected as the designated router (DR). This command can be configured on a single interface or a range of interfaces.

To reset the priority value to the default value for which a router is elected as the designated router (DR), use the no form of this command.

**Format** ip pim dr-priority <0-4294967294>

no ip pim dr-priority

| Fields | Definition |
|---|---|
| **<0-4294967294>** | The range for dr-priority is from 0 to 4294967294. |

**Default** 1

**Mode** Interface Config

i This command takes effect only when PIM-SM is configured as the PIM mode

### 7.4.2.10. *Ip pim hello-interval*

Use this command to configure the PIM hello interval for the specified router interface or range of interfaces.

To reset the PIM hello interval to the default value, use the no form of this command.

**Format** ip pim hello-interval <0–18000>

no ip pim hello-interval

| Fields | Definition |
|---|---|
| **<0-18000>** | The range for hello-interval is from 0 to 18000 seconds. |

**Default** 30

**Mode** Interface Config

### 7.4.2.11. *Ip pim join-prune-nterval*

This command is used to configure the join/prune interval for the PIM-SM router on an interface or range of interfaces. The join/prune interval is specified in seconds.

To reset the PIM join/prune interval to the default value, use the no form of this command.

**Format** ip pim join-prune-interval <0-18000>

no ip pim join-prune-interval

| Fields | Definition |
|---|---|
| **<0-18000>** | The range for join-prune-interval is from 0 to 18000 seconds. |

**Default** 60

**Mode** Interface Config

**i** This command takes effect only when PIM-SM is configured as the PIM mode.

# 7.5. IPv6 Protocol Independent Mulitcast (PIM) Commands

## 7.5.1. Show commands

### 7.5.1.1. *Show ipv6 pim*

Use this command to display the system-wide information for PIM-SM.

**Format** show ipv6 pim

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **PIM Mode** | Indicates the PIM mode is sparse (PIM-SM) |
| **Data Threshold Rate** | Indicates the data threshold rate for PIM. |
| **Interface** | Slot/port, loopback ID or VLAN ID. |
| **Interface Mode** | Indicates whether PIM is enabled or disabled on this interface. |
| **Operational Status** | The current state of PIM on this interface. Possible values are Operational or Non-Operational. |

### 7.5.1.2. *Show ipv6 pim ssm*

Use this command to displays the configured source specific IPv6 multicast addresses. If no SSM Group range is configured, this command output is No SSM address range is configured.

**Format** show ipv6 pim ssm

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|

| | |
|---|---|
| **Group Address** | The IPv6 multicast address of the SSM group. |
| **Prefix Length** | The network prefix length. |

### 7.5.1.3. *Show ipv6 pim interface*

Use this command to displays the interface information for PIM on the specified interface. If no interface is specified, the command displays the status parameters for all PIM-enabled interfaces.

**Format** show ipv6 pim interface [{<slot/port> | loopback <loopback-id> | vlan <vlan-id>}]

| **Fields** | **Definition** |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<loopback-id>** | The loopback interface. The range is 0 to 63. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **Interface** | slot/port, loopback ID, or VLAN ID. |
| **Mode** | Indicate the PIM mode enabled on the interface is sparse. |
| **Hello Interval** | The frequency at which PIM hello messages are transmitted on this interface. By default, the value is 30 seconds. |
| **Join Prune Interval** | The join/prune interval for the PIM router. The interval is in seconds. By default, the value is 60 seconds. |
| **DR Priority** | The priority of the Designated Router configured on the interface. |
| **BSR Border** | Identifies whether this interface is configured as a bootstrap router border interface. |
| **Neighbor Count** | The number of PIM neighbors learned on this interface. This is a dynamic |

| | |
|---|---|
| | value and is shown only when a PIM interface is operational. |
| **Designated Router** | The IP address of the elected Designated Router for this interface. This is a dynamic value and will only be shown when a PIM interface is operational. |

### 7.5.1.4. *Show ipv6 pim neighbor*

Use this command to display PIM neighbors discovered by PIMv2 Hello messages. If the interface number is not specified, this command displays the neighbors discovered on all the PIM-enabled interfaces.

**Format** show ipv6 pim neighbor [{<slot/port> | vlan <vlan-id>}]

| **Fields** | **Definition** |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **Interface** | Slot, and port number separated by forward slashes, or VLAN ID. |
| **Neighbor Address** | The IP address of the neighbor on an interface. |
| **Up Time** | The time since this neighbor has become active on this interface. |
| **Expiry Time** | The expiry time of the neighbor on this interface. |
| **DR Priority** | The DR Priority configured on this interface (PIM-SM only). |

### 7.5.1.5. *Show ipv6 pim bsr-router*

This command displays the bootstrap router (BSR) information.

**Format** show ipv6 pim bsr-router {candidate | elected}

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **BSR Address** | IPv6 address of the BSR. |
| **BSR Priority** | Priority as configured in the **ipv6 pim bsr-candidate** command. |
| **BSR Hash Mask Length** | Length of a mask (maximum 32 bits) that is to be ANDed with the group address before the hash function is called. This value is configured in the **ipv6 pim bsr-candidate** command. |
| **Next Bootstrap Message** | Time (in hours, minutes, and seconds) in which the next bootstrap message is due from this BSR. |
| **C-BSR Advertisement Interval** | Indicates the configured C-BSR Advertisement interval with which the router, acting as a C-BSR, will periodically send the C-BSR advertisement messages. |

### 7.5.1.6. *Show ipv6 pim rp-hash*

This command displays which rendezvous point (RP) is being used for a specified group.

**Format** show ipv6 pim rp-hash <group-address>

| Fields | Definition |
|---|---|
| **<group-address>** | The IPv6 address of the specified group. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **RP Address** | The IPv6 address of the RP for the group specified. |
| **Type** | Indicates the mechanism (BSR or static) by which the RP was selected. |

### 7.5.1.7. *Show ipv6 pim rp-mapping*

This command displays the mapping for the PIM group to the active Rendezvous points(RP) of which the router is aware (either configured or learned from the bootstrap router(BSR)). Use the optional parameters to limit the display to a specific RP address or to view group-to-candidate RP or group to Static RP mapping information.

**Format** show ipv6 pim rp mapping [{*rp-address* | candidate | static}]

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **RP Address** | The IPv6 address of the RP for the group specified. |
| **Group Address** | The IPv6 address and prefix length of the multicast group. |
| **Origin** | Indicates the mechanism (BSR or static) by which the RP was selected. |
| **Expiry Time** | The expiry time of the RP mapping. |
| **Next Candidate RP Advertisement (hh:mm:ss)** | Time (in hours, minutes, and seconds) in which the next C-RP Advertisement is due from this Router |

If candidate is specified, the following fields are displayed:

| Fields | Definition |
|---|---|
| **C-RP Advertisement Interval** | Indicates the configured C-RP Advertisement interval with which the router, acting as a Candidate RP will periodically send the C-RP advertisement messages to the elected BSR. |

### 7.5.1.8. *Show ipv6 pim statistic*

This command displays statistics for the received PIM control packets per interface. This command displays statistics only if PIM sparse mode is enabled.

**Format** show ipv6 pim statistics [{<slot/port> | vlan <vlan-id>}]

| Fields | Definition |
|---|---|

| | |
|---|---|
| **<slot/port >** | Interface number. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Intf** | The PIM-enabled routing interface. |
| **Stat** | Rx: Packets received, Tx: Packets transmitted. |
| **Hello** | The number of PIM Hello messages. |
| **Register** | The number of PIM Register messages. |
| **Reg-Stop** | The number of PIM Register-stop messages. |
| **Join/Pru** | The number of PIM Join/Prune messages. |
| **BSR** | The number of PIM Boot Strap messages. |
| **Assert** | The number of PIM Assert messages. |
| **CRP** | The number of PIM Candidate RP Advertisement messages. |

## 7.5.2. Configuration commands

### 7.5.2.1. *Ipv6 pim sparse*

This command enables the administrative mode of PIM-SM in the router.

To set the administrative mode of IPv6 PIM-SM in the router to inactive, use the no form of this command.

**Format** ipv6 pim sparse
no ipv6 pim sparse

**Default** Disable

**Mode** Global Config

### 7.5.2.2. *Ipv6 pim*

This command administratively enables PIM on an interface or range of interfaces.

To set the administrative mode of IPv6 PIM on an interface to disabled, use the no form of this command.

**Format** ipv6 pim

no ipv6 pim

**Default** Disable

**Mode** Interface Config

### 7.5.2.3. *Ipv6 pim hello-interval*

Use this command to configure the PIM hello interval for the specified router interface or range of interfaces.

To reset the PIM hello interval to the default value, use the no form of this command.

**Format** ipv6 pim hello-interval <0–18000>

no ipv6 pim hello-interval

| Fields | Definition |
|---|---|
| **<0-18000>** | The range for hello-interval is from 0 to 18000 seconds. |

**Default** 30

**Mode** Interface Config

### 7.5.2.4. *Ipv6 pim bsr-border*

Use this command to prevent bootstrap router (BSR) messages from being sent or received through an interface or range of interfaces. Note that this command takes effect only when PIM-SM is enabled in the Global mode.

To disable the interface from being the BSR border, use the no form of this command.

**Format** ipv6 pim bsr-border

no ipv6 pim bsr-border

**Default** Disable

**Mode** Interface Config

### 7.5.2.5. *Ipv6 pim bsr-candiate*

This command is used to configure the router to announce its candidacy as a bootstrap router (BSR). The argument <slot/port> corresponds to a physical routing interface or VLAN routing interface.

To remove a configured PIM candidate bootstrap router (C-BSR), use the no form of this command.

**Format** ipv6 pim bsr-candidate interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>} <hash-mask-length> [<priority>] [interval <1-16383>]

no ipv6 pim bsr-candidate interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **<slot/port>** | Interface number on this router from which the BSR address is derived, to make it a candidate. This interface must be enabled with PIM.. |
| **<loopback-id>** | The loopback interface. The range is 0 to 63. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<hash-mask-length>** | BSR hash-mask length. The range of the mask is 0 to 128. The length of a mask that is to be ANDed with the group address before the hash function is called. All groups with the saem seed hash correspond to the same RP. For example, if this value was 24, only the first 24 bits of the group addresses matter. This allows you to get one RP for multiple groups. |
| **<priority>** | Priority of the candidate BSR. The range of the priority is 0 to 255. The BSR with the larger priority is preferred. If the priority values are the same, the router with the larger IP address is the BSR. The default value is 0. |
| **<interval>** | BSR candidate advertisement interval. The range of the priority is 1 to 16383. The default value is 60. |

**Default** None

**Mode** Global Config

### 7.5.2.6. *Ipv6 pim dr-priority*

Use this command to set the priority value for which a router is elected as the designated router (DR). This command can be configured on a single interface or a range of interfaces.

To reset the priority value to the default value for which a router is elected as the designated router (DR), use the no form of this command.

**Format** ipv6 pim dr-priority <0-4294967294>

no ipv6 pim dr-priority

| Fields | Definition |
|---|---|
| **<0-4294967294>** | The range for dr-priority is from 0 to 4294967294. |

**Default** 1

**Mode** Interface Config

### 7.5.2.7. *Ipv6 pim join-prune-interval*

This command is used to configure the interface join/prune interval for the PIM-SM router on an interface or range of interfaces. The join/prune interval is specified in seconds.

To reset the join/prune interval to the default value, use the no form of this command.

**Format** ipv6 pim join-prune-interval <0-18000>

no ipv6 pim join-prune-interval

| Fields | Definition |
|---|---|
| **<0-18000>** | The range for join-prune-interval is from 0 to 18000 seconds. |

**Default** 60

**Mode** Interface Config

### 7.5.2.8. *Ipv6 pim rp-address*

This command is used to define the address of a PIM Rendezvous point (RP) for a specific multicast group range. The parameter <*rp-address*> is the IPv6 address of the RP. The parameter <*group-address*> is the group address supported by the RP. The parameter <*prefix-length*> is the group mask for the group address. The optional keyword **override** indicates that if there is a conflict, the RP configured with this command prevails over the RP learned by BSR.

To remove a configured RP address for one or more multicast groups, use the no form of this command.

**Format** ipv6 pim rp-address <*rp-address*> <*group-address/prefix-length*> [override]

no ipv6 pim rp-address <*rp-address*> <*group-address/prefix-length*>

| Fields | Definition |
|---|---|

| | |
|---|---|
| **<rp-address>** | The IPv6 address of the RP. |
| **<group-address>** | The group address supported by the RP. |
| **<prefix-length>** | The group mask for the group address. |
| **Override** | Indicates that if there is a conflict, the RP configured with this command prevails over the RP learned by BSR. |

**Default** None

**Mode** Global Config

### 7.5.2.9. *Ipv6 pim rp-candiate*

This command is used to configure the router to advertise itself as a PIM candidate rendezvous point (RP) to the bootstrap router (BSR) for a specific multicast group range.

To disable the router to advertise itself as a PIM candidate rendezvous point (RP) to the bootstrap router (BSR), use the no form of this command.

**Format** ipv6 pim rp-candidate interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>} <group-address/prefix-length> [interval <interval>]

no ipv6 pim rp-candidate interface {<slot/port> | loopback <loopback-id> | vlan <vlan-id>} <group-address/prefix-length>

| Fields | Definition |
|---|---|
| **<slot/port>** | The IP address associated with this interface type and number is advertised as a candidate RP address. This interface must be enabled with PIM. |
| **<loopback-id>** | The loopback interface. The range is 0 to 63. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<group-address>** | The multicast group address that is advertised in association with the RP address. |
| **<prefix-length>** | The multicast group prefix that is advertised in association with the RP address. |
| **<interval>** | Configure the C-RP advertisement interval. The range of interval is 1 to 16383, and the default value is 60. |

**Default** None

**Mode** Global Config

### 7.5.2.10. *Ipv6 pim spt-threshold*

This command is used to configure the Data Threshold rate for the last-hop router to switch to the shortest path. Now support to enable (0) or disable(Infinity).

To reset the Data Threshold rate for the last-hop router to switch to the shortest path to the default value, use the no form of this command.

**Format** ipv6 pim spt-threshold {0 | Infinity}

no ipv6 pim spt-threshold

| Fields | Definition |
|---|---|
| **<0>** | This is 0 kilobits per seconds. |
| **<Infinity>** | This command will disable the function. |

**Default** 0

**Mode** Global Config

### 7.5.2.11. *Ipv6 pim ssm*

Use this command to define the Source Specific Multicast (SSM) range of IPv6 multicast addresses on the router. Note that this command takes effect only when PIM-SM is configured as the PIM mode.

To disable the specified Source Specific Multicast (SSM) range, use the no form of this command.

**Format** ipv6 pim ssm {default | <group-address>/<prefix-length>}

no ipv6 pim ssm {default | <group-address>/<prefix-length>}

| Fields | Definition |
|---|---|
| **Default** | Defines the SSM range access list FF3x::/32. |
| **<group-address>** | Specifies the group address. |
| **<group-mask>** | Specifies the group-mask. |

**Default** Disable

**Mode** Global Config

# 7.6. IGMP Proxy Commands

The IGMP Proxy is used by IGMP Router (IPv4 system) to enable the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP router interfaces. With IGMP Proxy enabled, the system acts as proxy to all the hosts residing on its router interfaces.

## 7.6.1. Show commands

### 7.6.1.1. *Slow ip igmp-proxy*

This command displays a summary of the host interface status parameters. It displays the following parameters only when you enable IGMP Proxy.

**Format** show ip igmp-proxy

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface Index** | The interface number of the IGMP Proxy. |
| **Admin Mode** | States whether the IGMP Proxy is enabled or not. This is a configured value. |
| **Operational Mode** | States whether the IGMP Proxy is operationally enabled or not. This is a status parameter. |
| **Version** | The present IGMP host version that is operational on the proxy interface. |
| **Number of Multicast Groups** | States the number of multicast groups that are associated with the IGMP Proxy interface. |
| **Unsolicited Report Interval** | The time interval at which the IGMP Proxy interface sends unsolicited group membership report. |
| **Querier IP Address on Proxy Interface** | The IP address of the Querier, if any, in the network attached to the upstream interface (IGMP-Proxy interface). |
| **Older Version 1 Querier Timeout** | The interval used to timeout the older version 1 queriers. |
| **Older Version 2 Querier Timeout** | The interval used to timeout the older version 2 queriers. |

| | |
|---|---|
| **Proxy Start Frequency** | The number of times the IGMP Proxy has been stopped and started. |

### 7.6.1.2. *Show ip igmp-proxy groups*

This command displays information about the subscribed multicast groups that IGMP Proxy reported. It displays a table of entries with the following as the fields of each column.

**Format** show ip igmp-proxy groups

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The interface number of the IGMP Proxy. |
| **Group Address** | The IP address of the multicast group. |
| **Last Reporter** | The IP address of host that last sent a membership report. |
| **Up Time (in secs)** | The time elapsed since last created. |
| **Member State** | The status of the entry. Possible values are IDLE_MEMBER or DELAY_MEMBER.<br>• **IDLE_MEMBER** - interface has responded to the latest group membership query for this group.<br>• **DELAY_MEMBER** - interface is going to send a group membership report to respond to a group membership query for this group. |
| **Filter Mode** | Possible values are Include or Exclude. |
| **Sources** | The number of sources attached to the multicast group. |

### 7.6.1.3. *Show ip igmp-proxy groups detail*

This command displays complete information about multicast groups that IGMP Proxy reported. It displays a table of entries with the following as the fields of each column.

**Format** show ip igmp-proxy groups detail

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface Index** | The interface number of the IGMP Proxy. |
| **Group Address** | The IP address of the multicast group. |
| **Last Reporter** | The IP address of host that last sent a membership report for the current group, on the network attached to the IGMP-Proxy interface (upstream interface). |
| **Up Time (in secs)** | The time elapsed since last created. |
| **Member State** | The status of the entry. Possible values are IDLE_MEMBER or DELAY_MEMBER.<br>• **IDLE_MEMBER** - interface has responded to the latest group membership query for this group.<br>• **DELAY_MEMBER** - interface is going to send a group membership report to respond to a group membership query for this group. |
| **Filter Mode** | Possible values are Include or Exclude. |
| **Sources** | The number of sources attached to the multicast group. |
| **Group Source List** | The list of IP addresses of the sources attached to the multicast group. |
| **Expiry Time** | Time left before a source is deleted. |

### 7.6.1.4. *Show ip igmp-proxy interface*

This command displays a detailed list of the host interface status parameters. It displays the following parameters only when you enable IGMP Proxy.

**Format** show ip igmp-proxy interface

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface Index** | Shows the slot/port of the IGMP proxy. |

The column headings of the table associated with the interface are as follows:

| Fields | Definition |
|---|---|
| **Ver** | Shows the IGMP version. |
| **Query Rcvd** | Number of IGMP queries received. |
| **Report Rcvd** | Number of IGMP reports received. |
| **Report Sent** | Number of IGMP reports sent. |
| **Leaves Rcvd** | Number of IGMP leaves received. |
| **Leaves Sent** | Number of IGMP leaves sent. |

# 7.7. MLD Proxy Commands

MLD-Proxy is the IPv6 equivalent of IGMP-Proxy. MLD-Proxy commands allow you to configure the network device as well as to view device settings and statistics using either serial interface or telnet session. The operation of MLD-Proxy commands is the same as for IGMP-Proxy: MLD is for IPv6 and IGMP is for IPv4.MGMD is a term used to refer to both IGMP and MLD.

## 7.7.1. Show commands

### 7.7.1.1. *Show ipv6 mld-proxy*

This command displays a summary of the host interface status parameters.

**Format** show ipv6 mld-proxy

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface Index** | The interface number of the MLD-Proxy. |
| **Admin Mode** | States whether the MLD-Proxy is enabled or not. This is a configured value. |
| **Operational Mode** | States whether the MLD-Proxy is operationally enabled or not. This is a status parameter. |
| **Version** | The present MLD host version that is operational on the proxy interface. |
| **Number of Multicast Groups** | States the number of multicast groups that are associated with the MLD-Proxy interface. |
| **Unsolicited Report Interval** | The time interval at which the MLD-Proxy interface sends unsolicited group membership report. |
| **Querier IP Address on Proxy Interface** | The IP address of the Querier, if any, in the network attached to the upstream interface (MLD-Proxy interface). |
| **Older Version 1 Querier Timeout** | The interval used to timeout the older version 1 queriers. |
| **Proxy Start Frequency** | The number of times the MLD-Proxy has been stopped and started. |

### 7.7.1.2. *Show ipv6 mld-proxy groups*

This command displays information about multicast groups that the MLD-Proxy reported.

**Format** show ipv6 mld-proxy groups

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface Index** | The interface number of the MLD-Proxy. |

| | |
|---|---|
| **Group Address** | The IP address of the multicast group. |
| **Last Reporter** | The IP address of the host that last sent a membership report for the current group, on the network attached to the MLD-Proxy interface (upstream interface). |
| **Up Time (in secs)** | The time elapsed since last created. |
| **Member State** | Possible values are:<br>• **Idle_Member** - interface has responded to the latest group membership query for this group.<br>• **Delay_Member** - interface is going to send a group membership report to respond to a group membership query for this group. |
| **Filter Mode** | Possible values are Include or Exclude. |
| **Sources** | The number of sources attached to the multicast group. |

### 7.7.1.3. *Show ipv6 mld-proxy groups detail*

This command displays information about multicast groups that MLD-Proxy reported.

**Format** show ipv6 mld-proxy groups detail

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The interface number of the MLD-Proxy. |
| **Group Address** | The IP address of the multicast group. |
| **Last Reporter** | The IP address of host that last sent a membership report for the current group, on the network attached to the MLD-Proxy interface (upstream interface). |
| **Up Time (in secs)** | The time elapsed since last created. |
| **Member State** | Possible values are: |

| | |
|---|---|
| | • **Idle_Member** - interface has responded to the latest group membership query for this group.<br>• **Delay_Member** - interface is going to send a group membership report to respond to a group membership query for this group. |
| **Filter Mode** | Possible values are include or exclude. |
| **Sources** | The number of sources attached to the multicast group. |
| **Source Address** | The list of IP addresses of the sources attached to the multicast group. |
| **Expiry Time** | Time left before a source is deleted. |

### 7.7.1.4. *Show ipv6 mld-proxy interface*

This command displays a detailed list of the host interface status parameters. It displays the following parameters only when you enable MLD-Proxy.

**Format** show ipv6 mld-proxy interface

**Default** None

**Mode** Privileged Exec
User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Interface Index** | Shows the slot/port of the MLD proxy. |

The column headings of the table associated with the interface are as follows:

| Fields | Definition |
|---|---|
| **Ver** | Shows the MLD version. |
| **Query Rcvd** | Number of MLD queries received. |
| **Report Rcvd** | Number of MLD reports received. |
| **Report Sent** | Number of MLD reports sent. |

| | |
|---|---|
| **Leaves Rcvd** | Number of MLD leaves received. |
| **Leaves Sent** | Number of MLD leaves sent. |

## 7.7.2. Configuration commands

### 7.7.2.1. *Ipv6 mld-proxy*

This command enables MLD-Proxy on the router. To enable MLD-Proxy on the router, you must enable multicast forwarding. Also, make sure that there are no other multicast routing protocols enabled n the router.

To set the administrative mode of MLD-Proxy on an interface to disabled, use the no form of this command.

**Format** ipv6 mld-proxy

no ipv6 mld-proxy

**Default** Disable

**Mode** Interface Config

### 7.7.2.2. *Ipv6 mld-proxy reset-status*

This command resets the host interface status parameters of the MLD-Proxy router. This command is only valid when you enable MLD-Proxy on the interface.

**Format** ipv6 mld-proxy reset-status

**Default** None

**Mode** Interface Config

### 7.7.2.3. *Ipv6 mld-proxy unsolicit-rprt-interval*

This command sets the unsolicited report interval for the MLD-Proxy router. This command is only valid when you enable MLD-Proxy on the interface.

To reset the unsolicited report interval of the MLD-Proxy router to the default value, use the no form of this command.

**Format** ipv6 mld-proxy unsolicit-rprt-interval <1-260>

no ipv6 mld-proxy unsolicit-rprt-interval

| Fields | Definition |
| --- | --- |
| **<1-260>** | The range for unsolicit-rprt-interval is from 1 to 260 seconds. |

**Default** 1

**Mode** Interface Config

# 8. IPv6 Commands

## 8.1. Tunnel Interface Commands

The commands in this section describe how to create, delete, and manage tunnel interfaces.Several different types of tunnels provide functionality to facilitate the transition of IPv4 networks to IPv6 networks. These tunnels are divided into two classes: configured and automatic. The distinction is that configured tunnels are explicitly configured with a destination or endpoint of the tunnel. Automatic tunnels, in contrast, infer the endpoint of the tunnel from the destination address of packets routed into the tunnel. To assign an IP address to the tunnel interface, please refer to “ip address” command. To assign an IPv6 address to the tunnel interface, please refer to “ipv6 address” command.

### 8.1.1. Show commands

#### 8.1.1.1. *Show interface tunnel*

This command displays the parameters related to tunnel such as tunnel mode, tunnel source address and tunnel destination address.

**Format** show interface tunnel [<0-7>]

| Fields | Definition |
|---|---|
| **<0-7>** | Specify the tunnel interface number you would like to show**.** |

**Default** None

**Mode** Privileged Exec

**Display Message**

*If you do not specify a tunnel ID, the command shows the following information for each configured tunnel:*

| Fields | Definition |
|---|---|
| **tunnel ID** | Shows the tunnel identification number. |
| **interface** | Shows the name of the tunnel interface. |
| **tunnel Mode** | Shows the tunnel mode. |
| **source Address** | Shows the source transport address of the tunnel. |
| **destination Address** | Shows the destination transport address of the tunnel. |

*If you specify a tunnel ID, the command shows the following information for the tunnel:*

| Fields | Definition |
|---|---|
| **interface Link Status** | Shows whether the link is up or down. |
| **MTU Size** | Shows the maximum transmission unit for packets on the interface. |
| **IPv6 Address/Length** | If you enable IPv6 on the interface and assign an address, the IPv6 address and prefix display. |

## 8.1.2. Configuration commands

### 8.1.2.1. *Interface tunnel*

This command uses to enter the Interface Config mode for a tunnel interface. The tunnel id range is from 0 to 7.

To remove the tunnel interface and associated configuration parameters for the specified tunnel interface, use the no form of this command.

**Format** interface tunnel <0-7>

no interface tunnel <0-7>

**Default** None

**Mode** Global Config

### 8.1.2.2. *Tunnel source*

This command specifies the source transport address of the tunnel, either explicitly or by reference to an interface.

**Format** tunnel source {<ipv4-address> | <ethernet> {<slot/port> | vlan <vlan-id>}}

| Fields | Definition |
|---|---|
| **<slot/port>** | The Interface number. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<ipv4-address>** | A valid IP Address. |

**Default** None

**Mode** Interface Tunnel Mode

#### 8.1.2.3. *Tunnel destination*

This command specifies the destination transport address of the tunnel.

**Format** tunnel destination {<ipv4-address>}

| Fields | Definition |
|---|---|
| **<ipv4-address>** | A valid IP Address. |

**Default** None

**Mode** Interface Tunnel Mode

#### 8.1.2.4. *Tunnel mode*

This command specifies the mode of the tunnel.

**Format** tunnel mode ipv6ip [6to4]

| Fields | Definition |
|---|---|
| **[6to4]** | With the optional 6to4 argument, the tunnel mode is set to 6to4 automatic. Without the optional 6to4 argument, the tunnel mode is configured. |

**Default** None

**Mode** Interface Tunnel Mode

## 8.2. Loopback Interface Commands

The commands in this section describe how to create, delete, and manage loopback interfaces. A loopback interface is always expected to be up. This interface can provide the source address for sent packets and can receive both local and remote packets. The loopback interface is typically used by routing protocols. To assign an IP address to the loopback interface, please refer to “ip address” command. To assign an IPv6 address to the loopback interface, please refer to “ipv6 address” command.

### 8.2.1. Show commands

#### 8.2.1.1. *Show interface loopback*

This command displays information about configured loopback interfaces.

**Format** show interface loopback [<0-63>]

| Fields | Definition |
|---|---|
| **<0-63>** | Specify the ID of the loopback interface. The range is from 0 to 63. |

**Default** None

**Mode** Privileged Exec

**Display Message**

If you do not specify a loopback ID, the following information appears for each loopbackinterface on the system:

| Fields | Definition |
|---|---|
| **Loopback ID** | Shows the loopback ID associated with the rest of the information in the row. |
| **Interface** | Shows the interface name. |
| **IP Address** | Shows the IP address of the interface |

*If you specify a loopback ID, the following information appears:*

| Fields | Definition |
|---|---|
| **Interface Link Status** | Shows whether the link is up or down. |
| **IP Address** | Shows the IPv4 address of the interface. |
| **IPv6 is enabled (disabled)** | Show whether IPv6 is enabled on the interface |
| **IPv6 Prefix is** | Shows the IPv6 address of the interface. |
| **MTU size** | Shows the maximum transmission size for packets on this interface, in bytes. |

## 8.2.2. Configuration commands

### 8.2.2.1. *Interface loopback*

This command is used to enter the Interface Config mode for a loopback interface. The range of

the loopback ID is 0 to 63.

To remove the loopback interface and associated configuration parameters for the specified loopback interface, use the **no** form of this command.

**Format** interface loopback <0-63>

no interface loopback <0-63>

| Fields | Definition |
|---|---|
| **<0-63>** | Specify the ID of the loopback interface. |

**Default** None

**Mode** Global Config

# 8.3. IPv6 Routing Commands

This section describes the IPv6 commands you use to configure IPv6 on the system and on the interfaces. This section also describes IPv6 management commands and show commands.

## 8.3.1. Show commands

### 8.3.1.1. *Show ipv6 brief*

This command displays the IPv6 status and IPv6 unicast routing mode.

**Format** show ipv6 brief

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

| Fields | Definition |
|---|---|
| **IPv6 Unicast Routing Mode** | Shows whether the IPv6 unicast routing mode is enabled. |
| **IPv6 Hop Limit** | Shows the unicast hop count used in IPv6 packets originated by the node. For more information, see “ipv6 hot-limit” |
| **ICMPv6 Rate Limit Error Interval** | Shows how often the token bucket is initialized with burst-size tokens. For more information, see “ipv6 icmp error-interval” |
| **ICMPv6 Rate Limit Burst** | Shows the number of ICMPv6 error messages that can be sent during one |

| | |
|---|---|
| **Size** | burst-interval. For more information, see “ipv6 icmp error-interval” |
| **Maximum Routes** | Shows the maximum IPv6 route table size. |
| **IPv6 Unresolved Data Rate Limit** | Shows the rate in packets-per-second for the number of IPv6 data packets trapped to CPU when the packet fails to be forwarded in the hardware due to unresolved hardware address of the destined IPv6 node. |
| **IPv6 Neighbors Dynamic Renew** | Shows the dynamic renewal mode for the periodic NUD (neighbor unreachability detection) run on the existing IPv6 neighbor entries based on the activity of the entries in the hardware. |
| **IPv6 NUD Maximum Unicast Solicits** | Shows the maximum number of unicast Neighbor Solicitations sent during NUD (neighbor unreachability detection) before switching to multicast Neighbor Solicitations. |
| **IPv6 NUD Maximum Multicast Solicits** | Shows the maximum number of multicast Neighbor Solicitations sent during NUD (neighbor unreachability detection) when in UNREACHABLE state. |
| **IPv6 NUD Maximum Unicast Solicits** | Shows the expoenentail backoff multiple to be used in the calculation of the next timeout value for Neighbor Solicitations transmission during NUD (neighbor unreachability detection) following the exponential backoff algorithm. |

### 8.3.1.2. *Show ipv6 interface port*

This command displays the usability status of IPv6 interfaces and whether ICMPv6 Destination Unreachable messages may be sent.

**Format** show ipv6 interface [ brief | {{port <slot/port> | vlan <vlan-id>} [prefix]} | {tunnel <0-7>} | {loopback <0-63>}]

| **Fields** | **Definition** |
|---|---|
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<vlan-id>** | VLAN ID. The range of VLAN ID is 1 to 4093. |
| **<0-7>** | Specify the tunnel ID. |
| **<0-63>** | Specify the loopback ID. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

If you use the brief parameter, the following information displays for all configured IPv6 interfaces:

| Fields | Definition |
|---|---|
| **Interface** | Shows the interface in slot/port, vlan, lb (loopback), or tunnel format. |
| **Oper. Mode** | Shows whether the mode is enabled or disabled. |
| **IPv6 Address/Length** | Shows the IPv6 address and length on interfaces with IPv6 enabled. |

If you specify an interface, the following information also appears.

| Fields | Definition |
|---|---|
| **IPv6 Prefix is** | Shows the IPv6 address of the interface. |
| **Routing Mode** | Shows whether IPv6 routing is enabled or disabled. |
| **IPv6 Enable Mode** | Shows whether IPv6 is enabled on the interface. |
| **IPv6 Routing Operational Mode** | Shows whether the operational state of an interface is enabled or disabled. |
| **IPv6 Link-local Scope ID** | Shows the scope ID of the link local address. |
| **Bandwidth** | Shows the bandwidth of the interface. |
| **Interface Maximum Transmission Unit** | Shows the MTU size, in bytes. |
| **Router Duplicate Address Detection Transmits** | Shows the number of consecutive duplicate address detection probes to transmit. |
| **Address Autoconfigure Mode** | Shows whether the autoconfigure mode is enabled or disabled. |
| **Address DHCP Mode** | Shows whether the DHCPv6 client is enabled on the interface. |
| **IPv6 Hop Limit Unspecified** | Indicate if the router is configured on this interface to send Router Advertisements with unspecified (0) as the Current Hop Limit value. |
| **Router Advertisement NS Interval** | Shows the interval, in milliseconds, between router advertisements for advertised neighbor solicitations. |

| | |
|---|---|
| **Router Advertisement MTU** | Shows the MTU value of the interface in router advertisements. |
| **Router Advertisement Lifetime** | Shows the router lifetime value of the interface in router advertisements. |
| **Router Advertisement Reachable Time** | Shows the amount of time, in milliseconds, to consider a neighbor reachable after neighbor discovery confirmation. |
| **Max/Min Router Advertisement Interval** | Shows the frequency, in seconds, that router advertisements are sent. |
| **Router Advertisement Managed Config Flag** | Shows whether the managed configuration flag is set (enabled) for router advertisements on this interface. |
| **Router Advertisement Other Config Flag** | Shows whether the other configuration flag is set (enabled) for router advertisements on this interface. |
| **Router Advertisement Router Preference** | Shows router preference value in IPv6 router advertisements. |
| **Router Advertisement Suppress Flag** | Shows whether router advertisements are suppressed (enabled) or sent (disabled). |
| **IPv6 Destination Unreachables** | Shows whether ICMPv6 Destination Unreachable messages may be sent (enabled) or not (disabled). |
| **ICMPv6 Redirects** | Specify if ICMPv6 redirec messages are sent back to the sender by the Router in the redirect scenario is enabled on this interface. |

If an IPv6 prefix is configured on the interface, the following information also appears.

| Fields | Definition |
|---|---|
| **IPv6 Prefix** | Shows the IPv6 prefix for the specified interface. |
| **Preferred Lifetime** | Shows the amount of time the advertised prefix is a preferred prefix. |
| **Valid Lifetime** | Shows the amount of time the advertised prefix is valid. |
| **Onlink Flag** | Shows whether the onlink flag is set (enabled) in the prefix. |
| **Autonomous Flag** | Shows whether the autonomous address-configuration flag (autoconfig) is set (enabled) in the prefix. |

### 8.3.1.3. *Show ipv6 interface neighbors*

This command displays information about the IPv6 neighbors.

**Format** show ipv6 interface neighbors [<ipv6-address> | interface {<slot>/port> | {tunnel <0-7>} | {vlan <1-4093>}}]

| Fields | Definition |
|---|---|
| **<ipv6-address>** | Specif the IPv6 address of the neighbor. |
| **<slot/port>** | Valid slot and port number separated by forward slashes. |
| **<0-7>** | Specify the tunnel ID. |
| **<1-4093>** | Specify the VLAN ID. |

**Default** None

**Mode** Privileged Exec

**Display Message**

Count of Learned Neighbors the number of neighbor mac address be learned.

| Fields | Definition |
|---|---|
| **Interface** | Shows the interface in slot/port format. |
| **Type** | The type of the IPv6 address. It can be Dynamic, Static, Local or Other. |
| **IPv6 Address** | IPV6 address of neighbor or interface. |
| **MAC Address** | Link-layer Address. |
| **IsRtr** | Shows whether the neighbor is a router. If the value is TRUE, the neighbor is known to be a router, and FALSE otherwise. A value of FALSE might not mean Note that routers are not always known to be routers. |
| **Neighbor State** | State of neighbor cache entry. Possible values are Incomplete, Reachable, Stale, Delay, Probe, and Unknown. |
| **Age(Seconds)** | The time in seconds that has elapsed since an entry was added to the cache. |

### 8.3.1.4. *Show ipv6 protocols*

This command lists a summary of the configuration and status of the active IPv6 routing protocols. The command lists routing protocols that are configured and enabled. If a protocol is selected on the command line, the display is limited to that protocol.

**Format** show ipv6 protocols [bgp | ospf]

| Fields | Definition |
|---|---|
| **bgp** | Option to specify only display BGP summary. |
| **Ospf** | Option to specify only display OSPF summary. |

**Default** None

**Mode** Privileged Exec

**Display Message**

BGP section:

| Fields | Definition |
|---|---|
| **Routing Protocol** | BGP. |
| **BGP Router ID** | The router ID configured for BGP. |
| **Local AS Number** | The AS number that the local router is in. |
| **BGP Admin Mode** | Whether BGP is globally enabled or disabled. |
| **BGP GR-Enabled Mode** | Whether BGP Graceful Restart Enabled Mode is enabled. (Enabled or Disabled) |
| **BGP GR-Aware Mode** | Whether BGP Graceful Restart Aware Mode is enabled. (Enabled or Disabled) |
| **BGP GR restart-time** | Setting of BGP Graceful Restart Timer. |
| **BGP GR stalepath-time** | Setting of BGP Graceful Stale Path Timer. |
| **Maximum Paths** | The maximum number of next hops in an internal or external BGP route. |
| **Always compare MED** | Whether BGP is configured to compare the MEDs for routes received from peers in different ASs. |
| **Maximum AS Path Length** | Whether BGP is configured to compare the MEDs for routes received from peers in different ASs. |

| | |
|---|---|
| **Fast Interval Failover** | Whether BGP immediately brings down a iBGP adjacency if the routing table manager reports that the peer address is no longer reachable. |
| **Fast External Failover** | Whether BGP immediately brings down an eBGP adjacency if the link to the neighbor goes down. |
| **Distance** | The default administrative distance (or route preference) for external, internal, and locally-originated BGP routes. |
| **Prefix List In** | The global prefix list used to filter inbound routes from all neighbors. |
| **Prefix List Out** | The global prefix list used to filter outbound routes to all neighbors. |
| **Network Originated** | The set of networks originated through a network command. |
| **Neighbors** | A list of configured neighbors. |

OSPFv3 section:

| **Fields** | **Definition** |
|---|---|
| **Routing Protocol** | OSPFv3. |
| **Router ID** | The router ID configured for OSPFv3. |
| **OSPF Admin Mode** | Whether OSPFv3 is globally enabled or disabled. |
| **Maximum Paths** | The maximum number of next hops in an OSPF route. |
| **Default Route Advertise** | Whether OSPF is configured to orginiate a default route. |
| **Distance** | The default administrative distance (or route preference) for intra-as, inter-as, and external OSPF routes. |
| **Always** | Whether default advertisement depends on having a default route in the common routing table. |
| **Metric** | The metric configured to be advertised with the default route. |
| **Metric Type** | The metric type for the default route. |

### 8.3.1.5. *Show ipv6 route*

This command displays the IPv6 routing table The **<ipv6-address>** specifies a specific IPv6 address for which the best-matching route would be displayed. The **<ipv6-prefix/ipv6-prefix-length>** specifies a specific IPv6 network for which the matching route would be displayed. The **<interface>** specifies that the routes with next-hops on the **<interface>** be displayed. The **<slot/port>** corresponds to a physical routing interface. The keyword *vlan* is used to specify the VLAN ID of the routing VLAN directly. The **<protocol>** specifies the protocol that installed the routes. The **<protocol>** is one of the following keywords: **connected, bgp, ospf, static, 6to4.** The *all* specifies that all routes including best and non-best routes are displayed. Otherwise, only the best routes are displayed.

If you use the *connected* keyword for **<protocol>,** the *all* option is not available because there are no best or non-best connected routes.

**Format** show ipv6 route [{<ipv6-address> [<protocol>] | {{<ipv6-prefix/ipv6-prefix-length> | <slot/port> | vlan <vlan-id>} [<protocol>] | <protocol> | summary} [all] | all}]

| Fields | Definition |
|---|---|
| **vlan-id** | The range is from 1 to 4093. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Message**

The **show ipv6 route** command displays the routing tables in the following format:

Codes: C - connected, S – static, 6To4 – 6to4 Route, B - BGP Derived, D - Database Route

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF Ext 1, OE2 - OSPF Ext 2

ON1 - OSPF NSSA Ext Type 1, ON2 - OSPF NSSA Ext Type 2, K - Kernel

The columns for the routing table display the following information:

| Fields | Definition |
|---|---|
| **Code** | The code for the routing protocol that created this routing entry. |
| **IPv6-Prefix/IPv6-Prefix-Length** | The IPv6-Prefix and prefix-length of the destination IPv6 network corresponding to this route. |
| **Preference/Metric** | The administrative distance (preference) and cost (metric) associated with this route. An example of this output is [1/0], where 1 is the preference and 0 is the metric. |

| | |
|---|---|
| **Tag** | Displays the decimal value of the tag associated with a redistributed route, if it is not 0. |
| **Next-Hop** | The outgoing router IPv6 address to use when forwarding traffic to the next router (if any) in the path toward the destination |
| **Route-Timestamp** | The last updated time for dynamic routes. The format of Route-Timestamp will be<br>• Days:Hours:Minutes if days > = 1<br>• Hours:Minutes:Seconds if days < 1 |
| **Interface** | The outgoing router interface to use when forwarding traffic to the next destnation. For reject routes, the next hop interface would be Null0 interface. |
| **T** | A flag appended to an IPv6 route to indicate that it is an ECMP route, but only one of its next hops has been installed in the forwarding table. The forwarding table may limit the number of ECMP routes or the number of ECMp groups. When an ECMP route cannot be installed beacause such a limit is reached, the route is installed with a single next hop. Such truncated routes are identified by a **T** after the interface name. |

To administratively control the traffic destined to a particular network and prevent it from being forwarded through the router, you can configure a static reject route on the router. Such traffic would be discarded and the ICMP destination unreachable message is sent back to the source. This is typically used for preventing routing loops. The reject route added in the RTO is of the type OSPF Inter-Area. Reject routes (routes of REJECT type installed by any protocol) are not redistributed by OSPF. Reject routes are supported in both OSPFv2 and OSPFv3.

### 8.3.1.6. *Show ipv6 route ecmp-groups*

This command reports all current ECMP groups in the IPv6 routing table. An ECMP group is a set of two or more next hops used in one or more routes. The groups are numbered arbitrarily from 1 to n. The output indicates the number of next hops in the group and the number of routes that use the set of next hops. The output lists the IPv6 address and outgoing interface of each next hop in each group.

**Format** show ipv6 route ecmp-groups

**Default** None

**Mode** Privileged Exec

### 8.3.1.7. *Show ipv6 route hw-failure*

This command displays the routes that failed to be added to the hardware due to hash errors or a table full condition.

**Format** show ipv6 route hw-failure

**Default** None

**Mode** Privileged Exec

### 8.3.1.8. *Show ipv6 route preferences*

This command displays the preference value associated with the type of route. Lower numbers have a greater preference. A route with a preference of 255 cannot be used to forward traffic.

**Format** show ipv6 route preferences

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Local** | Preference of directly-connected routes. |
| **Static** | Preference of static routes. |
| **OSPF Intra** | Preference of routes within the OSPF area. |
| **OSPF Inter** | Preference of routes to other OSPF routes that are outside of the area. |
| **OSPF External** | Preference of OSPF external routes. |
| **BGP External** | Preference of eBGP routes. |
| **BGP Internal** | Preference of iBGP routes. |
| **BGP Local** | Preference of BGP local routes. |

### 8.3.1.9. *Show ipv6 route summary*

This command displays the summary of the routing table. Use *all* to display the count summary for all routes, including best and non-best routes. Use the command without parameters to display the count summary for only the best routes.

**Format** show ipv6 route summary [all]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **Connected Routes** | Total number of connected routes in the routing table. |
| **Static Routes** | Total number of static routes in the routing table. |
| **Kernel Routes** | Total number of kernel routes in the routing table. |
| **6to4 Routes** | Total number of 6to4 routes in the routing table. |
| **BGP Routes** | Total number of routes installed by BGP protocol. |
| **OSPF Routes** | Total number of routes installed by OSPFv3 protocol. |
| **Reject Routes** | Total number of reject routes installed by all protocols. |
| **Total Routes** | Total number of routes in the routing table. |
| **Best Routes** | The number of best routes currently in the routing table. This number only counts the best route to each destination. |
| **Alternate Routes** | The number of alternate routes currently in the routing table. An alternate route is a route that was not selected as the best route to its destination. |
| **Route Adds** | The number of routes that have been added to the routing table. |
| **Route Modifies** | The number of routes that have been changed after they were initially added to the routing table. |
| **Route Deletes** | The number of routes that have been deleted from the routing table. |
| **Unresolved Rotue Adds** | The number of routes adds that failed because none of the route's next hops were on a local subnet. Note that static routes can fail to be added to the routing table at startup because the routing interfaces are not yet up. |

| | |
|---|---|
| **Invalid Route Adds** | The number of routes that failed to be added to the routing table because the route was invalid. A log message is written for each of these failures. |
| **Failed Route Adds** | The number of routes that failed to be added to the routing table because of a resource limitation in the routing table. |
| **Kernel Failed Route Adds** | The number of routes that failed to be added to the routing table by kernel because of a resource limitation in the routing table. |
| **Hardware Failed Route Adds** | The number of routes that failed to be inserted into the hardware due to a hash error or a table full condition. |
| **Reserved Locals** | The number of routing table entries reserved for a local subnet on a routing interface that is down. Space for local routes is always reserved so that local routes can be installed when a routing interface bounces. |
| **Unique Next Hops (High)** | The number of distinct next hops used among all routes currently in the routing table. The *(High)* means the highest count of uniqe next hops since counters were last cleared. These include local interfaces for local routes and neighbors for indirect routes. |
| **Next Hop Groups (High)** | The current number of next hop groups in use by one or more routes. Each next hop group includes one or more next hops. The *(High)* means the highest count of next hop groups since counters were last cleared. |
| **ECMP Groups (High)** | The number of next hop groups with multiple next hops. The *(High)* means the highest count of next hop groups with multiple next hops since counters were last cleared. |
| **ECMP Routes** | The number of routes with multiple next hops currently in the routing table. |
| **Truncated ECMP Routes** | The number of ECMP routes that are currently installed in the forwarding table with just one next hop. The forwarding table may limit the number of ECMP routes or the number of ECMP groups. When a ECMP route cannot be installed because such a limit is reached, the route is installed with a single next hop. |
| **ECMP Retries** | The number of ECMP routes that have been installed in the forwarding table after initially being installed with a single next hop. |
| **Routes with *n* Next Hop** | The current number of routes with each number of next hops. |
| **Number of Prefixes** | Summarizes the number of routes with prefixes of different lengths. |

### 8.3.1.10. *Show ipv6 traffic*

This command displays traffic and statistics for IPv6 and ICMPv6. Specify a logical, loopback, or tunnel interface to view information about traffic on a specific interface. If you do not specify an interface, the command displays information about traffic on all interfaces.

**Format** show ipv6 traffic [{<slot/port> | loopback <loopback-id> | tunnel <tunnel-id> | vlan <vlan-id>}]

| Fields | Definition |
|---|---|
| **loopback-id** | The range is from 0 to 63. |
| **tunnel-id** | The range is from 0 to 7. |
| **vlan-id** | The range is from 1 to 4093. |

**Default** None

**Mode** Privileged Exec

**Display Message**

IPv6 STATISTICS

| Fields | Definition |
|---|---|
| **Total Datagrams Received** | Total number of input datagrams received by the interface, including those received in error. |
| **Received Datagrams Locally Delivered** | Total number of datagrams successfully delivered to IPv6 user-protocols (including ICMP). This counter increments at the interface to which these datagrams were addressed, which might not necessarily be the input interface for some of the datagrams. |
| **Received Datagrams Discarded Due To Header Errors** | Number of input datagrams discarded due to errors in their IPv6 headers, including version number mismatch, other format errors, hop count exceeded, errors discovered in processing their IPv6 options, etc. |
| **Received Datagrams Discarded Due To MTU** | Number of input datagrams that could not be forwarded because their size exceeded the link MTU of outgoing interface. |
| **Received Datagrams Discarded Due To No Route** | Number of input datagrams discarded because no route could be found to transmit them to their destination. |
| **Received Datagrams With Unknown Protocol** | Number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol. This counter increments at the interface to which these datagrams were addressed, which might not be necessarily the input interface for some of the datagrams. |
| **Received Datagrams Discarded Due To Invalid** | Number of input datagrams discarded because the IPv6 address in their IPv6 header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (for example, ::0) and |

| | |
|---|---|
| **Address** | unsupported addresses (for example, addresses with unallocated prefixes). Forentities which are not IPv6 routers and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address. |
| **Received Datagrams Discarded Due To Truncated Data** | Number of input datagrams discarded because datagram frame didn't carry enough data. |
| **Received Datagrams Discarded Other** | Number of input IPv6 datagrams for which no problems were encountered to prevent their continue processing, but which were discarded (e.g., for lack of buffer space). Note that this counter does not include datagrams discarded while awaiting re-assembly. |
| **Received Datagrams Reassembly Required** | Number of IPv6 fragments received which needed to be reassembled at this interface. Note that this counter increments at the interface to which these fragments were addressed, which might not be necessarily the input interface for some of the fragments. |
| **Datagrams Successfully Reassembled** | Number of IPv6 datagrams successfully reassembled. Note that this counter increments at the interface to which these datagrams were addressed, which might not be necessarily the input interface for some of the fragments. |
| **Datagrams Failed To Reassemble** | Number of failures detected by the IPv6 reassembly algorithm (for whatever reason: timed out, errors, etc.). Note that this is not necessarily a count of discarded IPv6 fragments. This counter increments at the interface to which these fragments were addressed, which might not be necessarily the input interface for some of the fragments. |
| **Datagrams Forwarded** | Number of output datagrams which this entity received and forwarded to their final destinations. In entities which do not act as IPv6 routers, this counter will include only those packets which were Source-Routed via this entity, and the Source-Route processing was successful. Note that for a successfully forwarded datagram the counter of the outgoing interface increments. |
| **Datagrams Locally Transmitted** | Total number of IPv6 datagrams which local IPv6 user-protocols (including ICMP) supplied to IPv6 in requests for transmission. Note that this counter does not include any datagrams counted in **Datagrams Forwarded**. |
| **Datagrams Transmit Failed** | Number of output IPv6 datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (e.g., for lack of buffer space). Note that this counter would include datagrams counted in **Datagrams Forwarded** if any such packets met this (discretionary) discard criterion. |
| **Datagrams Successfully Fragmented** | Number of IPv6 datagrams that have been successfully fragmented at this output interface. |
| **Datagrams Failed To** | Number of IPv6 datagrams that have been discarded because they needed to |

| | |
|---|---|
| **Fragment** | be fragmented at this output interface but could not be. |
| **Fragments Created** | Number of output datagram fragments that have been generated as a result of fragmentation at this output interface. |
| **Multicast Datagrams Received** | Number of multicast packets received by the interface. |
| **Multicast Datagrams Transmitted** | Number of multicast packets transmitted by the interface. |

ICMPv6 STATISTICS

| Fields | Definition |
|---|---|
| **Total ICMPv6 Messages Received** | Total number of ICMP messages received by the interface which includes all those counted by ipv6IfIcmpInErrors. Note that this interface is the interface to which the ICMP messages were addressed which may not be necessarily the input interface for the messages. |
| **ICMPv6 Messages With Errors Received** | Number of ICMP messages which the interface received but determined as having ICMP-specific errors (bad ICMP checksums, bad length, etc.). |
| **ICMPv6 Destination Unreachable Messages Received** | Number of ICMP Destination Unreachable messages received by the interface. |
| **ICMPv6 Messages Prohibited Administratively Received** | Number of ICMP destination unreachable/communication administratively prohibited messages received by the interface. |
| **ICMPv6 Time Exceeded Messages Received** | Number of ICMP Time Exceeded messages received by the interface. |
| **ICMPv6 Parameter Problem Messages Received** | Number of ICMP Parameter Problem messages received by the interface. |
| **ICMPv6 Packet Too Big Messages Received** | Number of ICMP Packet Too Big messages received by the interface. |
| **ICMPv6 Echo Request Messages Received** | Number of ICMP Echo request messages received by the interface. |
| **ICMPv6 Echo Reply Messages Received** | Number of ICMP Echo reply messages received by the interface. |

| | |
|---|---|
| **ICMPv6 Router Solicit Messages Received** | Number of ICMP Router Solicit messages received by the interface. |
| **ICMPv6 Router Advertisement Messages Received** | Number of ICMP Router Advertisement messages received by the interface. |
| **ICMPv6 Neighbor Solicit Messages Received** | Number of ICMP Neighbor Solicit messages received by the interface. |
| **ICMPv6 Neighbor Advertisement Messages Received** | Number of ICMP Neighbor Advertisement messages received by the interface. |
| **ICMPv6 Redirect Messages Received** | Number of Redirect messages received by the interface. |
| **ICMPv6 Group Membership Query Messages Received** | Number of ICMPv6 Group Membership Query messages received by the interface. |
| **ICMPv6 Group Membership Response Messages Received** | Number of ICMPv6 Group Membership Response messages received by the interface. |
| **ICMPv6 Group Membership Reduction Messages Received** | Number of ICMPv6 Group Membership Reduction messages received by the interface. |
| **Total ICMPv6 Messages Transmitted** | Total number of ICMP messages which this interface attempted to send. Note that this counter includes all those counted by icmpOutErrors. |
| **ICMPv6 Messages Not Transmitted Due To Error** | Number of ICMP messages which this interface did not send due to problems discovered within ICMP such as a lack of buffers. This value should not include errors discovered outside the ICMP layer such as the inability of IPv6 to route the resultant datagram. In some implementations there may be no types of error which contribute to this counter's value. |
| **ICMPv6 Destination Unreachable Messages Transmitted** | Number of ICMP Destination Unreachable messages sent by the interface. |
| **ICMPv6 Messages Prohibited Administratively Transmitted** | Number of ICMP destination unreachable/communication administratively prohibited messages sent. |
| **ICMPv6 Time Exceeded Messages Transmitted** | Number of ICMP Time Exceeded messages sent by the interface. |

| | |
|---|---|
| **ICMPv6 Parameter Problem Messages Transmitted** | Number of ICMP Parameter Problem messages sent by the interface. |
| **ICMPv6 Packet Too Big Messages Transmitted** | Number of ICMP Packet Too Big messages sent by the interface. |
| **ICMPv6 Echo Request Messages Transmitted** | Number of ICMP Echo request messages sent by the interface. |
| **ICMPv6 Echo Reply Messages Transmitted** | Number of ICMP Echo reply messages sent by the interface. |
| **ICMPv6 Router Solicit Messages Transmitted** | Number of ICMP Router Solicitation messages sent by the interface. |
| **ICMPv6 Router Advertisement Messages Transmitted** | Number of ICMP Router Advertisement messages sent by the interface. |
| **ICMPv6 Neighbor Solicit Messages Transmitted** | Number of ICMP Neighbor Solicitation messages sent by the interface. |
| **ICMPv6 Neighbor Advertisement Messages Transmitted** | Number of ICMP Neighbor Advertisement messages sent by the interface. |
| **ICMPv6 Redirect Messages Transmitted** | Number of Redirect messages sent. For a host, this object will always be zero, since hosts do not send redirects. |
| **ICMPv6 Group Membership Query Messages Transmitted** | Number of ICMPv6 Group Membership Query messages sent. |
| **ICMPv6 Group Membership Response Messages Transmitted** | Number of ICMPv6 Group Membership Response messages sent. |
| **ICMPv6 Group Membership Reduction Messages Transmitted** | Number of ICMPv6 Group Membership Reduction messages sent. |
| **ICMPv6 Duplicate Address Detects** | Number of duplicate addresses detected by interface. |

## 8.3.2. Configuration commands

This section describes the IPv6 commands you use to configure IPv6 on the system and on the interface.

### 8.3.2.1. *Ipv6 hop-limit*

This command defines the unicast hop count used in ipv6 packets originated by the node. The value is also included in router advertisements. The default “not configured” means that a value of zero is sent in router advertisements and a value of 64 is sent in packets originated by the node. Note that this is not the same as configuring a value of 64.

To return the unicast hop count to the default, use the no form of this command.

**Format** ipv6 hop-limit <hops>

no ipv6 hop-limit

| Fields | Definition |
|---|---|
| **<hops>** | The range is from 1 to 255. |

**Default** Not configured

**Mode** Global Config

### 8.3.2.2. *Ipv6 unicast-routing*

Use this command to enable the forwarding of IPv6 unicast packets.

To disable the forwarding of IPv6 unicast packets, use the no form of this command.

**Format** ipv6 unicast-routing

no ipv6 unicast-routing

**Default** Disabled

**Mode** Global Config

### 8.3.2.3. *Ipv6 enable*

Use this command to enable IPv6 routing on an interface, including tunnel and loopback interfaces that has not been configured with an explicit IPv6 address. When you use this command, the interface is automatically configured with a link-local address. You do not need to use this command if you configured an IPv6 global address on the interface.

To disable IPv6 routing on an interface, use the no form of this command.

**Format** ipv6 enable

no ipv6 enable

**Default** Disabled

**Mode** Interface Config
Interface VLAN

### 8.3.2.4. *Ipv6 address*

Use this command to configure an IPv6 address on an interface, including tunnel and loopback interfaces, and to enable IPv6 processing on this interface. You can assign multiple globally reachable addresses to an interface by using this command. You do not need to assign a linklocal address by using this command since one is automatically created. The <prefix> field consists of the bits of the address to be configured. The <prefix_length> designates how many of the high-order contiguous bits of the address make up the prefix.

You can express IPv6 addresses in eight blocks. Also of note is that instead of a period, a colon now separates each block. For simplification, leading zeros of each 16 bit block can be omitted. One sequence of 16 bit blocks containing only zeros can be replaced with a double colon "::", but not more than one at a time (otherwise it is no longer a unique representation).

- **Dropping zeros:** 3ffe:ffff:100:f101:0:0:0:1 becomes 3ffe:ffff:100:f101::1
- **Local host**: 0000:0000:0000:0000:0000:0000:0000:0001 becomes ::1
- **Any host:** 0000:0000:0000:0000:0000:0000:0000:0000 becomes ::

The hexadecimal letters in the IPv6 addresses are not case-sensitive. An example of an IPv6 prefix and prefix length is 3ffe:1::1234/64.

The optional [eui-64] field designates that IPv6 processing on the interfaces was enabled using an EUI-64 interface ID in the low order 64 bits of the address. If you use this option, the value of <prefix_length> must be 64 bits.

To remove all IPv6 addresses or specified IPv6 address on an interface, use the no form of this command. If you do not specify any parameter, the command deletes all the IPv6 addresses on an interface.

**Format** ipv6 address <prefix> / <prefix_length> [eui64]
no ipv6 address [<prefix> / <prefix_length>] [eui64]

| Fields | Definition |
|---|---|
| **<prefix>** | parameter consists of the bits of the address to be configured. |
| **<prefix_length>** | It designates how many of the high-order contiguous bits of the address comprise the prefix. |
| **[eui-64]** | This field designates that IPv6 processing on the interfaces was enabled using an EUI-64 interface ID in the low order 64 bits of the address. If you do not supply any parameters, the command deletes all the IPv6 addresses on an |

| | |
|---|---|
| | interface. |

**Default** None

**Mode** Interface Config
Interface VLAN

### 8.3.2.5. *Ipv6 address autoconfig*

Use this command to allow an in-band interface to acquire an IPv6 address through IPv6 Neighbor Discovery Prococol (NDP) and through the use of Router Advertisement messages.

To revert the IPv6 autoconfiguration status on an interface to the default value, use the no form of this command.

**Format** ipv6 address autoconfig
no ipv6 address autoconfig

**Default** Disable

**Mode** Interface Config
Interface VLAN

### 8.3.2.6. *Ipv6 address dhcp*

This command enables the DHCPv6 client on an in-band interface so that it can acquire network information, such as the IPv6 address, from a network DHCP server.

To release a leased address and disable DHCPv6 on an interface, use the no form of this command.

**Format** ipv6 address dhcp [restart]
no ipv6 address dhcp

| Parameter | Definition |
|---|---|
| **<dhcp>** | Obtains IPv6 address from DHCPv6. |
| **<restart>** | To restart the DHCPv6 process. |

**Default** Disable

**Mode** Interface-Vlan Config
Interface Config

### 8.3.2.7. *Ipv6 route*

Use this command to configure an IPv6 static route. The <ipv6-prefix> is the IPv6 network that is the destination of the static route. The <prefix_length> is the length of the IPv6 prefix — a decimal value (usually 0-64) that shows how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the <prefix_length>. The <next-hop-address> is the IPv6 address of the next hop that can be used to reach the specified network. The <preference> parameter is a value the router uses to compare this route with routes from other route sources that have the same destination. The range for <preference> is 1 - 255, and the default value is 1. The interface <slot/port> identifies direct static routes from point-to-point and broadcast interfaces, and must be specified when using a link-local address as the next hop. A route with a preference of 255 cannot be used to forward traffic.

To delet an IPv6 static route, use the no form of this command. Use the command without the optional parameters to delete all static routes to the specified destination. Use the <preference> parameter to revert preference of a route to default preference.

**Format** ipv6 route <ipv6-prefix>/<prefix_length> {<next-hop-address> | Null0 | interface {<slot/port> | tunnel <tunnel-id> | vlan <vlan-id>} <next-hop-address>} [<preference>]

no ipv6 route <ipv6-prefix>/<prefix_length> [{<next-hopaddress> | Null0 | interface {<slot/port> | tunnel <tunnel-id> | vlan <vlan-id>} <next-hop-address> | <preference>}]

| Fields | Definition |
|---|---|
| **<tunnel-id>** | The range is from 0 to 7. |
| **<vlan-id>** | The range is from 1 to 4093. |

**Default** Disable

**Mode** Global Config

### 8.3.2.8. *Ipv6 route distance*

This command sets the default distance (preference) for IPv6 static routes. Lower route distance values are preferred when determining the best route. The ipv6 route command allows you to optionally set the distance (preference) of an individual static route. The default distance is used when no distance is specified in this command.

Changing the default distance does not update the distance of existing static routes, even if they were assigned the original default distance. The new default distance will only be applied to static routes created after invoking the ipv6 route distance command.

To reset the default static route preference value in the router to the original default preference, use the no form of this command.

**Format** ipv6 route distance <1-255>

no ipv6 route distance

**Default** 1

**Mode** Global Config

### 8.3.2.9. *Ipv6 mtu*

This command sets the maximum transmission unit (MTU) size, in bytes, of IPv6 packets on an interface. This command replaces the default or link MTU with a new MTU value. The default MTU value for a tunnel interface is 1480. You cannot change this value.

To reset maximum transmission unit value to default value, use the no form of this command.

**Format** ipv6 mtu <1280-12270>

no ipv6 mtu

**Default** 0 or link speed (MTU value is 1500)

**Mode** Interface Config

### 8.3.2.10. *Ipv6 nd dad attemps*

This command sets the number of duplicate address detection probes transmitted on an interface. Duplicate address detection verifies that an IPv6 address on an interface is unique.

To reset to number of duplicate address detection value to default value, use the no form of this command.

**Format** ipv6 nd dad attempts <0 – 255>

no ipv6 nd dad attempts

**Default** 1

**Mode** Interface Config

### 8.3.2.11. *Ipv6 nd managed-config-flag*

This command sets the “managed address configuration” flag in router advertisements on the interface. When the value is true, end nodes use DHCPv6. When the value is false, end nodes automatically configure addresses.

To reset the “managed address configuration” flag in router advertisements to the default value, use the no form of this command.

**Format** ipv6 nd managed-config-flag

no ipv6 nd managed-config-flag

**Default** False

**Mode** Interface Config

### 8.3.2.12. *Ipv6 nd ns-interval*

This command sets the interval between router advertisements for advertised neighbor solicitations, in milliseconds, for an interface. An advertised value of 0 means the interval is unspecified.

To reset the neighbor solicit retransmission interval of the specified interface to the default value, use the no form of this command.

**Format** ipv6 nd ns-interval { <1000 – 4294967295> | 0 }

no ipv6 nd ns-interval

**Default** 0

**Mode** Interface Config

### 8.3.2.13. *Ipv6 nd other-config-flag*

This command sets the “other stateful configuration” flag in router advertisements sent from the interface.

To reset the “other stateful configuration” flag back to its default value in router advertisements sent from the interface, use the no form of this command.

**Format** ipv6 nd other-config-flag

no ipv6 nd other-config-flag

**Default** False

**Mode** Interface Config

### 8.3.2.14. *Ipv6 nd ra-interval*

This command sets the transmission interval between router advertisements on the interface.

To set router advertisement interval to the default, use the no form of this command.

**Format** ipv6 nd ra-interval <4 – 1800> [<Min Router Advertisement Interval>]

no ipv6 nd ra-interval

| Fields | Definition |
|---|---|
| **Min Router Advertisement Interval** | This command sets the minimal transmission interval between router advertisements on the interface. |

**Default** 600

**Mode** Interface Config

### 8.3.2.15. *Ipv6 nd ra-lifetime*

This command sets the value, in seconds, that is placed in the Router Lifetime field of the router advertisements sent from the interface. The **<lifetime>** value must be zero, or it must be an integer between the value of the router advertisement transmission interval and 9000. A value of zero means this router is not to be used as the default router.

To reset router lifetime to the default value, use the no form of this command.

**Format** ipv6 nd ra-lifetime <lifetime>

no ipv6 nd ra-lifetime

**Default** 1800

**Mode** Interface Config

### 8.3.2.16. *Ipv6 nd reachable-time*

This command sets the router advertisement time to consider a neighbor reachable after neighbor discovery confirmation. Reachable time is specified in milliseconds. A value of zero means the time is unspecified by the router.

To reset reachable time to the default value, use the no form of this command.

**Format** ipv6 nd reachable-time <0 - 3600000>

no ipv6 nd reachable-time

**Default** 0

**Mode** Interface Config

### 8.3.2.17. *Ipv6 nd router-preference*

This command sets the default router preference that the interface advertises in router advertisement messages.

To reset router preference to default, use the no form of this command.

**Format** ipv6 nd router-preference <high | low | medium>

no ipv6 nd router-preference

**Default** Medium

**Mode** Interface Config

### 8.3.2.18. *Ipv6 nd suppress-ra*

This command suppresses router advertisement transmission on an interface.

To enables router transmission on an interface, use the no form of this command.

**Format** ipv6 nd suppress-ra

no ipv6 nd suppress-ra

**Default** Disabled

**Mode** Interface Config

### 8.3.2.19. *Ipv6 nd prefix*

This command is used to configure parameters associated with prefixes the router advertises in its router advertisements. The first optional parameter is the valid lifetime of the router, in seconds. You can specify a value or indicate that the lifetime value is infinite. The second optional parameter is the preferred lifetime of the router.

The router advertises its global IPv6 prefixes in its router advertisements (RAs). An RA only includes the prefixes of the IPv6 addresses configured on the interface where the RA is transmitted. Addresses are configured using the ipv6 address interface configuration command. Each prefix advertisement includes information about the prefix, such as its lifetime values and whether hosts should use the prefix for on-link determination or address auto-configuration. Use the ipv6 nd prefix command to configure these values.

The ipv6 nd prefix command allows you to preconfigure RA prefix values before you configure the associated interface address. In order for the prefix to be included in RAs, you must configure an address that matches the prefix using the ipv6 address command. Prefixes specified using ipv6 nd prefix without associated interface address will not be included in RAs and will not be committed to the device configuration.

To set prefix configuration to default values, use the no form of this command.

**Format** ipv6 nd prefix <prefix/prefix_length> [{<0-4294967295> | infinite}{<0-4294967295> | infinite}] [no-autoconfig][off-link]

no ipv6 nd prefix <prefix/prefix_length>

**Default** Valid-lifetime: 2592000

Preferred-lifetime: 604800

Autoconfig: enabled

On-link: enabled

**Mode** Interface Config

### 8.3.2.20. *Ipv6 neighbor*

Use this command to configure a static IPv6 neighbor with the given IPv6 address and MAC address on a routing interface.

To remove a static IPv6 neighbor with the given IPv6 address on a routing interface, use the no form of this command.

**Format** ipv6 neighbor <ipv6address> {<slot/port> | vlan <1-4093>} <macaddr>

no ipv6 neighbor <ipv6address> {<slot/port> | vlan <1-4093>}

| Fields | Definition |
|---|---|
| **ipv6address** | The IPv6 address of the neighbor. |
| **Macaddr** | The MAC address for the neighbor. |

**Default** None

**Mode** Global Config

### 8.3.2.21. *Ipv6 neighbors dynamicrenew*

Use this command to automatically renew the IPv6 neighbor entries.

To disable automatic renewing of IPv6 neighbor entries, use the no form of this command.

**Format** ipv6 neighbors dynamicrenew

no ipv6 neighbors dynamicrenew

**Default** Disable

**Mode** Global Config

### 8.3.2.22. *Ipv6 nud*

Use this command to configure Neighbor Unreachability Detection (NUD). NUD verifies that communication with a neighbor exists.

To reset to the default value, use the no form of this command.

**Format** ipv6 nud {backoff-multiple | max-multicast-solicits | max-unicast-solicits}

no ipv6 unreachables

| Fields | Definition |
|---|---|
| **backoff-multiple** | Set the exponential backoff multiple to calculate time outs in NS transmissions during NUD. The value ranges from 1 to 5. The next timeout value is limited to a maximum value of 60 seconds if the value with exponential backoff calculation is greater than 60 seconds. |
| **max-multicast-solicits** | Set the maximal number of multicast solicits sent during NUD. The value ranges from 3 to 255. |
| **max-unicast-solicits** | Set the maximal number of unicast solicits sent during NUD. The value ranges from 3 to 10. |

**Default** backoff-multiple: 1

max-multicast-solicits: 3

max-unicast-solicits: 3

**Mode** Global Config

### 8.3.2.23. *Ipv6 unreachables*

Use this command to enable the generation of ICMPv6 Destination Unreachable messages. By default, the generation of ICMPv6 Destination Unreachable messages is enabled.

To prevent the generation of ICMPv6 Destination Unreachable messages, use the no form of this command.

**Format** ipv6 unreachables

no ipv6 unreachables

**Default** Enable

**Mode** Interface Config

### 8.3.2.24. *Ipv6 unresolved-traffic rate-limit*

Use this command to control the rate at which IPv6 data packets come into the CPU. By default, rate limiting is disabled. When enabled, the rate can range from 50 to 1024 packets per second.

To disable the rate limit, use the no form of this command.

**Format** ipv6 unresolved-traffic rate-limit <50-1024>

no ipv6 unresolved-traffic rate-limit

**Default** Enable

**Mode** Global Config

### 8.3.2.25. *Ipv6 icmp error-interval*

Use this command to limit the rate at which ICMPv6 error messages are sent. The rate limit is configured as a token bucket, with two configurable parameters, burst-size and burst-interval. To disable ICMPv6 rate limiting, set burst-interval to zero (0).

To return burst-interval and burst-size to their default values, use the no form of this command.

**Format** ipv6 icmp error-interval <burst-interval> [<burst-size>]

no ipv6 icmp error-interval

| Fields | Definition |
|---|---|
| **<burst-interval>** | Specifies how often the token bucket is initialized with burst-size tokens. burst-interval is from 0 to 2147483647 milliseconds (msec). |
| **<burst-size>** | The number of ICMPv6 error messages that can be sent during one burst-interval. The range is from 1 to 200 messages. |

**Default** burst-interval of 1000 msec

burst-size of 100 messages

**Mode** Global Config

### 8.3.2.26. *Clear ipv6 route counters*

This command resets to zero the IPv6 routing table counters reported in the command “show ipv6 route summary”. The command only resets event counters. Counters that report the current state of the routing table, such as the number of routes of each type, are not reset.

**Format** clear ipv6 route counters

**Default** None

**Mode** Privileged Exec

# 8.4. OSPFv3 Commands

This section describes the commands you use to configure OSPFv3, which is a link-state routing protocol that you use to route traffic within a network.

## 8.4.1. Show commands

### 8.4.1.1. *Show ipv6 ospf*

This command displays information relevant to the OSPF router.

Some of the information below displays only if you enable OSPF and configure certain features.

**Format** show ipv6 ospf

**Default** None

**Mode** Privileged Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Router ID** | A 32 bit integer in dotted decimal format identifying the router, about which information is displayed. This is a configured value. |
| **OSPF Admin Mode** | Shows whether the administrative mode of OSPF in the router is enabled or disabled. This is a configured value. |
| **External LSDB Limit** | Shows the maximum number of non-default AS-external-LSAs entries that can be stored in the link-state database. |
| **Exit Overflow Interval** | Shows the number of seconds that, after entering Overflow State, a router will attempt to leave Overflow State. |
| **SPF Start Time** | The number of milliseconds the SPF calculation is delayed if no SPF calculation has been scheduled during the current “wait interval”. |
| **SPF Hold Time** | The number of milliseconds of the initial “wait interval”. |
| **SPF Maximum Hold Time** | The maximum number of milliseconds of the “wait interval”. |
| **LSA Refresh Group Pacing Time** | The size of the LSA refresh group window, in seconds. |
| **Autocost Ref BW** | Shows the value of auto-cost reference bandwidth configured on the router. |

| | |
|---|---|
| **Default Passive Setting** | Shows whether the interfaces are passive by default. |
| **Prefix Suppression** | Display whether prefix-suppression is enabled or disabled. |
| **Maximum Paths** | The maximum number of paths that OSPF can report for a given destination. |
| **Default Metric** | Default value for redistributed routes. |
| **Maximum Routes** | The maximum number of routes that OSPF can support. |
| **Stub Router Configuration** | Indicates whether stub router is configured. |
| **BFD Mode** | Indicates whether BFD is enabled or disabled. |
| **Default Route Advertise** | Indicates whether the default routes received from other source protocols are advertised or not. |
| **Always** | Shows whether default routes are always advertised. |
| **Metric** | The metric for the advertised default routes. |
| **Metric Type** | Shows whether the routes are External Type 1 or External Type 2. |
| **Number of Active Areas** | The number of active OSPF areas. An “active” OSPF area is an area with at least one interface up. |
| **ABR Status** | Shows whether the router is an OSPF Area Border Router. |
| **ASBR Status** | Reflects whether the ASBR mode is enabled or disabled. Enable implies that the router is an autonomous system border router. The router automatically becomes an ASBR when it is configured to redistribute routes learnt from other protocols. The possible values for the ASBR status is enabled (if the router is configured to redistribute routes learned by other protocols) or disabled (if the router is not configured for the same). |
| **Stub Router Status** | When OSPF runs out of resources to store the entire link state database, or any other state information, OSPF goes into stub router mode. As a stub router, OSPF re-originates its own router LSAs, setting the cost of all non-stub interfaces to infinity. To restore OSPF to normal operation, disable and re-enable OSPF. |
| **External LSDB Overflow** | When the number of non-default external LSAs exceeds the configured limit, External LSDB Limit, OSPF goes into LSDB overflow state. In this state, OSPF withdraws all of its self-originated non-default external LSAs. After the Exit Overflow Interval, OSPF leaves the overflow state, if the number of external LSAs has been reduced. |

| | |
|---|---|
| **External LSA Count** | Shows the number of external (LS type 5) link-state advertisements in the link-state database. |
| **External LSA Checksum** | Shows the sum of the LS checksums of external link-state advertisements contained in the link-state database. |
| **New LSAs Originated** | Shows the number of new link-state advertisements that have been originated. |
| **LSAs Received** | Shows the number of link-state advertisements received determined to be new instantiations. |
| **LSA Count** | The total number of link state advertisements currently in the link state database. |
| **Maximum Number of LSAs** | The maximum number of LSAs that OSPF can store. |
| **LSA High Water Mark** | The maximum size of the link state database since the system started. |
| **Retransmit List Entries** | The total number of LSAs waiting to be acknowledged by all neighbors. An LSA may be pending acknowledgment from more than one neighbor. |
| **Maximum Number of Retransmit Entries** | The maximum number of LSAs that can be waiting for acknowledgment at any given time. |
| **Retransmit Entries High Water Mark** | The highest number of LSAs that have been waiting for acknowledgment. |
| **Redistributing** | This field is a heading and appears only if you configure the system to take routes learned from a non-OSPF source and advertise them to its peers. |
| **Source** | Show source protocol/routes that are being redistributed. Possible values are static, connected, or BGP. |
| **Metric** | The metric of the routes being redistributed. |
| **Metric Type** | Show whether the routes are EX1 ro EX2. |
| **Tag** | The decimal value attached to each external route. |
| **Prefix-suppresion** | Display whether prefix-suppresion is enabled of disabled on the given interface. |
| **NSF Helper Support** | Indicate whether helpful neighbor functionality has been enabled for OSPF for planned restarts, unplanned restarts, or Always (Both). |
| **NSF Helper Strict LSA** | Indicate whether strict LAS checking has been enabled. If enabled then an |

| | |
|---|---|
| **Checking** | OSPF helpful neighbor will exit helper mode whenever a topology change occurs. If disabled, an OSPF neighbor will continue as a helpful neighbor in spite of topology changes. |

### 8.4.1.2. *Show ipv6 ospf abr*

This command displays the internal OSPFv3 routes to reach Area Border Routers (ABR).This command takes no options.

**Format** show ipv6 ospf abr

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Type** | The type of the route to the destination. It can be either:<br>• intra — Intra-area route<br>• inter — Inter-area route |
| **Router ID** | Router ID of the destination |
| **Cost** | Cost of using this route |
| **Area ID** | The area ID of the area from which this route is learned. |
| **Next Hop** | Next hop toward the destination |
| **Next Hop Intf** | The outgoing router interface to use when forwarding traffic to the next hop. |

### 8.4.1.3. *Show ipv6 ospf area*

This command displays information about the area. The <areaid> identifies the OSPF area that is being displayed.

**Format** show ipv6 ospf area <areaid>

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **AreaID** | The area id of the requested OSPF area. |
| **External Routing** | A number representing the external routing capabilities for this area. |
| **Spf Runs** | The number of times that the intra-area route table has been calculated using this area's link-state database. |
| **Area Border Router Count** | The total number of area border routers reachable within this area. |
| **Area LSA Count** | Total number of link-state advertisements in this area's link-state database, excluding AS External LSAs. |
| **Area LSA Checksum** | A number representing the Area LSA Checksum for the specified AreaID excluding the external (LS type 5) link-state advertisements. |
| **Stub Mode** | Represents whether the specified Area is a stub area or not. The possible values are enabled and disabled. This is a configured value. |
| **Import Summary LSAs** | Shows whether to import summary LSAs (enabled). |
| **Stub Area Metric Value** | The metric value of the stub area. This field displays only if the area is configured as a stub area. |

The following OSPF NSSA specific information displays only if the area is configured as an NSSA.

| Fields | Definition |
|---|---|
| **Import Summary LSAs** | Shows whether to import summary LSAs into the NSSA. |
| **Redistribute into NSSA** | Shows whether to redistribute information into the NSSA. |
| **Default Information Originate** | Shows whether to advertise a default route into the NSSA |
| **Default Metric** | Shows the metric value for the default route advertised into the NSSA. |
| **Default Metric Type** | Shows the metric type for the default route advertised into the NSSA. |
| **Translator Role** | Shows the NSSA translator role of the ABR, which is always or candidate. |

| | |
|---|---|
| **Translator Stability Interval** | Shows the amount of time that an elected translator continues to perform its duties after it determines that its translator status has been deposed by another router. |
| **Translator State** | Shows whether the ABR translator state is disabled, always, or elected. |

### 8.4.1.4. *Show ipv6 ospf asbr*

This command displays the internal OSPFv3 routes to reach Autonomous System Boundary Routers (ASBR). This command takes no options.

**Format** show ipv6 ospf asbr

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Type** | The type of the route to the destination. It can be either:<br>• intra — Intra-area route<br>• inter — Inter-area route |
| **Router ID** | Router ID of the destination |
| **Cost** | Cost of using this route |
| **Area ID** | The area ID of the area from which this route is learned. |
| **Next Hop** | Next hop toward the destination |
| **Next Hop Intf** | The outgoing router interface to use when forwarding traffic to the next hop. |

### 8.4.1.5. *Show ipv6 ospf database*

This command displays information about the link state database when OSPFv3 is enabled. If you do not enter any parameters, the command displays the LSA headers for all areas. Use the optional <areaid> parameter to display database information about a specific area. Use the other optional parameters to specify the type of link state advertisements to display. Use *external* to display the external LSAs. Use *inter-area* to display the inter-area LSAs. Use *link* to display the link LSAs. Use *network* to display the network

LSAs. Use *nssa-external* to display NSSA external LSAs. Use *prefix* to display intra-area Prefix LSAs. Use *router* to display router LSAs. Use *unknown area*, *unknown as*, or *unknown link* to display unknown area, AS or link-scope LSAs, respectively. Use <lsid> to specify the link state ID (LSID). Use *adv-router* to show the LSAs that are restricted by the advertising router. Use *self-originate* to display the LSAs in that are self originated. The information below is only displayed if OSPF is enabled.

**Format** show ipv6 ospf [<areaid>] database [{external | inter-area {prefix | router} | link | network | nssa-external | prefix | router | unknown {area | as | link}}] [<lsid>] [{adv-router [<rtrid>] | self-originate}]

| Fields | Definition |
|---|---|
| **<areaid>** | Configures to display database information about a specific area. |
| **<lsid>** | Specify the link state ID. |
| **<rtrid>** | Specify an IP Address. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Link Id** | A number that uniquely identifies an LSA that a router originates from all other self originated LSA's of the same LS type. |
| **Adv Router** | The Advertising Router. Is a 32 bit dotted decimal number representing the LSDB interface. |
| **Age** | A number representing the age of the link state advertisement in seconds. |
| **Sequence** | A number that represents which LSA is more recent. |
| **Csum** | The total number LSA checksum. |
| **Options** | This is an integer. It indicates that the LSA receives special handling during routing calculations. |
| **Rtr Opt** | Router Options are valid for router links only. |

### 8.4.1.6. *Show ipv6 ospf database database-summary*

This command displays the number of each type of LSA in the database and the total number of LSAs in the database.

**Format** show ipv6 ospf database database-summary

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Router** | Total number of router LSAs in the OSPFv3 link state database. |
| **Network** | Total number of network LSAs in the OSPFv3 link state database. |
| **Inter-area Prefix** | Total number of inter-area prefix LSAs in the OSPFv3 link state database. |
| **Inter-area Router** | Total number of inter-area router LSAs in the OSPFv3 link state database. |
| **Type-7 Ext** | Total number of NSSA external LSAs in the OSPFv3 link state database. |
| **Link** | Total number of link LSAs in the OSPFv3 link state database. |
| **Intra-area Prefix** | Total number of intra-area prefix LSAs in the OSPFv3 link state database. |
| **Link Unknown** | Total number of link-source unknown LSAs in the OSPFv3 link state database. |
| **Area Unknown** | Total number of area unknown LSAs in the OSPFv3 link state database. |
| **AS Unknown** | Total number of as unknown LSAs in the OSPFv3 link state database. |
| **Subtotal** | Number of entries for the identified area. |
| **Self-Originated Type-7 Ext** | Total number of self originated Type-7 external LSAs in the database. |
| **Type-5 Ext** | Total number of AS external LSAs in the database. |
| **Self-Originated Type-5 Ext** | Total number of self originated AS external LSAs in the database. |
| **Total** | Total number of router LSAs in the OSPFv3 link state database. |

### 8.4.1.7. *Show ipv6 ospf interface*

This command displays the information for the physical or virtual interface tables.

**Format** show ipv6 ospf interface {<slot/port> | loopback <0-63> | tunnel <0-7> | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **<slot/port>** | Interface number. |
| **<0-63>** | Loopback Interface ID. |
| **<0-7>** | Tunnel Interface ID. |
| **<vland-id>** | VLAN ID. The range is from 0 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **IPv6 Address** | Shows the IPv6 address of the interface. |
| **ifIndex** | Shows the interface index number associated with the interface. |
| **OSPF Admin Mode** | Shows whether the admin mode is enabled or disabled. |
| **OSPF Area ID** | Shows the area ID associated with this interface. |
| **Router Priority** | Shows the router priority. The router priority determines which router is the designated router. |
| **Retransmit Interval** | Shows the frequency, in seconds, at which the interface sends LSA. |
| **Hello Interval** | Shows the frequency, in seconds, at which the interface sends Hello packets. |
| **Dead Interval** | Shows the amount of time, in seconds, the interface waits before assuming a neighbor is down. |
| **LSA Ack Interval** | Shows the amount of time, in seconds, the interface waits before sending an LSA acknowledgement after receiving an LSA. |
| **Transmit Delay Interval** | A number representing the OSPF Transmit Delay for the specified interface. |
| **Authentication Type** | Shows the type of authentication the interface performs on LSAs it receives. |

| | |
|---|---|
| **Metric Cost** | Shows the priority of the path. Low costs have a higher priority than high costs. |
| **Prefix-suppresion** | Shows whether prefix-suppresion is enabled, disabled, or unconfigured on the given interface. |
| **Passive Status** | Shows whether the interface is passive or not. |
| **OSPF MTU-ignore** | Shows whether to ignore MTU mismatches in database descriptor packets sent from neighboring routers. |
| **Link LSA Suppresion** | Shows the configured state of Link LSA Suppresion for the interface. |

The following information only displays if OSPF is initialized on the interface:

| Fields | Definition |
|---|---|
| **OSPF Interface Type** | Broadcast LANs, such as Ethernet and IEEE 802.5, take the value *broadcast*. The OSPF Interface Type will be 'broadcast'. |
| **State** | The OSPF Interface States are: down, loopback, waiting, point-to-point, designated router, and backup designated router. |
| **Designated Router** | The router ID representing the designated router. |
| **Backup Designated Router** | The router ID representing the backup designated router. |
| **Number of Link Events** | The number of link events. |
| **Metric Cost** | The cost of the OSPF interface. |

### 8.4.1.8. *Show ipv6 ospf interface brief*

This command displays brief information for the physical or virtual interface tables.

**Format** show ipv6 ospf interface brief

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Interface** | The routing interface associated with the rest of the data in the row. |
| **OSPF Admin Mode** | States whether OSPF is enabled or disabled on a router interface. This is a configured value. |
| **OSPF Area ID** | Represents the OSPF Area ID for the specified interface. This is a configured value. |
| **Router Priority** | Shows the router priority. The router priority determines which router is the designated router. |
| **Metric Cost** | The priority of the path. Low costs have a higher priority than high costs. |
| **Hello Interval** | Shows the frequency, in seconds, at which the interface sends Hello packets. |
| **Dead Interval** | Shows the amount of time, in seconds, the interface waits before assuming a neighbor is down. |
| **Retransmit Interval** | Shows the frequency, in seconds, at which the interface sends LSA. |
| **Retransmit Delay Interval** | Shows the number of seconds the interface adds to the age of LSA packets before transmission. |
| **LSA Ack Interval** | Shows the amount of time, in seconds, the interface waits before sending an LSA acknowledgement after receiving an LSA. |

### 8.4.1.9. *Show ipv6 ospf interface stats*

This command displays the statistics for a specific interface. The command only displays information if OSPF is enabled

**Format** show ipv6 ospf interface stats {<slot/port> | loopback <loopback-id> | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **<slot/port>** | Interface number. |
| **<loopback-id>** | The loopback ID ranges from 0 to 63. |
| **<vlan-id>** | VLAN ID. The range is from 0 to 4093. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **OSPFv3 Area ID** | The area id of this OSPF interface. |
| **IP Address** | The IP address associated with this OSPF interface. |
| **OSPFv3 Interface Events** | The number of times the specified OSPF interface has changed its state, or an error has occurred. |
| **Virtual Events** | The number of state changes or errors that occurred on this virtual link. |
| **Neighbor Events** | The number of times this neighbor relationship has changed state, or an error has occurred. |
| **Packets Received** | The number of OSPFv3 packets received on the interface. |
| **Packets Transmitted** | The number of OSPFv3 packets sent on the interface. |
| **LSAs Sent** | The total number of LSAs flooded on the interface. |
| **LSA Acks Received** | The total number of LSA acknowledged from this interface. |
| **LSA Acks Sent** | The total number of LSAs acknowledged to this interface. |
| **Sent Packets** | The number of OSPF packets transmitted on the interface. |
| **Received Packets** | The number of valid OSPF packets received on the interface. |
| **Discards** | The number of received OSPF packets discarded because of an error in the packet or an error in processing the packet. |
| **Bad Version** | The number of received OSPF packets whose version field in the OSPF header does not match the version of the OSPF process handling the packet. |
| **Virtual Link Not Found** | The number of received OSPF packets discarded where the ingress interface is in a non-backbone area and the OSPF header identifies the packet as belonging to the backbone, but OSPF does not have a virtual link to the packet's sender. |
| **Area Mismatch** | The number of OSPF packets discarded because the area ID in the OSPF header is not the area ID configured on the ingress interface. |

| | |
|---|---|
| **Invalid Destination Address** | The number of OSPF packets discarded because the packet's destination IP address is not the address of the ingress interface and is not the AllDrRouters or AllSpfRouters multicast addresses. |
| **No Neighbor at Source Address** | The number of OSPF packets dropped because the sender is not an existing neighbor or the sender's IP address does not match the previously recorded IP address for that neighbor. NOTE: Does not apply to Hellos. |
| **Invalid OSPF Packet Type** | The number of OSPF packets discarded because the packet type field in the OSPF header is not a known type. |
| **Hello Ignored** | The number of received Hello packets that were ignored by this router from the new neighbors after the limit has been reached for the number of neighbors on an interface or on the system as a whole. |

### 8.4.1.10. *Show ipv6 ospf lsa-group*

This command displays the number of self-originated LSAs within each LSA group.

**Format** show ipv6 ospf lsa-group

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Total self-originated LSAs** | The number of LSAs the router is currently originating. |
| **Average LSAs per group** | The number of self-originated LSAs divided by the number of LSA groups. The number of LSA groups is the refresh interval (1800 seconds) divided by the pacing interval (configured with *timers pacing lsa-group*) plus two. |
| **Pacing group limit** | The maximum number of self-originated LSAs in one LSA group. If the number of LSAs in a group exceeds this limit, OSPF redistributes LSAs throughout the refresh interval to achieve better balance. |
| **Groups** | For each LSA pacing group, the output shows the range of LSA ages in the group and the number of LSAs in the group. |

### 8.4.1.11. *Show ipv6 ospf max-metric*

This command displays the configured maximum metrics for stub router mode.

**Format** show ipv6 ospf max-metric

**Default** None

**Mode** Privileged Exec
User Exec

### 8.4.1.12. *Show ipv6 ospf neighbor*

This command displays information about OSPF neighbors. If you do not specify a neighbor IP address, the output displays summary information in a table. If you specify an interface or tunnel, only the information for that interface or tunnel displays. The **<ipaddr>** is the IP address of the neighbor, and when you specify this, detailed information about the neighbor displays. The information below only displays if OSPF is enabled and the interface has a neighbor.

**Format** show ipv6 ospf neighbor [{interface {<slot/port> | tunnel <0-7> | vlan <vlan-id>} | <ipaddr>}]

| Fields | Definition |
|---|---|
| **<ipaddr>** | IP address of the neighbor. |
| **<slot/port>** | Interface number. |
| **<vlan-id>** | VLAN ID ranges from 1 to 4093. |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

If you do not specify an IP address, a table with the following columns displays for all neighbors or the neighbor associated with the interface that you specify:

| Fields | Definition |
|---|---|
| **Router ID** | Shows the 4-digit dotted-decimal number of the neighbor router. |
| **Priority** | Displays the OSPF priority for the specified interface. The priority of an interface is a priority integer from 0 to 255. A value of '0' indicates that the router is not eligible to become the designated router on this network. |
| **Intf ID** | Shows the interface ID of the neighbor. |
| **Interface** | Shows the interface of the local router. |

| | |
|---|---|
| **State** | Shows the state of the neighboring routers. Possible values are:<br>• Down - initial state of the neighbor conversation - no recent information has been received from the neighbor.<br>• Attempt - no recent information has been received from the neighbor but a more concerted effort should be made to contact the neighbor.<br>• Init - an Hello packet has recently been seen from the neighbor, but bidirectional communication has not yet been established.<br>• 2 way - communication between the two routers is bidirectional.<br>• Exchange start - the first step in creating an adjacency between the two neighboring routers, the goal is to decide which router is the master and to decide upon the initial DD sequence number.<br>• Exchange - the router is describing its entire link state database by sending Database Description packets to the neighbor.<br>• Loading - Link State Request packets are sent to the neighbor asking for the more recent LSAs that have been discovered (but not yet received) in the Exchange state.<br>• Full - the neighboring routers are fully adjacent and they will now appear in router-LSAs and network-LSAs. |
| **Dead Time** | Shows the amount of time, in seconds, to wait before the router assumes the neighbor is unreachable. |

If you specify an IP address for the neighbor router, the following fields display:

| Fields | Definition |
|---|---|
| **Interface** | Shows the interface of the local router. |
| **Area ID** | The area ID associated with the interface. |
| **Options** | An integer value that indicates the optional OSPF capabilities supported by the neighbor. These are listed in its Hello packets. This enables received Hello Packets to be rejected (i.e., neighbor relationships will not even start to form) if there is a mismatch in certain crucial OSPF capabilities. |
| **Router Priority** | Displays the router priority for the specified interface. |

| | |
|---|---|
| **Dead Timer Due** | Shows the amount of time, in seconds, to wait before the router assumes the neighbor is unreachable. |
| **State** | Shows the state of the neighboring routers. |
| **Events** | The number of times this neighbor relationship has changed state, or an error has occurred. |
| **Retransmission Queue Length** | An integer representing the current length of the retransmission queue of the specified neighbor router Id of the specified interface. |

### 8.4.1.13. *Show ipv6 ospf range*

This command displays information about the area ranges for the specified <areaid>. The <areaid> identifies the OSPFv3 area whose ranges are being displayed.

**Format** show ipv6 ospf range <areaid>

| **Fields** | **Definition** |
|---|---|
| **<areaid>** | The area ID of the requested OSPFv3 area |

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| **Fields** | **Definition** |
|---|---|
| **Area ID** | The area ID of the requested OSPFv3 area |
| **IPv6 Prefix/Prefix Length** | The summary prefix and prefix length. |
| **Lsdb Type** | The type of link advertisement associated with this area range. |
| **Advertisement** | The status of the advertisement. Advertisement has two possible settings: enabled or disabled. |

### 8.4.1.14. *Show ipv6 ospf statistics*

This command displays information about the 15 most recent Shortest Path First (SPF) calculations.

**Format** show ipv6 ospf statistics

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

The command displays the following information with the most recent statistics displayed at the end of the table.

| Fields | Definition |
|---|---|
| **Delta T** | The time since the routing table was computed. The time is in the format hours, minutes, and seconds (hh:mm:ss). |
| **Intra** | The time taken to compute intra-area routes, in milliseconds. |
| **Summ** | The time taken to compute inter-area routes, in milliseconds. |
| **Ext** | The time taken to compute external routes, in milliseconds. |
| **SPF Total** | The total time taken to compute routes, in milliseconds. The total may exceed the sum of Intra, Summ, and Ext times. |
| **RIB Update** | The time from the completion of the routing table calculation until all changes have been made in the common routing table (the Routing Information Base, RIB), in milliseconds. |
| **Reason** | The event or events that triggered the SPF. The reaons codes are as follows:<br>• R – New router LSA.<br>• N – New network LSA.<br>• SN – New network (inter-area prefix) summary LSA.<br>• SA – New ASBR (inter-area router) summary LSA.<br>• X – New external LSA.<br>• IP – New Intra-area prefix LSA.<br>• L – New Link LSA. |

### 8.4.1.15. *Show ipv6 ospf stub table*

This command displays the OSPF stub table. The information bello will only be displayed if OSPF is initialized on the switch.

**Format** show ipv6 ospf stub table

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Area ID** | A 32-bit identifier for the created stub area. |
| **Type of Service** | The type of service associated with the stub metric. Only supports Normal TOS. |
| **Metric Val** | The metric value is applied based on the TOS. It defaults to the least metric of the type of service among the interfaces to other areas. The OSPF cost for a route is a function of the metric value. |
| **Import Summary LSA** | Controls the import of summary LSAs into stub areas. |

### 8.4.1.16. *Show ipv6 ospf virtual-link*

This command displays the OSPF Virtual Interface information for a specific area and neighbor.

**Format** show ipv6 ospf virtual-link <areaid> <neighbor>

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<neighbor>** | Neighbor's router ID. |

**Default** None

**Mode** Privileged Exec

User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Area ID** | The area ID of the requested OSPFv3 area. |
| **Neighbor Router ID** | The input neighbor Router ID. |
| **Hello Interval** | The configured hello interval for the OSPF virtual interface. |
| **Dead Interval** | The configured dead interval for the OSPF virtual interface. |
| **Interface Transmit Delay** | The configured transit delay for the OSPF virtual interface. |
| **Retransmit Interval** | The configured retransmit interval for the OSPF virtual interface. |
| **State** | The OSPFv3 Interface States are: down, loopback, waiting, point-to-point, designated router, and backup designated router. This is the state of the OSPFv3 interface. |
| **Metric** | The OSPFv3 virtual interface metric. |
| **Neighbor State** | The neighbor state. |

### 8.4.1.17. *Show ipv6 ospf virtual-link brief*

This command displays the OSPFv3 Virtual Interface information for all areas in the system.

**Format** show ipv6 ospf virtual-link brief

**Default** None

**Mode** Privileged Exec
User Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **Area ID** | The area ID of the requested OSPFv3 area. |
| **Neighbor** | The neighbor interface of the OSPFv3 virtual interface. |
| **Hello Interval** | The configured hello interval for the OSPFv3 virtual interface. |
| **Dead Interval** | The configured dead interval for the OSPFv3 virtual interface. |

| | |
|---|---|
| **Retransmit Interval** | The configured retransmit interval for the OSPFv3 virtual interface. |
| **Transit Delay** | The configured transit delay for the OSPFv3 virtual interface. |

## 8.4.2. Configuration commands

### 8.4.2.1. *Ipv6 ospf*

This command enables OSPF on a router interface or loopback interface.

To disable OSPF on a router interface or loopback interface, use the no form of this command.

**Format** ipv6 ospf
no ipv6 ospf

**Default** Disable

**Mode** Interface Config

### 8.4.2.2. *Ipv6 ospf area*

This command sets the OSPF area to which the specified router interface belongs. The <areaid> is an 32-bit integer, formatted as a 4-digit dotted-decimal number or a decimal value in the range of <0-4294967295>. The area uniquely identifies the area to which the interface connects. Assigning an area ID, which does not exist on an interface, causes the area to be created with default values.

**Format** ipv6 ospf area {<0-4294967295> | <areaid>}

| Fields | Definition |
|---|---|
| **<areaid>** | An 32-bit integer, formatted as a 4-digit dotted-decimal number. |
| **<0-4294967295>** | A decimal value for an area ID. |

**Default** None

**Mode** Interface Config

### 8.4.2.3. *Ipv6 ospf bfd*

This command enables BFD for OSPF on the specified interface.

To disable BFD for OSPF on the specified interface, use the no form of this command.

**Format** ipv6 ospf bfd

**Default** Disable

**Mode** Interface Config

### 8.4.2.4. *Ipv6 ospf cost*

This command configures the cost on an OSPF interface. The <cost> parameter has a range of 1 to 65535.

To reset to the default cost on an OSPF interface, use the no form of this command.

**Format** ipv6 ospf cost <1-65535>

no ipv6 ospf cost

**Default** 10

**Mode** Interface Config

### 8.4.2.5. *Ipv6 ospf dead-interval*

This command sets the OSPF dead interval for the specified interface. The value for <seconds> is a valid positive integer, which represents the length of time in seconds that a router's Hello packets have not been seen before its neighbor routers declare that the router is down. The value for the length of time must be the same for all routers attached to a common network. This value should be some multiple of the Hello Interval (i.e. 4).

To set the default OSPF dead interval for the specified interface, use the no form of this command.

**Format** ipv6 ospf dead-interval <seconds>

no ipv6 ospf dead-interval

| Fields | Definition |
|---|---|
| **<seconds>** | This value ranges from 1 to 65535. |

**Default** 40

**Mode** Interface Config

### 8.4.2.6. *Ipv6 ospf hello-interval*

This command sets the OSPF hello interval for the specified interface. The value for <seconds> is a valid positive integer, which represents the length of time in seconds. The value for the length of time must be the same for all routers attached to a network. Valid values for <seconds> range from 1 to 65535.

To set the default OSPF hello interval for the specified interface, use the no form of this command.

**Format** ipv6 ospf hello-interval <seconds>

no ipv6 ospf hello-interval

| Fields | Definition |
|---|---|
| **<seconds>** | This value ranges from 1 to 65535. |

**Default** 10

**Mode** Interface Config

### 8.4.2.7. *Ipv6 ospf link-lsa-suppression*

This command enables Link LSA Suppression on an interface. When Link LSA Suppression is enabled on a P2P interface, no Link LSA protocol packets are originated on the interface. This configuration does not apply to non-P2P interfaces.

To disables Link LSA Suppression on an interface, use the no form of this command. When Link LSA suppression is disabled, Link LSA protocol packets are originated on the P2P interfaces.

**Format** ipv6 ospf link-lsa-suppresion

no ipv6 ospf link-lsa-suppresion

**Default** Disable

**Mode** Interface Config

### 8.4.2.8. *Ipv6 ospf mtu-ignore*

This command disables OSPF maximum transmission unit (MTU) mismatch detection. OSPF Database Description packets specify the size of the largest IP packet that can be sent without fragmentation on the interface. When a router receives a Database Description packet, it examines the MTU advertised by the neighbor. By default, if the MTU is larger than the router can accept, the Database Description packet is rejected and the OSPF adjacency is not established.

To enable the OSPF MTU mismatch detection, use the no form of this command.

**Format** ipv6 ospf mtu-ignore

no ipv6 ospf mtu-ignore

**Default** Enable

**Mode** Interface Config

### 8.4.2.9. *Ipv6 ospf network*

This command changes the default OSPF network type for the interface. Normally, the network type is determined from the physical IP network type. By default all Ethernet networks are OSPF type broadcast. Similarly, tunnel interfaces default to point-to-point. When an Ethernet port is used as a single large bandwidth IP network between two routers, the network type can be point-to-point since there are only two routers. Using point-to-point as the network type eliminates the overhead of the OSPF designated router election. It is normally not useful to set a tunnel to OSPF network type broadcast.

To set the interface type to the default value, use the no form of this command.

**Format** ipv6 ospf network {broadcast | point-to-point}

no ipv6 ospf network {broadcast | point-to-point}

**Default** Broadcast

**Mode** Interface Config

### 8.4.2.10. *Ipv6 ospf prefix-suppression*

This command suppresses the advertisement of the IPv6 prefixs that are associated with an interface, except for those associated with secondary IPv6 addresses. This command takes precedence over the global configuration. If this configuration is not specified, the global prefix-suppression configuration applies.

To remove prefix-suppression configurations for the specified interface, use the no form of this command. When this no command is issued, global prefix-suppression applies to the interface.

**Format** ipv6 ospf prefix-suppression [disable]

no ipv6 ospf prefix-suppression

| Fields | Definition |
|---|---|
| **Disable** | This is for excluding specified interfaces from performing prefix-suppression when the feature is enabled globally. |

**Default** None

**Mode** Interface Config

### 8.4.2.11. *Ipv6 ospf priority*

This command sets the OSPF priority for the specified router interface. The priority of the interface is a priority integer from 0 to 255. A value of 0 indicates that the router is not eligible to become the designated router on this network.

To set the default OSPF priority for the specified router interface, use the no form of this command.

**Format** ipv6 ospf priority <0-255>

no ipv6 ospf priority

**Default** 1, which is the highest router priority

**Mode** Interface Config

### 8.4.2.12. *Ipv6 ospf retransmit-interval*

This command sets the OSPF retransmit Interval for the specified interface. The retransmit interval is specified in seconds. The value for <seconds> is the number of seconds between link-state advertisement retransmissions for adjacencies belonging to this router interface. This value is also used when retransmitting database description and link-state request packets.

To set the default OSPF retransmit Interval for the specified interface, use the no form of this command.

Format ipv6 ospf retransmit-interval <seconds>

no ipv6 ospf retransmit-interval

| Fields | Definition |
|---|---|
| **<seconds>** | Valid value ranges from 0 to 3600 (1 hour). |

**Default** 5

**Mode** Interface Config

### 8.4.2.13. *Ipv6 ospf transmit-delay*

This command sets the OSPF Transit Delay for the specified interface. The transmit delay is specified in seconds. In addition, it sets the estimated number of seconds it takes to transmit a link state update packet over this interface.

To set the default OSPF Transit Delay for the specified interface, use the no form of this command.

**Format** ipv6 ospf transmit-delay <seconds>

no ipv6 ospf transmit-delay

| Fields | Definition |
|---|---|
| **<seconds>** | Valid value ranges from 1 to 3600 (1 hour). |

**Default** 1

**Mode** Interface Config

### 8.4.2.14. *Ipv6 router ospf*

Use this command to enter Router OSPFv3 Config mode.

**Format** ipv6 router ospf

**Default** None

**Mode** Global Config

### 8.4.2.15. *Area default-cost*

This command configures the monetary default cost for the stub area. The operator must specify the area id and an integer value between 1-16777214.

**Format** area <areaid> default-cost <1-16777214>

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.16. *Area nssa*

This command configures the specified areaid to function as an NSSA.

To disable nssa from the specified area id, use the no form of this command.

**Format** area <areaid> nssa

no area <areaid> nssa

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.17. *Area nssa default-info-ogiginate*

This command configures the metric value and type for the default route advertised into the NSSA. The optional metric parameter specifies the metric of the default route and is to be in a range of 1-16777214. If no metric is specified, the default value is 10. The metric type can be comparable (nssa-external 1) or non-comparable (nssa-external 2).

To disable the default route advertised into the NSSA, use the no form of this command.

**Format** area <areaid> nssa default-info-originate [<1-16777214>] [{comparable | non-comparable}]

no area <areaid> nssa default-info-originate [<1-16777214>] [{comparable | non-comparable}]

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<1-16777214>** | The metric of the default route. The range is 1 to 16777214. |
| **comparable** | Specify the metric type as NSSA-External 1. |
| **non-comparable** | Specify the metric type as NSSA-External 2. |

**Default** Disable

**Mode** Router OSPFv3 Config

### 8.4.2.18. *Area nssa no-redistribute*

This command configures the NSSA ABR so that learned external routes will not be redistributed to the NSSA.

To disable the NSSA ABR so that learned external routes are redistributed to the NSSA, use the no form of this command.

**Format** area <areaid> nssa no-redistribute

no area <areaid> nssa no-redistribute

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |

**Default** Disable

**Mode** Router OSPFv3 Config

### 8.4.2.19. *Area nssa no-summry*

This command configures the NSSA so that summary LSAs are not advertised into the NSSA.

To disable the NSSA from the summary LSAs, use the no form of this command.

**Format** area <areaid> nssa no-summary

no area <areaid> nssa no-summary

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.20. *Area nssa translator-role*

This command configures the translator role of the NSSA. A value of *always* causes the router to assume the role of the translator the instant it becomes a border router and a value of *candidate* causes the router to participate in the translator election process when it attains border router status.

To disable the NSSA translator role from the specified area id, use the no form of this command.

Format area <areaid> nssa translator-role {always | candidate}

no area <areaid> nssa translator-role

| Fields | Definition |
|---|---|

| | |
|---|---|
| **<areaid>** | Area ID. |
| **always** | A value of *always* will cause the router to assume the role of the translator when it becomes a border router. |
| **Candidate** | A value of *candidate* will cause the router to participate in the translator election process when it attains border router status. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.21. *Area nssa translator-stab-intv*

This command configures the translator stability interval of the NSSA. The <stabilityinterval> is the period of time that an elected translator continues to perform its duties after it determines that its translator status has been deposed by another router.

To disable the NSSA translator stability interval from the specified area id, use the no form of this command.

**Format** area <areaid> nssa translator-stab-intv <0-3600>

no area <areaid> nssa translator-stab-intv

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<0-3600>** | The range is 0 to 3600. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.22. *Area range*

This command creates a specified area range for a specified NSSA. The **<ipv6-prefix>** is a valid IPv6 address. The **<prefix-length>** is a valid subnet mask. The LSDB type must be specified by either summarylink or nssaexternallink, and the advertising of the area range can be allowed or suppressed.

To delete a specified area range, use the no form of this command.

**Format** area <areaid> range <ipv6-prefix>/<prefix-length> {summarylink | nssaexternallink} [advertise | not-advertise]

no area <areaid> range <ipv6-prefix>/<prefix-length> {summarylink | nssaexternallink}

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<ipv6-prefix>** | IPv6 Address. |
| **<prefix-length>** | The subnetmask of the IPv6 address. |
| **summarylink** | When this keyword is given, the area range is used when summarizing prefixes advertised in type 3 summary LSAs. |
| **nssaexternallink** | When this keyword is given, the area range is used when translating type 7 LSAs to type 5 LSAs. |
| **advertise** | Allow advertising the specified area range. When this option is specified, the summary link is advertised when the area range is active. This is default. |
| **not-advertise** | Disallow advertising the specified area range. When this option is specified, neither the summary prefix nor the contained prefixes are advertised when the area range is active. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.23. *Area stub*

This command creates a stub area for the specified area ID. A stub area is characterized by the fact that AS External LSAs are not propagated into the area. Removing AS External LSAs and Summary LSAs can significantly reduce the link state database of routers within the stub area.

To delete a stub area for the specified area ID, use the no form of this command.

**Format** area <areaid> stub

no area <areaid> stub

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.24. *Area stub no-summary*

This command disables the import of Summary LSAs for the stub area identified by the specified area ID.

To sets the Summary LSA import mode to the default for the stub area identified by the specified area ID, use the no form of this command.

**Format** area <areaid> stub no-summary

no area <areaid> stub no-summary

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |

**Default** Enable

**Mode** Router OSPFv3 Config

### 8.4.2.25. *Area virtual-link*

This command creates the OSPF virtual interface for the specified <areaid> and <neighbor>. The <neighborid> parameter is the Router ID of the neighbor.

To delete the OSPF virtual interface from the given interface identified by **<areaid>** and **<neighborid>**, use the no form of this command.

**Format** area <areaid> virtual-link <neighborid>

no area <areaid> virtual-link <neighborid>

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<neighborid>** | Router ID of the neighbor. |

**Default** The default authentication type is none

**Mode** Router OSPFv3 Config

### 8.4.2.26. *Area virtual-link dead-interval*

This command configures the dead interval for the OSPF virtual interface on the virtual interface identified by **<areaid>** and **<neighborid>**.

To configures the default dead interval for the OSPF virtual interface on the virtual interface identified by **<areaid>** and **<neighbor>**, use the no form of this command.

**Format** area <areaid> virtual-link <neighborid> dead-interval <1-65535>

no area <areaid> virtual-link <neighborid> dead-interval

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<neighborid>** | Router ID of the neighbor. |
| **<1-65535>** | The range of the dead interval is 1 to 65535, in seconds. |

**Default** 40 seconds

**Mode** Router OSPFv3 Config

### 8.4.2.27. *Area virtual-link hello-interval*

This command configures the hello interval for the OSPF virtual interface on the interface identified by **<areaid>** and **<neighborid>**.

To configures the default hello interval for the OSPF virtual interface on the virtual interface identified by **<areaid>** and **<neighbor>**, use the no form of this command.

**Format** area <areaid> virtual-link <neighborid> hello-interval <1-65535>

no area <areaid> virtual-link <neighborid> hello-interval

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<neighborid>** | Router ID of the neighbor. |
| **<1-65535>** | The range of the dead interval is 1 to 65535, in seconds. |

**Default** 10 seconds

**Mode** Router OSPFv3 Config

### 8.4.2.28. *Area virtual-link retransmit-interval*

This command configures the retransmit interval for the OSPF virtual interface on the interface identified by **<areaid>** and **<neighborid>**.

To configures the default retransmit interval for the OSPF virtual interface on the virtual interface identified by **<areaid>** and **<neighbor>**, use the no form of this command.

**Format** area <areaid> virtual-link <neighborid> retransmit-interval <0-3600>

no area <areaid> virtual-link <neighborid> retransmit-interval

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<neighborid>** | Router ID of the neighbor. |
| **<0-3600>** | The range of the retransmit interval is 0 to 3600, in seconds. |

**Default** 5 seconds

**Mode** Router OSPFv3 Config

### 8.4.2.29. *Area virtual-link transmit-delay*

This command configures the transmit delay for the OSPF virtual interface on the virtual interface identified by **<areaid>** and **<neighborid>**.

To configures the default transmit delay for the OSPF virtual interface on the virtual interface identified by **<areaid>** and **<neighbor>**, use the no form of this command.

**Format** area <areaid> virtual-link <neighborid> transmit-delay <0-3600>

no area <areaid> virtual-link <neighborid> transmit-delay

| Fields | Definition |
|---|---|
| **<areaid>** | Area ID. |
| **<neighborid>** | Router ID of the neighbor. |
| **<0-3600>** | The range of the retransmit interval is 0 to 3600, in seconds. |

**Default** 1 seconds

**Mode** Router OSPFv3 Config

### 8.4.2.30. *Auto-cost*

By default, OSPF computes the link cost of each interface from the interface bandwidth. Faster links have lower metrics, making them more attractive in route selection. The configuration parameters in the *auto-cost reference bandwidth* and *bandwidth* commands give you control over the default link cost. You can configure for OSPF an interface bandwidth that is independent of the actual link speed. A second configuration parameter allows you to control the ratio of interface bandwidth to link cost. The link cost is computed as the ratio of a reference bandwidth to the interface bandwidth (ref_bw /interface bandwidth), where interface bandwidth is defined by the *bandwidth* command. Because the default reference bandwidth is 100 Mbps, OSPF uses the same default link cost for all interfaces whose bandwidth is 100 Mbps or greater. Use the *auto-cost* command to change the reference bandwidth, specifying the reference bandwidth in megabits per second (Mbps). The reference bandwidth range is 1–4294967 Mbps. The different reference bandwidth can be independently configured for OSPFv2 and OSPFv3.

To set the reference bandwidth to the default value, use the no form of this command.

**Format** auto-cost reference-bandwidth <1-4294967>

no auto-cost reference-bandwidth

| Fields | Definition |
|---|---|
| **<1-4294967>** | The range of reference bandwidth. |

**Default** 100Mbps

**Mode** Router OSPFv3 Config

### 8.4.2.31. *Bfd*

This command configures BFD for all interfaces.

To reset BFD for interfaces to default, use the no form of this command.

**Format** bfd

no bfd

**Default** Disable

**Mode** Router OSPFv3 Config

### 8.4.2.32. *default-information originate*

This command is used to control the advertisement of default routes.

To configure the default advertisement of default routes, use the no form of this command.

**Format** default-information originate [always] [metric <1-16777214>] [metric-type {1 | 2}]

no default-information originate

| Fields | Definition |
|---|---|
| **[always]** | Specify this option to roginate default route without depending on wheterh routing table has a default route. |
| **metric** | The range of the metric is 1 to 16777214. |
| **metric type** | The value of metric type is type 1 or type 2. |

**Default** Metric: unspecified

Type: 2

**Mode** Router OSPFv3 Config

### 8.4.2.33. *default-metric*

This command is used to set a default for the metric of distributed routes.

To set a default for the metric of distributed routes, use the no form of this command.

**Format** default-metric <1-16777214>

no default-metric

| Fields | Definition |
|---|---|
| **<1-16777214>** | The range of default metric is 1 to 16777214. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.34. *distance ospf*

This command sets the route preference value of OSPF in the router. Lower route preference values are preferred when determining the best route. The type of OSPF can be intra, inter, or external. All the external type routes are given the same preference value. The <preference> range is 1 to 255. A route with a preference of 255 cannot be used to forward traffic.

To set the default route preference value of OSPF in the router, use the no form of this command.

**Format** distance ospf {intra-area <1-255> | inter-area <1-255> | external <1-255>}

no distance ospf {intra-area | inter-area | external }

| Fields | Definition |
|---|---|
| **<1-255>** | The range of preference value. |

**Default** 110

**Mode** Router OSPFv3 Config

## 8.4.2.35. *enable*

This command resets the default administrative mode of OSPF in the router (active).

To set the administrative mode of OSPF in the router to inactive, use the no form of this command.

**Format** enable

no enable

**Default** Enable

**Mode** Router OSPFv3 Config

## 8.4.2.36. *exit-overflow-interval*

This command configures the exit overflow interval for OSPF. It describes the number of seconds after entering Overflow state that a router will wait before attempting to leave the Overflow State. This allows the router to again originate non-default AS-external-LSAs. When set to 0, the router will not leave Overflow State until restarted.

To configure the default exit overflow interval for OSPF, use the no form of this command.

**Format** exit-overflow-interval <0-2147483647>

no exit-overflow-interval

| Fields | Definition |
|---|---|
| **<0-2147483647>** | The range of exit overflow interval for OSPF, in seconds. |

**Default** 0

**Mode** Router OSPFv3 Config

### 8.4.2.37. *external-isdb-limit*

This command configures the external LSDB limit for OSPF. If the value is -1, then there is no limit. When the number of non-default AS-external-LSAs in a router's link-state database reaches the external LSDB limit, the router enters overflow state. The router never holds more than the external LSDB limit non-default AS-external-LSAs in its database. The external LSDB limit MUST be set identically in all routers attached to the OSPF backbone and/or any regular OSPF area.

To configure the default external LSDB limit for OSPF, use the no form of this command.

**Format** external-lsdb-limit <-1-2147483647>

no external-lsdb-limit

| Fields | Definition |
|---|---|
| **<0-2147483647>** | The range of external LSDB limit for OSPF is -1 to 2147483647. |

**Default** -1

**Mode** Router OSPFv3 Config

### 8.4.2.38. *max-metric*

This command sets the number of paths that OSPF can report for a given destination where <maxpaths> is platform dependent.

To disable stub router mode, use the no form of this command. The command clears either type of stub router mode (always or on-startup) and resets all LSA options.

**Format** max-metric router-lsa [on-startup <5-86400>] [summary-lsa [<1-16777215>]] [external-lsa [<1-16777215>]] [inter-area-lsas <1-16777215>]]

no max-metric router-lsa [on-startup] [summary-lsa] [external-lsa] [inter-area-lsas]

| Fields | Definition |
|---|---|
| **on-startup** | OSPF starts in stub router mode after a reboot. |
| **<5-86400>** | The number of seconds that OSPF remains in stub router mode after a reboot. The range is from 5 to 86,400 seconds. There is no default value. |
| **summary-lsa** | Set the maximum metric value for summary LSAs. |
| **external-lsa** | Set the maximum metric value for external LSAs. |
| **Inter-area-lsas** | Set the maximum metric value for inter-area LSAs. |

**Default** OSPF is not in stub router mode by default

**Mode** Router OSPFv3 Config

### 8.4.2.39. *maximum-paths*

This command sets the number of paths that OSPF can report for a given destination where <maxpaths> is platform dependent.

To resets the number of paths that OSPF can report for a given destination back to its default value, use the no form of this command.

**Format** maximum-paths <1-48>

no maximum-paths

| Fields | Definition |
|---|---|
| **<1-48>** | The maximum number of paths that OSPF can report for a given destination. The range of the value is 1 to 48. |

**Default** 1

**Mode** Router OSPFv3 Config

### 8.4.2.40. *passive-interface default*

Use this command to enable global passive mode by default for all interfaces. It overrides any interface level passive mode.OSPF shall not form adjacencies over a passive interface.

To disable the global passive mode by default for all interfaces, use the no form of this command. Any interface previously configured to be passive reverts to non-passive mode.

**Format** passive-interface default

no passive-interface default

**Default** Disable

**Mode** Router OSPFv3 Config

### 8.4.2.41. *passive-interface*

Use this command to set the interface or tunnel as passive. It overrides the global passive mode that is currently effective on the interface or tunnel.

To set the interface or tunnel as non-passive, use the no form of this command. It overrides the global passive mode that is currently effective on the interface or tunnel.

**Format** passive-interface {< slot/port> | tunnel <tunnel-id> | vlan <vlan-id>}

no passive-interface {< slot/port> | tunnel <tunnel-id> | vlan <vlan-id>}

| Fields | Definition |
|---|---|
| **<slot/port>** | Specify the interface. |
| **<tunnel-id >** | Specify the Tunnel ID. Range 0 -7. |
| **<vlan-id>** | Specifies the VLAN interface. The range of the VLAN ID is 1 to 4093. |

**Default** Disable

**Mode** Router OSPFv3 Config

## 8.4.2.42. *prefix-suppression*

This command enables the global prefix suppression for OSPFv3.

To disable the global prefix suppression for OSPFv3, use the no form of this command.

**Format** prefix-suppression

**Default** Disable

**Mode** Router OSPFv3 Config

## 8.4.2.43. *redistribute*

This command configures the OSPFv3 protocol to allow redistribution of routes from the specified source protocol/routers.

To configure OSPF to prohibit redistribution of routes from the specified soure protocol/rotuers, use the no form of this command.

**Format** redistribute {static | connected | bgp} [metric <0-16777214>] [metric-type {1 | 2}] [tag <0-4294967295>]

no redistribute { static | connected | bgp} [metric] [metric-type] [tag]

| Fields | Definition |
|---|---|

| | |
|---|---|
| **<0-16777214>** | The range of metric is 0 to 16777214. |
| **<0-4294967295>** | The range of tag is 0 to 4294967295. |

**Default** Metric is unspecified
Type is 2
Tag is 0

**Mode** Router OSPFv3 Config

### 8.4.2.44. *router-id*

This command sets a 4-digit dotted-decimal number uniquely identifying the router ospf id.

**Format** router-id <ipaddress>

| Fields | Definition |
|---|---|
| **<ipaddress>** | IP Address. |

**Default** None

**Mode** Router OSPFv3 Config

### 8.4.2.45. *clear ipv6 ospf*

This command disable and reenable OSPF.

**Format** clear ipv6 ospf

**Default** None

**Mode** Privileged Exec

### 8.4.2.46. *clear ipv6 ospf configuration*

This command resets the OSPF configuration to factory defaults.

**Format** clear ipv6 ospf configuration

**Default** None

**Mode** Privileged Exec

### 8.4.2.47. *clear ipv6 ospf counters*

This command reset global and interface statistics.

**Format** clear ipv6 ospf counters

**Default** None

**Mode** Privileged Exec

### 8.4.2.48. *clear ipv6 ospf neighbor*

This command drops the adjacency with all OSPF neighbors. On each neighbor's interface, send a oneway hello. Adjacencies may then be established. To drop all adjacencies with a specific router ID, specify the neighbor's Router ID using the optional parameter <ipaddr>

**Format** clear ipv6 ospf neighbor [<ipaddr>]

| Fields | Definition |
|---|---|
| **<ipaddr>** | Neighbor's Router ID. |

**Default** None

**Mode** Privileged Exec

### 8.4.2.49. *clear ipv6 ospf neighbor interface*

This command drops the adjacency with all OSPF neighbors on a specific interface. To drop adjacency with a specific router ID on a specific interface, specify the neighbor's Router ID using the optional parameter <ipaddr>

**Format** clear ipv6 ospf neighbor interface {<slot/port> | vlan <1-4093>} [ipaddr]

| Fields | Definition |
|---|---|
| **<slot/port>** | Specify the interface. |

| | |
|---|---|
| **<1-4093>** | Specifies the VLAN interface. The range of the VLAN ID is 1 to 4093. |
| **<ipaddr>** | Neighbor's Router ID. |

**Default** None

**Mode** Privileged Exec

### 8.4.2.50. *clear ipv6 ospf redistribution*

This command flushes all self-originated external LSAs. Reapply the redistribution configuration and reoriginate prefixes as necessary.

**Format** clear ipv6 ospf redistribution

**Default** None

**Mode** Privileged Exec

### 8.4.2.51. *clear ipv6 ospf stub-router*

This command forces OSPF to exit stub router mode when it has automatically entered stub router mode because of a resource limitation. OSPF only exits stub router mode if it entered stub router mode because of a resource limitation or if it is in stub router mode at startup. This command has no effect if OSPF is configured to be in stub router mode permanently.

**Format** clear ipv6 ospf stub-router

**Default** None

**Mode** Privileged Exec

# 8.5. Routing Policy Commands

## 8.5.1. Show commands

### 8.5.1.1. *Show ipv6 prefix-list*

This command displays configuration and status for a selected prefix list.

**Format** show ipv6 prefix-list [detail | summary] listname [ipv6-prefix/prefix-length] [seq sequencenumber] [longer] [first-match]

**Default** None

**Mode** Privileged Exec

**Display Message**

| Fields | Definition |
|---|---|
| **detail \| summary** | (Optional) Displays detailed or summarized information about all prefix lists. |
| **listname** | (Optional) The name of a specific prefix list. |
| **ipv6-prefix/prefixlength** | (Optional) The network number and length (in bits) of the network mask. |
| **seq** | (Optional) Applies the sequence number to the prefix list entry. |
| **sequence-number** | (Optional) The sequence number of the prefix list entry. |
| **Longer** | (Optional) Displays all entries of a prefix list that are more specific than the given network/length. |
| **first-match** | (Optional) Displays the entry of a prefix list that matches the given network/length. |

The command outputs the following information:

| Fields | Definition |
|---|---|
| **count** | Mumber of entries in the prefix list. |
| **range entries** | Mumber of entries that match the input range. |
| **ref count** | Mumber of entries referencing the given prefix list. |

| | |
|---|---|
| **seq** | Sequence number of the entry in the list. |
| **permit/deny** | The action to take. |
| **sequences** | Range of sequence numbers for the entries in the list. |
| **hit count** | Number of matches for the prefix entry. |

## 8.5.2. Configuration commands

### 8.5.2.1. *Ipv6 prefix-list*

Use this command to create a IPv6 prefix list or add a prefix list entry. An IPv6 prefix list can contain only ipv6 addresses. Prefix lists allow matching of route prefixes with those specified in the prefix list. Each prefix list includes of a sequence of prefix list entries ordered by their sequence numbers. A router sequentially examines each prefix list entry to determine if the route's prefix matches that of the entry. For IPv6 routes, only IPv6 prefix lists are matched. An empty or nonexistent prefix list permits all prefixes. An implicit deny is assumed if a given prefix does not match any entries of a prefix list. Once a match or deny occurs the router does not go through the rest of the list.

An IPv6 prefix list may be used within a route map to match a route's prefix using the match ipv6 address command. A route map may contain both IPv4 and IPv4 prefix lists. If a route being matched is an IPv6 route, only the IPv6 prefix lists are matched.

Up to 128 prefix lists may be configured. The maximum number of statements allowed in prefix list is 64. These numbers indicate only IPv6 prefix lists. IPv4 prefix lists may be configured in appropriate numbers independently.

To delete either the entire prefix list or an individual statement from a prefix list, use the **no** form of this command. The description must be removed using the no ip prefix-list description before using this command to delete an IPv6 Prefix List. To remove an individual statement from a prefix list, you must specify the statement exactly, with all its options.

**Format** ipv6 prefix-list <list-name> [seq seq-number] {{permit/deny} ipv6-prefix/prefix-length [ge ge-value] [le le-value] | description text | renumber renumber-interval first-statement-number}

no ipv6 prefix-list <list-name> [seq seq-number] {{permit/deny} ipv6-prefix/prefix-length [ge ge-value] [le le-value]}

**Default** No prefix lists are configured by default. When neither the **ge** nor the **le** option is configured, the destination prefix must match the network/length exactly. If the **ge** option is configured without the **le** option, any prefix with a network mask greater than or equal to the **ge** value is considered a match. Similarly, if the **le** option is configured without the **ge** option, a prefix with a network mask less than or equal to the **le** value is considered a match

**Mode** Global Config

**Display Messages**

| Fields | Definition |
|---|---|
| **list-name** | The text name of the prefix list. Up to 32 characters. |
| **seq number** | (Optional) The sequence number for this prefix list statement. Prefix list statements are ordered from lowest sequence number to highest and applied in that order. If you do not specify a sequence number, the system will automatically select a sequence number five larger than the last sequence number in the list. Two statements may not be configured with the same sequence number. The value ranges from 1 to 4,294,967,294. |
| **permit** | Permit routes whose destination prefix matches the statement. |
| **deny** | Deny routes whose destination prefix matches the statement. |
| **ipv6-prefix/prefix-length** | Specifies the match criteria for routes being compared to the prefix list statement. The ipv6-prefix can be any valid IPv6 prefix where the address is specified in hexadecimal using 16-bit values between colons. The prefix-length is the The length of the IPv6 prefix, given as a decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the decimal value. |
| **ge length** | (Optional) If this option is configured, specifies a prefix length greater than or equal to the ipv6-prefix/prefix-length. It is the lowest value of a range of the length. |
| **le length** | (Optional) If this option is configured, specifies a prefix length less than or equal to the ipv6-prefix/prefix-length. It is the highest value of a range of the length. |
| **description** | A description of the prefix list. It can be up to 80 characters in length.. |
| **renumber** | (Optional) Provides the option to renumber the sequence numbers of the IPv6 prefix list statements with a given interval starting from a particular sequence number. The valid range for renumber-interval is 1 - 100, and the valid range for first-statement-number is 1 - 1000. |

### 8.5.2.2. *match ipv6 address*

Use this command to configure a route map to match based on a destination prefix. *prefix-list prefix-listname* identifies the name of an IPv6 prefix list used to identify the set of matching routes. Up to eight prefix lists may be specified. If multiple prefix lists are specified, a match occurs if a prefix matches any one of the prefix lists. If you configure a match ipv6 address statement within a route map section that already has a match ipv6 address statement, the new prefix lists are added to the existing set of prefix lists, and a match occurs if any prefix list in the combined set matches the prefix.

To delete a match statement from a route map, use the **no** form of this command.

**Format** match ipv6 address prefix-list <list-name> [list-name...]

no match ipv6 address prefix-list <list-name> [list-name...]

**Default** No match criteria are defined by default

**Mode** Route Map Config

**Display Messages**

| Fields | Definition |
|---|---|
| **list-name** | The name of a prefix list used to identify the set of matching routes. Up to eight prefix lists may be specified. |

### 8.5.2.3. *set ipv6 next-hop (BGP)*

To set the IPv6 next hop of a route, use the *set ipv6 next-hop* command in Route Map Configuration mode. When used in a route map applied to UPDATE messages received from a neighbor, the command sets the next hop address for matching IPv6 routes received from the neighbor.

When used in a route map applied to UPDATE messages sent to a neighbor, the command sets the next hop address for matching IPv6 routes sent to the neighbor. If the address is a link local address, the address is assumed to be on the interface where the UPDATE is sent or received. If the command specifies a global IPv6 address, the address is not required to be on a local subnet.

To remove a set command from a route map, use the **no** form of this command.

**Format** set ipv6 next-hop <next-hop-ipv6-address>

no set ipv6 next-hop

**Default** None

**Mode** Route Map Config

**Display Messages**

| Fields | Definition |
|---|---|
| **next-hop-ipv6-address** | The IPv6 address set as the Network Address of Next Hop field in the MP_NLRI attribute of an UPDATE message. |

### 8.5.2.4. *clear ipv6 prefix-list*

Use this command to reset and clear IPv6 prefix-list hit counters. The hit count is a value indicating the number of matches to a specific prefix list entry.

**Format** clear ipv6 prefix-list [list-name] [ipv6-prefix/prefix-length]

**Mode** Privileged Exec

**Display Messages**

| Fields | Definition |
|---|---|
| **list-name** | (Optional) Name of the prefix list from which the hit count is to be cleared. |
| **ipv6-prefix/prefixlength** | (Optional) IPv6 prefix number and length (in bits) of the network mask. If this option is specified, hit counters are only cleared for the matching statement. |

# 8.6. DHCPv6 Snooping Commands

DHCPv6 snooping is a security feature that monitors DHCPv6 messages between a DHCPv6 client and DHCPv6 servers to filter harmful DHCPv6 messages and to build a bindings database of {MAC address, IPv6 address, VLAN ID, port} tuples that are considered authorized. You can enable DHCPv6 snooping globally and on specific VLANs, and configure ports within the VLAN to be trusted or untrusted. DHCPv6 servers must be reached through trusted ports.

DHCPv6 snooping enforces the following security rules:

DHCPv6 packets from a DHCPv6 server (Advertise and Reply) are dropped if received on an untrusted port.

DHCPv6 Release and DHCPv6 Decline messages are dropped if for a MAC address in the snooping database, but the binding's interface is other than the interface where the message was received.

DHCPv6 Snooping doesn't support DHCPv6 relay function, and other behaviors are same DHCP Snooping, please refers to Chapter 5.18 DHCP Snooping Commands for more details.

## 8.6.1. Show ipv6 dhcp snooping

This command displays the DHCPv6 snooping global configurations and summaries of port configurations.

**Format** show ipv6 dhcp snooping

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ipv6 dhcp snooping

DHCP snooping is Enabled
DHCP snooping source MAC verification is enabled
DHCP snooping is enabled on the following VLANs:

1

```
 Interface    Trusted     Log Invalid Pkts
-----------  ----------   ----------------
0/1          Yes          No
0/2          No           No
0/3          No           No
0/4          No           No
0/5          No           No
0/6          No           No
0/7          No           No
0/8          No           No
0/9          No           No
0/10         No           No
0/11         No           No
0/12         No           No
0/13         No           No
0/14         No           No
0/15         No           No

(QCT) #
```

## 8.6.2. Show ipv6 dhcp snooping per interface

This command displays the DHCPv6 snooping detail configurations for all interfaces or for a specific interface.

**Format** show ipv6 dhcp snooping interfaces [<slot/port> | port-channel <portchannel-id>]

**Default** None

**Mode** Privileged Exec

Example:

```
(QCT) #show ipv6 dhcp snooping interfaces

Interface     Trust State     Rate Limit      Burst Interval
                                (pps)           (seconds)
----------    -------------   -------------   ---------------
```

| | | | |
|---|---|---|---|
| 0/1 | Yes | None | N/A |
| 0/2 | No | None | N/A |
| 0/3 | No | None | N/A |
| 0/4 | No | None | N/A |
| 0/5 | No | None | N/A |
| 0/6 | No | None | N/A |
| 0/7 | No | None | N/A |
| 0/8 | No | None | N/A |
| 0/9 | No | None | N/A |
| 0/10 | No | None | N/A |
| 0/11 | No | None | N/A |
| 0/12 | No | None | N/A |
| 0/13 | No | None | N/A |
| 0/14 | No | None | N/A |
| 0/15 | No | None | N/A |
| 0/16 | No | None | N/A |
| 0/17 | No | None | N/A |
| 0/18 | No | None | N/A |
| 0/19 | No | None | N/A |

(QCT) #

## 8.6.3. Show ipv6 dhcp snooping binding

This command displays the DHCP Snooping binding entries.

The parameter “static” means to restrict the output based on static entries which are added by user manually.

The parameter “static” means to restrict the output based on dynamic entries which are added by DHCPv6 Snooping automatically

**Format** show ipv6 dhcp snooping binding [{static | dynamic}] [interface {<slot/port> | port-channel <portchannel-id>}] [vlan <vlan-id>]

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ipv6 dhcp snooping binding

Total number of bindings: 363

Total number of Tentative bindings: 61

| MAC Address | IPv6 Address | VLAN | Interface | Type | Lease (Secs) |
|---|---|---|---|---|---|
| 44:0A:A7:8A:00:00 | 2001::100 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:01 | 2001::101 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:02 | 2001::102 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:03 | 2001::103 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:04 | 2001::104 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:00:05 | 2001::105 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:00 | 2001::106 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:01 | 2001::107 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:02 | 2001::108 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:03 | 2001::109 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:04 | 2001::111 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:01:05 | 2001::112 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:02:00 | 2001::113 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:02:01 | 2001::114 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:02:02 | 2001::115 | 1 | 0/10 | DYNAMIC | 86383 |
| 44:0A:A7:8A:02:03 | 2001::116 | 1 | 0/10 | DYNAMIC | 86383 |

(QCT) #

## 8.6.4. Show ipv6 dhcp snooping database

This command displays the DHCPv6 Snooping configuration related to the database persistency.

**Format** show ipv6 dhcp snooping database

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ipv6 dhcp snooping database

agent url: local

write-delay: 300

(QCT) #

## 8.6.5. Ipv6 dhcp snooping

This command enables or disables the DHCPv6 Snooping globally.

**Format** [no] ipv6 dhcp snooping

**Default** Disabled

**Mode** Global Config

## 8.6.6. Ipv6 dhcp snooping vlan

This command enables or disables the DHCPv6 Snooping to the specific VLAN.

**Format** [no] ipv6 dhcp snooping vlan <vlan-list>

**Default** Disabled

**Mode** Global Config

## 8.6.7. Ipv6 dhcp snooping verify mac-address

This command enables or disables the verification of the source MAC address with the client hardware address in the received DHCPv6 message.

**Format** [no] ipv6 dhcp snooping verify mac-address

**Default** Disabled

**Mode** Global Config

## 8.6.8. Ipv6 dhcp snooping database

This command configures the persistent location of the DHCPv6 Snooping database. This can be local or a remote file on a given IP machine.

The parameter “local” means to set database access inside device.

The parameter “tftp://hostIP/filename” means to set database access on remote TFTP Server.

**Format** ipv6 dhcp snooping database {local | <url>}

**Default** local

**Mode** Global Config

## 8.6.9. Ipv6 dhcp snooping database write-delay

This command configures the interval in seconds at which the DHCPv6 Snooping database will be persisted, and this database stores the results of DHCPv6 snooping bindings. Use keyword “no” to restore the default value of this command.

The parameter “<interval>” value ranges is from 15 to 86400 seconds.

**Format** ipv6 dhcp snooping database write-delay <interval>

no ipv6 dhcp snooping database write-delay

**Default** 300

**Mode** Global Config

## 8.6.10. Ipv6 dhcp snooping binding

This command configures the static DHCPv6 Snooping binding which binds a MAC address to assigned IPv6 address on a specific VLAN ID and interface. Use keyword “no” to remove an existing entry of DHCPv6 Snooping binding.

**Format** ipv6 dhcp snooping binding <mac-address> vlan <vlan id> <ipv6 address> interface {<slot/port> | port-channel < portchannel-id>}

no ipv6 dhcp snooping binding <mac-address>

**Default** None

**Mode** Global Config

Example: To add a static entry of DHCPv6 snooping binding which binds MAC address 00:11:22:33:44:55 to IPv6 address 2001::1 on vlan 1 and port interface 0/1.

```
(QCT) #configure
(QCT) (Config)#ipv6 dhcp snooping binding 00:11:22:33:44:55 vlan 1 2001::1 interface 0/1
```

(QCT) (Config)#

## 8.6.11. Ipv6 dhcp snooping limit

This command controls the rate at which the DHCPv6 Snooping messages come. If packet rate exceeds limitation over burst interval, the assigned port will shut down automatically. User could use interface command “shutdown” and then “no shutdown” to recover it. Use keyword “no” to restore the default value of this command.

The parameter “rate” means to the limitation of packet rate. Its range is from 0 to 300 packets per second.

The parameter “burst interval” means the time interval of packet burst could be over rate limitation. Its range is from 1 to 15 seconds.

**Format** ipv6 dhcp snooping limit {rate <pps> [burst interval <seconds>]} | none

no ipv6 dhcp snooping limit rate

**Default** “rate” is None

“burst interval” is 1 second.

**Mode** Interface Config

Example: While the packet rate of DHCPv6 message received from port 0/1 exceeds 100 pps and consecutive time interval is over 10 seconds, the port 0/1 will be shutdown automatically.

(QCT) #configure

(QCT) (Config)#interface 0/1

(QCT) (Interface 0/1)# ipv6 dhcp snooping limit rate 100 burst interval 10

(QCT) (Interface 0/1)#

## 8.6.12. Ipv6 dhcp snooping log-invalid

This command controls logging the illegal DHCPv6 messages to logging buffer.

**Format** [no] ipv6 dhcp snooping log-invalid

**Default** Disabled

**Mode** Interface Config

## 8.6.13. Ipv6 dhcp snooping trust

This command enables or disables a port as DHCPv6 Snooping trust port.

**Format** [no] ipv6 dhcp snooping trust

**Default** Disabled

**Mode** Interface Config

### 8.6.14. Clear ipv6 dhcp snooping binding

This command is used to clear all DHCPv6 Snooping bindings on all interfaces or on a specific interface.

**Format** clear ipv6 dhcp snooping binding [interface <slot/port>]

**Default** None

**Mode** Privileged EXEC

### 8.6.15. Clear ipv6 dhcp snooping statistics

This command is used to clear all DHCPv6 Snooping statistics.

**Format** clear ipv6 dhcp snooping statistics

**Default** None

**Mode** Privileged EXEC

## 8.7. DHCPv6 Commands

### 8.7.1. Show ipv6 dhcp interface

This command displays the DHCPv6 information for the specific interface.

**Format** show ipv6 dhcp interface {<slot/port> | vlan <vlan-id>} [statistics]

**Default** None

**Mode** Privileged Exec

Example:

(QCT) #show ipv6 dhcp interface 0/1

IPv6 Interface..... 0/1
Mode..... Relay
Relay Address..... ::
Relay Interface Number..... 0/2
Relay Remote ID.....
Option Flags.....

## 8.7.2. Show ipv6 dhcp statistics

This command displays the DHCPv6 statistics for all interfaces.

**Format** show ipv6 dhcp statistics

**Default** None

**Mode** Privileged Exec

Example:

DHCPv6 Interface Global Statistics
---
DHCPv6 Solicit Packets Received..... 0
DHCPv6 Request Packets Received..... 0
DHCPv6 Confirm Packets Received..... 0
DHCPv6 Renew Packets Received..... 0
DHCPv6 Rebind Packets Received..... 0
DHCPv6 Release Packets Received..... 0
DHCPv6 Decline Packets Received..... 0
DHCPv6 Inform Packets Received..... 0
DHCPv6 Relay-forward Packets Received..... 0
DHCPv6 Relay-reply Packets Received..... 0
DHCPv6 Malformed Packets Received..... 0
Received DHCPv6 Packets Discarded..... 0
Total DHCPv6 Packets Received..... 0
DHCPv6 Advertisement Packets Transmitted..... 0
DHCPv6 Reply Packets Transmitted..... 0
DHCPv6 Reconfig Packets Transmitted..... 0
DHCPv6 Relay-reply Packets Transmitted..... 0

DHCPv6 Relay-forward Packets Transmitted..... 0

Total DHCPv6 Packets Transmitted..... 0

## 8.7.3. Ipv6 dhcp relay destination

This command configures an interface for DHCPv6 relay functionality on an interface or range of interfaces. Use the *destination* keyword to set the relay server IPv6 address. Use the *interface* keyword to set the relay server interface. Use the *remote-id* keyword to add the Relay Agent Information Option “remote ID”suboption to relayed messages. It can either be DUID plus IFID or a user-defined string.

If *relay-address* is an IPv6 global address, *relay-interface* is not required. If *relay-address* is a link-local address, *relay-interface* is required.

**Format** ipv6 dhcp relay destination <relay-address> { [interface <relay-interface>] | [remote-id {<user-defined-string> | duid-ifid}]}

| Fields | Definition |
|---|---|
| **relay-address** | IPv6 address of a DHCPv6 relay server |
| **relay-interface** | The interface to reach a relay server |
| **duid-ifid** | Specify that the remote ID is derived from the DHCPv6 server DUID and the relay interface |

**Default** None

**Mode** Interface Config

## 8.7.4. Ipv6 dhcp relay interface

This command configures the relay interface to reach a relay server. Use the *remote-id* keyword to add the Relay Agent Information Option “remote ID”suboption to relayed messages. It can either be DUID plus IFID or a user-defined string.

**Format** ipv6 dhcp relay interface <relay-interface> [remote-id {<user-defined-string> | duid-ifid}]

**Default** None

**Mode** Interface Config

# 9. Data Center Bridging Commands

## 9.1. FIP Snooping

### 9.1.1. Show fip-snooping

This command displays information about the global FIP snooping configuration and status.

**Format** show fip-snooping

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| Global Mode | FIP snooping configuration status on the switch. It displays **Enable** when FIP snooping is enabled on the switch and **Disable** when FIP snooping is disabled on the switch. |
| FCoE VLAN List | List of VLAN IDs on which FIP snooping is enabled. |
| FCFs | Number of FCFs discovered on the switch. |
| ENodes | Number of ENodes discovered on the switch. |
| Sessions | Total virtual sessions on the switch. |
| Max VLANs | Maximum number of VLANs that can be enabled for FIP snooping on the switch. |
| Max FCFs in VLAN | Maximum number of FCFs supported in a VLAN. |
| Max ENodes | Maximum number of ENodes supported in the switch. |
| Max Sessions | Maximum number of Sessions supported in the switch. |

### 9.1.2. Show fip-snooping enode

This command displays the information about the interfaces connected to ENodes.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

**Format** Show fip-snooping enode <enode-mac>

| Fields | Definition |
|---|---|
| **<enode-mac>** | MAC address of the ENode to dispaly. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | Interface to which the ENode is connected. |
| **VLAN** | ID number of the VLAN to which the ENode belongs. |
| **Name-ID** | Name of the ENode |
| **ENode-MAC** | MAC address of the ENode. |
| **FCFs** | Number of FCFs connected. |
| **Session Established** | Number of successful virtual connections established. |

The command displays the following additional information when the optional argument is supplied.

| Fields | Definition |
|---|---|
| **Sessions Waiting** | Number of virtual connections waiting for FCF acceptance. |
| **Session Failed** | Number of virtual sessions failed. |
| **Max-FCoE-PDU** | Maximum FCoE PDU size the ENode MAC intends to use for FCoE traffic. This is equivalent to the maximum Ethernet frame payload the ENode intends to send. |
| **Time elapsed** | Time elapsed since first successful login session snooped from ENode. |

## 9.1.3. Show fip-snooping sessions

This command displays information about the active FIP snooping sessions.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

**Format** show fip-snooping sessions [[[vlan <1-4093>] | [interface <slot/port>] | [fcf <fcf-mac> [enode <enode-mac>]]] [detail]]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| interface-id | ID of an interface on which FIP snooping has been enabled. |
| FCF-MAC | MAC address of the FCF that is part of the session. |
| ENode-MAC | MAC address of the ENode that is part of the session. |
| VLAN | ID number of the VLAN that contains the session. |
| FCoE MAC | Source MAC address of the FCoE packets that are originated by the ENode as part of the session. |
| FCID | Fiber channel ID number of the virtual port that was created by FCF when the ENode VN_Port did a FLOGI/NPIV/FDISC request. |

The command output format is different when the detail option is used. The information below is displayed.

| Fields | Definition |
|---|---|
| VLAN | VLAN to which the session belongs. |
| FC-MAP | FCMAP value used by the FCF. |
| FCFs | Number of FCFs discovered. |
| ENodes | Number of ENodes discovered. |
| Sessions | Total virtual sessions in FCoE VLAN. |

FCF Information:

| Fields | Definition |
|---|---|
| Interface | The interface on which the FCF is discovered. |
| MAC | MAC address of the FCF. |

| | |
|---|---|
| **ENodes** | Total number of ENodes that are connected to the FCF. |
| **Sessions** | Total number of virtual sessions accepted by FCF in the associated VLAN. |

ENode Information:

| Fields | Definition |
|---|---|
| **Interface** | The interface to which the ENode is connected. |
| **MAC** | MAC address of the ENode |
| **Sessions** | Total number of virtual sessions originated from ENodes to FCF in the associated VLAN. |
| **Waiting** | Total number of virtual connections waiting for FCF acceptance in the associated VLAN. |

Session Information:

| Fields | Definition |
|---|---|
| **FCoE-MAC** | Source MAC address of the FCoE packets that are originated by the ENode as part of the session. |
| **Request (FP, SP)** | FIP session request type sent by ENode. This can be FLOGI or FDESC (NPIV FDISC). Whereas FP and SP values are the FP bit and the SP bit values in the FLOGI or NPIV FDISC request respectively. |
| **Expiry Time** | This is virtual connection/session expiry interval. This is used to monitor the status of the session. Session entry is removed when the value reaches 0. This value is reset to 450 secs (5*90 secs) every time an associated VN_Port FKA is received from the ENode. This is ignored (marked as NA) if the D-bit is set to one in the FCF Discovery Advertisements. |
| **Mode** | This is the addressing mode in use by the VN_Port at ENode. In other words, this is the type of MAC address granted (selected and returned) by FCF. This can be one of the addressing modes, i.e. FPMA or SPMA. |
| **State** | This is the state of the virtual session. The state is displayed as **Tentative** during the process of ENode login to FCF (using FLOGI or FDESC). It displays **Active** after ENode and FCF establish a successful virtual connection. |
| **Session Time** | Time elapsed after this successful virtual session is established by ENode with FCF. The value is displayed in **xd**, **yh**, **zm** format where **x** represents number of days, **y** represents number of hours, and **z** represents minutes elapsed following this successful virtual session. This field has no useful information for waiting sessions. |

## 9.1.4. Show fip-snooping fcf

This command displays information about the interfaces connected to FCFs.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

**Format** show fip-snooping fcf [fcf-mac]

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | Interface to which the FCF is connected. |
| **VLAN** | ID number of the VLAN to which the FCF belongs. |
| **No. of ENodes** | Total number of ENodes that are connected to the FCF. |
| **FPMA/SPMA** | Type of the MAC address for ENode as negotiated by the FCF. |
| **FCMAP** | FCMAP value used by the FCF. |
| **FCF-MAC** | MAC address of the FCF. |
| **Fabric Name** | Name of the FCF. |

Below is additional information regarding the FCF that is displayed when the optional FCF MAC address argument is provided.

| Fields | Definition |
|---|---|
| **Sessions** | Total number of virtual sessions accepted by FCF in the assocated VLAN. |
| **D-bit** | This reflects the value of the D-bit provided by the most recently received Discovery Adtvertisements from the FCF. When D-bit value is zero then FIP snooping bridge verifies the periodic VN_Port FIP Keep Alive frames associated with FCF and Discovery Advertisement sent by FCF. When D-bit is set to 1, switch discards snooped VN_Port FIP Keep Alive frames associated with FCF and does not timeout the FCoE sessions established with the FCF based on FKA_VN_PERIOD*5 interval. |

| | |
|---|---|
| **Available for Login** | This reflects the value of the A bit provided by the most recently received Discovery Adtvertisements from the FCF. This provides the information that the transmitting FCF is available for FIP FLOGI/FDISC from ENodes. This is informational and shall have no effect on existing login. |
| **Priority** | The priority returned from the FCF in Solicited Discovery Advertisement. This indicates the priority that has been manually assigned to the FCF. |
| **FKA-ADV** | FIP keepalive interval (FKA_ADV_PERIOD) in seconds configured on the FCF multiplied by five. For example, if the FKA_ADV period configured on the FCF is 80 seconds, the value of this field is 400. |
| **FCF Expiry Time** | This is timer value to monitor the status of the FCF. FCF entry and all its associated sessions will be removed when the value reaches 0. This value is reset to Configured FKA-ADV every time a Discovery Advertisement is received from the FCF-MAC. |
| **Time Elapsed** | Time since FCF is discovered. |

## 9.1.5. Show fip-snooping vlan

This command displays the FCoE VLANs information, and additionally, the FIP snooping port status when optional argument is specified.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

**Format** show fip-snooping vlan [<1-4093>]

| **Fields** | **Definition** |
|---|---|
| **<1 - 4093>** | VLAN ID. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| **Fields** | **Definition** |
|---|---|
| **vlan-id** | A VLAN enabled for FIP snooping. |
| **Vlan** | VLAN in which FIP snooping is enabled/operational. |
| **FC-MAP** | FCoE mapped address prefix of the FCoE forwarder for the FCoE VLAN. |

| | |
|---|---|
| **FCFs** | Number of FCFs discovered. |
| **ENodes** | Number of ENodes discovered. |
| **Sessions** | Total virtual sessions in FCoE VLAN. |

## 9.1.6. Show fip-snooping statistics

This command displays the statistics of the FIP packets snooped in the VLAN or on an interface. If the optional (VLAN or interface) argument is not given, this command displays the statistics for all of the FIP snooping enabled VLANs. When an interface is provided as an argument, interface applicable statistics are only displayed.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

**Format** show fip-snooping statistics [interface <slot/port> | vlan <1-4093>]

| Fields | Definition |
|---|---|
| **<slot/port>** | Specify the interface. |
| **<1-4093>** | Specifies the VLAN interface. The range of the VLAN ID is 1 to 4093. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

The following table describes the packet counters per FIP operation.

| Fields | Definition |
|---|---|
| **VR** | Number of VLAN Request messages received on the VLAN. |
| **VN** | Number of VLAN Notification messages received on the VLAN. |
| **MDS** | Number of Multicast Discovery Solicitation messages snooped on the VLAN. |
| **UDS** | Number of Unicast Discovery Solicitation messages snooped on the VLAN. |
| **FLOGI** | Number of Fabric Logins snooped on the VLAN. |
| **FDISC** | Number of Fabric Discovery Logins snooped on the VLAN. |

| | |
|---|---|
| **LOGO** | Number of Fabric Logouts on the VLAN. |
| **VNPort-keep-alive** | Number of VN_Port keepalive messages snooped on the VLAN. |
| **MDA** | Number of Multicast Discovery Advertisement messages snooped on the VLAN. |
| **UDA** | Number of Unicast Discovery Advertisement messages snooped on the VLAN. |
| **FLOGI_ACC** | Number of Fabric Logins accepted on the VLAN. |
| **FLOGI_RJT** | Number of Fabric Logins rejected on the VLAN. |
| **FDISC_ACC** | Number of Fabric Discovery Logins accepted on the VLAN. |
| **FDISC_RJT** | Number of Fabric Discovery Logins rejected on the VLAN. |
| **LOGO_ACC** | Number of Fabric Logouts accepted on the VLAN. |
| **LOGO_RJT** | Number of Fabric Logouts rejected on the VLAN. |
| **CVL** | Number of Clear Virtual Links actions on the VLAN. |

The following table describes the other interface or session-related counters.

| Fields | Definition |
|---|---|
| **Number of Virtual Session Timeouts** | Number of Virtual sessions removed due to session timer expiry. |
| **Number of FCF Session Timeouts** | Number of Active sessions time out due to Discovery Advertisements expiry from FCFs in the VLAN. |
| **Number of Session configuration failures** | Number of sessions in the VLAN that failed to be configured in the hardware. |
| **Number of Session denied with FCF limit** | Number of sessions that are denied to be created for the new FCF as the number of FCFs reached the maximum allowed in the VLAN. |
| **Number of Session denied with ENode limit** | Number of session create requests that are denied for the new ENode as the number of ENodes reached the maximum allowed in the system. |
| **Number of Session denied with System limit** | Number of sessions that are denied to be created as the number of sessions reached the maximum allowed in the system. |

## 9.1.7. Feature fip-snooping

This command globally enables Fiber Channel over Ethernet Initialization Protocol (FIP) snooping on the switch. When FIP snooping is globally enabled, FC-BB-5 Annex D ACLs are installed on the switch and FIP frames are snooped. FIP snooping will not allow FIP or Fiber Channel over Ethernet (FCoE) frames to be forwarded over a port until the port is operationally enabled for PFC. VLAN tagging must be enabled on the interface in order to carry the dot1p values through the network.

To return the settings to the default values and globally disable FIP snooping, use the **no** form of this command. When FIP snooping is globally disabled, received FIP frames are forwarded or flooded using the normal multicast rules. In addition, other FIP snooping commands are not available until the FIP snooping feature is enabled.

**Format** feature fip-snooping
no feature fip-snooping

**Default** Disable

**Mode** Global Config

## 9.1.8. fip-snooping enable

This command enables FIP snooping on the configured VLAN. Priority Flow Control (PFC) must be operationally enabled before FIP snooping can operate on an interface. VLAN tagging must be enabled on the interface in order to carry the dot1p value through the network.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

To return the mode to the default (disabled), use the **no** form of this command.

**Format** fip-snooping enable
no fip-snooping enable

**Default** Disable

**Mode** VLAN Config

## 9.1.9. fip-snooping fc-map

This command configures the FP-MAP value on a VLAN. The FC map value is used to help in securing the swith against misconfiguration. When configured using fabric-provided MAC addresses, FCoE devices transmit frames containing the FC map value in the upper 24 bits. Only frames that match the configured

FC map values are passed across the VLAN. Frames with MAC addresses that do not match the FC map value are discarded.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

To set the FC-MAP value for the VLAN to the default value, use the **no** form of this command.

**Format** fip-snooping fc-map <0x0-0xffffff>

no fip-snooping fc-map

| Fields | Definition |
|---|---|
| < 0x0-0xffffff > | Valid FC map values are in the range of 0x0 to 0xffffff. |

**Default** 0x0efc00

**Mode** VLAN Config

## 9.1.10. fip-snooping port-mode fcf

This command configures the interface that is connected towards FCF. To relay the FIP packets received from the hosts toward the FCF, the switch needs to know the interfaces to which the FCFs are connected. By default, an interface is configured to be a host-facing interface if it is not configured to be an FCF-facing interface.

It is recommended that FCF-facing ports be placed into auto-upstream mode in order to receive DCBX information and propogate it to the CNAs on the downstream (host-facing) ports. Intefaces enabled for PFC should be configured in trunk or general mode and must be PFC-operationally enabled before FCoE traffic can pass over the port.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

To set the interface to be connected towards the host, use the **no** form of this command.

**Format** fip-snooping port-mode fcf

no fip-snooping port-mode fcf

**Default** Configuration as a host-facing interface

**Mode** Interface Config

## 9.1.11. Clear fip-snooping statistics

This command clears the FIP snooping statistics in the supplied VLAN or on a supplied interface. If the optional (VLAN or interface) argument is not given, this command clears the statistics on all FIP snooping-enabled VLANs.

This command can only be entered after FIP snooping is enabled using the *feature fip-snooping* command. Otherwise, it does not appear in the CLI.

**Format** clear fip-snooping statistics [interface <slot/port> | vlan <1-4093>]

| Fields | Definition |
|---|---|
| **<slot/port>** | Specify the interface. |
| **<1-4093>** | Specifies the VLAN interface. The range of the VLAN ID is 1 to 4093. |

**Default** Disable

**Mode** Privileged Exec

# 9.2. Priority-based Flow Control

## 9.2.1. Show interface priority-flow-control

This command displays the PFC information of a given interface or all interfaces.

**Format** show interface [<slot/port] priority-flow-control

| Fields | Definition |
|---|---|
| <slot/port> | Interface number. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| Interface Detail | The port for which data is displayed. |
| Operational State | The operational status of the interface. |
| Configured State | The administrative mode of PFC on the interface. |
| Configured Drop Priorities | The 802.1p priority values that are configured with a drop priority on the interface. Drop priorities do not participate in pause. |
| Configured No-Drop Priorities | The 802.1p priority values that are configured with a no-drop priority on the interface. If an 802.1p priority that is designated as no-drop is congested, the priority is pause. |
| Operational Drop Priorities | The 802.1p priority values that the switch is using with a drop priority. The operational drop priorities might not be the same as the configured priorities if the interface has accepted different priorities from a peer device. |
| Operational No-Drop Priorities | The 802.1p priority values that the switch is using with a no-drop priority. The operational drop priorities might not be the same as the configured priorities if the interface has accepted different priorities from a peer device. |
| Delay Allowance | The allowed delay on the interface. |
| Peer Configuration Compatible | Indicates whether the local switch has accepted a compatible configuration from a peer switch. |
| Compatible Configuration | The number of received configurations accepted and processed as valid. This number does not include duplicated configurations. |

| | |
|---|---|
| **Count** | |
| **Incompatible Configuration Count** | The number of received configurations that were not accepted from a peer device because they were incompatible. |
| **Priority** | The 802.1p priority value. |
| **Received PFC Frames** | The number of PFC frames received by the interface with the associated 802.1p priority. |
| **Transmitted PFC Frames** | The number of PFC frames transmitted by the interface with the associated 802.1p priority. |

Example: The following example shows the CLI display output for the command *show interface priority-flow-control*.

```
(M4500-32C) #show interface priority-flow-control
Port    Drop          No-Drop        Operational
        Priorities    Priorities     Status
------  ------------  -------------  -----------
0/1     0-7                          Inactive
0/2     0-7                          Inactive
0/3     0-7                          Inactive
0/4     0-7                          Inactive
0/5     0-7                          Inactive
0/6     0-7                          Inactive
0/7     0-7                          Inactive


        Port:  all physical interfaces
Operational Status:  Active/Inactive
```

## 9.2.2. Priority-flow-control mode

This command enables or disables Priority-Flow-Control (PFC) on the given interface.

To return the mode to the default, use the **no** form of this command. VLAN tagging must be enabled on the interface in order to carry the dot1p value through the network. Additionally, the dot1p mapping to class-of-service must be set to one-to-one.

When PFC is enabled on an interface, the normal PAUSE control mechanism is operationally disabled.

**Format** priority-flow-control mode { on | off}

no priority-flow-control mode

**Default** Off

**Mode** DCB (Data Center Bridging) interface mode

## 9.2.3. Priority-flow-control priority

This command enables or disables the priority group for lossless (no-drop) or lossy (drop) behavior on the selected interface. Up to two lossless priorities can be enabled on an interface. The users must configure the same no-drop priorities across the network in order to ensure end-to-end lossless behavior.

This command has no effect on interfaces not enabled of PFC. VLAN tagging needs to be turned on in order to carry the dot1p value through the network. Additionally, the dot1p mapping to class-of-service must be set to one-to-one.

To enable lossy behavior on all priorities on the interface, use the **no** form of this command. This has no effect on interfaces not enabled for PFC or with no lossless priorities configured.

**Format** priority-flow-control priority <0-7> { drop | no-drop }

no priority-flow-control priority

| Fields | Definition |
|---|---|
| **<drop>** | Disable lossless behavior on the selected priorities. |
| **<no-drop>** | Enable lossless behavior on the selected priorities. |

**Default** The default behavior for all priorities is drop

**Mode** DCB (Data Center Bridging) interface mode

## 9.2.4. Clear priority-flow-control statistics

This command clears all global and interface PFC statistics

**Format** clear priority-flow-control statistics

**Mode** Privileged Exec

# 9.3. Enhanced Transimssion Selection (ETS)

## 9.3.1. Show classofservice traffic-class-group

This command displays the Traffic Class to Traffic Class Group mapping.

**Format** show classofservice traffic-class-group [<slot/port>]

| Fields | Definition |
|---|---|
| **<slot/port>** | Interface number. This is only valid on platforms that support independent per port class of service mappings.<br>• If slot/port is specified, the TCG mapping table of the interface is displayed.<br>• If slot/port is omitted, the global configuration settings are displayed (these may have been subsequently overridden by per-port configuration). |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Traffic Class** | The Traffic Class queue identifier. Can range from 0-7 although the actual number of available traffic classes depends on the platform. |
| **Traffic Class Group** | The Traffic Class Group identifier. Can range from 0-7 although the actual number of available traffic classes depends on the platform. |

## 9.3.2. Show interface traffic-class-group

This command displays Traffic Class Group configuration.

**Format** show interfaces traffic-class-group [<slot/port>]

| Fields | Definition |
|---|---|
| **<slot/port>** | Interface number. This is only valid on platforms that support independent per port class of service mappings.<br>• If slot/port is specified, the TCG mapping table of the interface is |

| | |
|---|---|
| | displayed.<br>• If slot/port is omitted, the global configuration settings are displayed (these may have been subsequently overridden by per-port configuration). |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Interface** | The slot/port of the interface. If displaying the global configuration, this output line is replaced with a Global Configuration indication. |
| **Traffic Class Group** | The Traffic Class Group identifier. |
| **Min. Bandwidth** | The minimum transmission bandwidth, expressed as a percentage. A value of zero means bandwidth is not guaranteed and the TCG operates using best-effort. This is a configured value. |
| **Max. Bandwidth** | The maximum transmission bandwidth, expressed as a percentage. A value of zero means no upper limit is enforced, so the queue may use any or all of the available bandwidth of the interface. |
| **Weight** | The weight of the TCG used during non-strict scheduling. |
| **Scheduler Type** | Indicates whether this queue is scheduled for transmission using a strict priority or a weighted scheme. This is a configured value. |

## 9.3.3. Classofservice traffic-class-group

Use the ets classofservice traffic-class-group command to map the internal Traffic Class Group.

To restore the default mapping for each of the Traffic Classes, use the **no** form of this command.

**Format** classofservice traffic-class-group <0-7> <0-2>

no classofservice traffic-class-group

| Fields | Definition |
|---|---|
| **<0 – 7>** | Traffic Class number. |

| | |
|---|---|
| **<0 – 2>** | Traffic Class Group number. |

## 9.3.4. Traffic-class-group max-bandwidth

This command specifies the maximum transmission bandwidth limit for each Traffic Class Group (TCG). As known as rate shaping, this has the effect of smoothing temporary traffic bursts over time so that the transmitted traffic rate is bounded. The total number of TCG supported per interface is platform specific.

Each <bw-x> value is a percentage that ranges from 0 to 100 in increments of 1. All n bandwidth values must be specified with this command, and each is independent of the others. The number n is platform-dependent and corresponds to the number of supported Traffic Classes Groups. The default maximum bandwidth value for each TCG is 0, meaning no upper limit is enforced, which allows the TCG queue to consume any available non-guaranteed bandwidth of the interface.

If a non-zero value is specified for any bw-x maximum bandwidth parameter, it must not be less than current minimum bandwidth value for the corresponding queue. A bw-x maximum bandwidth parameter value of 0 may be specified at any time without restriction.

The maximum bandwidth limits may be used with either a weighted or strict priority scheduling scheme.

To restore the default for each queue's maximum bandwidth value, use the **no** form of this command.

**Format** traffic-class-group max-bandwidth <bw-0> <bw-1> <bw-2> ... <bw-n>

| Fields | Definition |
|---|---|
| **<bw-0>** | The maximum bandwidth percentage for TCG 0. |
| **<bw-1>** | The maximum bandwidth percentage for TCG 1. |
| **<bw-2>** | The maximum bandwidth percentage for TCG 2. |

**Default** 0 for all TCG

**Mode** Global Config
Interface Config

## 9.3.5. Traffic-class-group min-bandwidth

This command specifies the minimum transmission bandwidth guarantee for each interface Traffic Class Group (TCG). The total number of TCG supported per interface is platform specific.

Each <bw-x> value is a percentage that ranges from 0 to 100 in increments of 1. All n bandwidth values must be specified with this command, and their combined sum must not exceed 100%. The number n is

platform-dependent and corresponds to the number of supported Traffic Classes Groups. The default maximum bandwidth value for each TCG is 0, meaning no bandwidth is guaranteed (best effort).

If the value of any bw-x minimum bandwidth parameter is specified as greater than the current maximum bandwidth value for the corresponding TCG, then its corresponding maximum bandwidth automatically increases the maximum to the same value.

To restore the default for each queue's minimum bandwidth value, use the **no** form of this command.

**Format** traffic-class-group min-bandwidth <bw-0> <bw-1> <bw-2>... <bw-n>

| Fields | Definition |
|---|---|
| **<bw-0>** | The minimum bandwidth percentage for TCG 0. |
| **<bw-1>** | The minimum bandwidth percentage for TCG 1. |
| **<bw-2>** | The minimum bandwidth percentage for TCG 2. |

## 9.3.6. Traffic-class-group strict

This command activates the strict priority scheduler mode for each specified Traffic Class Group. The total number of TCG supported per interface is platform dependent.

When strict priority scheduling is used for a TCG, the minimum bandwidth setting for the TCG is ignored and packets are scheduled for transmission as soon as they arrive. A maximum bandwidth setting for the queue, if configured, serves to limit the outbound transmission rate of a strict priority TCG queue so that it does not consume the entire capacity of the interface. If multiple TCG on the same interface are configured for strict priority mode, the method of handling their packet transmission is platform specific. One typical scheme is to schedule all strict priority TCG ahead of the weighted queue, giving preference among the strict priority TCG to the one with the highest TCG-id.

To restore the default weighted scheduler mode for each specified TCG, use the **no** form of this command.

**Format** traffic-class-group strict <tcg-id> [<tcg-id>] [<tcg-id>]

| Fields | Definition |
|---|---|
| **< tcg-id >** | The number of TCG ID from 0 to 2. |

**Default** Weighted scheduler mode is used

**Mode** Global Config

Interface Config

### 9.3.7. Traffic-class-group weight

This command specifies the weight for each interface Traffic Class Group. The total number of TCGs supported per interface is platform specific.

Each <bw-x> value is a percentage that ranges from 0 to 100 in increments of 1. All n bandwidth values must be specified with this command, and their combined sum must not exceed 100%. The number n is platform-dependent and corresponds to the number of supported Traffic Classes Groups. The default weight percentage value is in the ratio of 1:2:3 for TCG0:TCG1:TCG2, which is calculated as 100%:0%:0%. The weight percentage is not considered for TCG that are configured for strict scheduling.

To restore the default for each queue's weight percentage value, use the **no** form of this command.

**Format** traffic-class-group weight < wp-0> <wp-1> <wp-2> .. <wp-n>

| Fields | Definition |
|---|---|
| **<wp-0>** | The number of weight for queue 0. |
| **<wp-1>** | The number of weight for queue 1. |
| **<wp-2>** | The number of weight for queue 2. |

**Default** For TCG0:TCG1:TCG2, weight are in the ratio 100%:0%:0%

**Mode** Global Config
Interface Config

## 9.4. OpenFlow

### 9.4.1. Show openflow

This command displays the OpenFlow feature status and configuration information.

**Format** show openflow

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Administrative Mode** | The OpenFlow feature administrative mode set by the command "*openflow* |

| | |
|---|---|
| | *enable*". |
| **Administrative Status** | The operational status of the OpenFlow feature. Although the feature may be administratively enabled, it could be operationally disabled due to various reasons |
| **Disable Reason** | If the OpenFlow feature is operationally disabled, then this status shows the reason for the feature to be disabled. |
| **IP Address** | IPv4 Address assigned to the feature. If the IP address is not assigned, then the status is **None**. |
| **IP Mode** | IP mode assigned by the command "*openflow ip-mode*". The IP mode can be **Auto**, **Static**, or **ServicePort IP**. |
| **Static IP Address** | Static IP address assigned by the command "*openflow static-ip*". |
| **OpenFlow Variant** | OpenFlow Protocol Variant. The OpenFlow protocol can be OpenFlow 1.3. |
| **Default Table** | The Hardware Table used as the target for flows installed by an OpenFlow 1.0 controller which is not enhanced to handle multiple hardware tables. |
| **Passive Mode** | The OpenFlow passive mode set by the command "*openflow passive-mode*". |

## 9.4.2. Show openflow configured controller

This command displays a list of configured OpenFlow controllers.

**Format** show openflow configured controller

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **IP Address** | IPv4 address of the controller. |
| **IP Port** | IPv4 port number for the controller connection. |
| **Connection Mode** | SSL or TCP Controller Connection mode. |
| **Role** | The role of the controller: Master, Equal, Slave |

## 9.4.3. Show openflow installed flows

This command displays the list of configured flows on the switch.

**Format** show openflow installed flows [dest_ip <ip-address> | dest_ip_port <1-65535> | dest_mac <macaddr>| dscp <0-63> | ether_type <0-0xFFFF> | ingress_port <slot/port> | ip_proto <0-255> | priority <1-65535>| source_ip <ip-address> | source_ip_port <1-65535>| source_mac <macaddr> | table <10,60> | vlan <1-4093> | vlan_prio <0-7> ]

| Fields | Definition |
|---|---|
| **dest_ip** | The IP address of the destination. |
| **dest_ip_port** | The port number of the destination. |
| **dest_mac** | The MAC address of the destination. |
| **dscp** | The DSCP value. |
| **ether_type** | The ethertype value. |
| **ingress_port** | The slot and port for the ingress. |
| **ip_proto** | The IP protocol. |
| **priority** | The priority of the flow. |
| **source_ip** | The IP address of the source. |
| **source_ip_port** | The port number of the source. |
| **source_mac** | The MAC address of the source. |
| **table** | The table number. |
| **vlan** | The VLAN. |
| **vlan_prio** | The VLAN priority. |

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Flow type** | The type of flow. (For example, 1DOT3) |

| | |
|---|---|
| **Macth criteria** | The match criteria specified by the flow. |
| **Flow table** | The hardward table in which the flow is installed. |
| **Flow priority** | The priority of the flow versus other flows. |
| **Ingress port** | The port on which the flow is active. |
| **Actions** | The action specified by the flow. |
| **Hard timeout** | The number of seconds after which the flow is expired regardless of whether or not packets are hitting the entry. |
| **Idle timeout** | The number of seconds after which the flow is expired with no received traffic. |
| **Idle** | The time since the flow was hit. |
| **Installed in hardware** | If the flow could be added to the hardware.<br>• 0 is displayed if the flow cannot be added.<br>• 1 is displayed if the flow was added. |

## 9.4.4. Show openflow installed groups

This command displays the list of configured groups on the switch.

**Format** show openflow installed groups

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **group type** | Type of the Group – Indirect, All, Select etc. |
| **group ID** | Unique ID of the Group. |
| **reference count** | Group Reference Count - is used only for Indirect groups. This count indicates how many Select groups are referring to the current Indirect group. |
| **duration** | The time since the group was created. |
| **bucket count** | Number of Buckets in the group. |

| | |
|---|---|
| **reference group ID** | References the Indirect group ID and used for Select group only. |

## 9.4.5. Show openflow table-status

This command displays the supported OpenFlow tables and report usage information for the tables.

**Format** show openflow table-status openflow13

**Default** None

**Mode** Privileged EXEC

**Display Message**

| Fields | Definition |
|---|---|
| **Flow Table** | OpenFlow table identifier. The range is 0 to 255. |
| **Flow Table Name** | The name of this table. |
| **Maximum Size** | Platform-defined maximum size for this flow table. |
| **Number of Entries** | Total number of entries in this table. The count includes delete-pending entries. |
| **Hardware Entries** | Number of entries currently inserted into the hardware. |
| **Software-Only Entries** | Number of entries that are not installed in the hardware for any reason. This includes entries pending for insertion, entries that cannot be inserted due to missing interfaces and entries that cannot be inserted due to table-full condition. |
| **Waiting for Space Entries** | Number of entries that are not currently in the hardware because the attempt to insert the entry failed. |
| **Flow Insertion Count** | Total number of flows that were added to this table since the switch powered up. |
| **Flow Deletion Count** | Total number of flows that were deleted from this table since the switch powered up. |
| **Insertaion Failure Count** | Total number of hardware insertion attempts that were rejected due to lack of space since the switch powered up. |
| **Flow Table Description** | A detailed description for this table. |

## 9.4.6. Openflow enable

This command enables or disables the OpenFlow feature. If the OpenFlow feature is not in disabled state, then enabling has no effect on the OpenFlow feature.

To return the mode to the default, use the **no** form of this command. If the OpenFlow feature is not in enabled state, then issuing this command has no effect on the OpenFlow feature. The OpenFlow feature can be administratively disabled at any time.

**Format** openflow enable

no openflow enable

**Default** Disabled

**Mode** Global Config

## 9.4.7. Openflow static-ip

This command sets the IP address to be used for the OpenFlow feature. The static IP is applied only when the static IP mode is enabled. The switch must have an operational IP interface with the specified address in order for the static IP address to be used for the OpenFlow feature. If the system does not have an interface with a matching IP address then the OpenFlow feature is operationally disabled.

If the OpenFlow feature is enabled when this command is issued and the specified static IP address is not the same as the IP address already in use by the OpenFlow feature then the feature is automatically disabled and re-enabled.

To set the OpenFlow Static IP address to 0.0.0.0, use the **no** form of this command. Issuing this command when OpenFlow is enabled and using a static IP causes the OpenFlw feature to become operationally disabled.

**Format** openflow static-ip <ip-address>

no openflow static-ip

**Default** 0.0.0.0

**Mode** Global Config

## 9.4.8. Openflow controller

Specify up to twenty IP addresses to which the switch should establish an OpenFlow Controllers connection. Each command invocation specifies one IP address and connection mode (TCP or SSL). If the IP Port is omitted then the default IP port number 6633 is used. The default connection mode is SSL. The controller table configured by this command is used by the switch in OpenFlow 1.3 modes.

To delete the specified OpenFlow Controller IP address or delete all Controller addresses, use the **no** form of this command. If the IP Port number is omitted then all entries for the specified IP address are deleted.

**Format** openflow controller <ip-address> [ip-port][connection mode]

no openflow controller { ip-address [ip-port] | all}

| Fields | Definition |
|---|---|
| **ip-address** | Specify up to five IP addresses to which the switch should establish an OpenFlow Management connection. |
| **ip-port** | IP port to use for an OpenFlow Management connection. If the IP Port is omitted, then the default IP port number 6632 is used. |
| **connection mode** | TCP or SSL. The default is SSL. |

**Mode** Global Config

## 9.4.9. Openflow ip-mode

This command directs the OpenFlow feature to use the configured IP address. Issuing this command when OpenFlow is already enabled causes the feature to be disabled and re-enabled with the new IP address.

To direct the OpenFlow feature to automatically assign the IP address to itself, use the **no** form of this command.

**Format** openflow ip-mode {auto | static | serviceport}

no openflow ip-mode

**Default** Disabled

**Mode** Global Config

## 9.4.10. Openflow passive-mode

This command enables OpenFlow passive-mode.

To disable OpenFlow passive-mode, use the **no** form of this command.

**Format** openflow passive-mode

no openflow passive-mode

**Default** Disabled

**Mode** Global Config

## 9.4.11. Openflow failmode

This command configures the OpenFlow fail mode of connection interruption. It can choose the Fail-Secure or Fail-Standalone mode.

In the case that a switch loses contact with all controllers, the switch should immediately enter either “fail secure mode” or “fail standalone mode”. In “fail secure mode”, the only change to switch behavior is that packets and messages destined to the controllers are dropped. Flow entries should continue to expire according to their timeouts. In “fail standalone mode”, the switch processes all packets using the OFPP_NORMAL reserved port; in other words, the switch acts as a legacy Ethernet switch or router.

To reset to the default failmode, use the **no** form of this command.

**Format** openflow failmode {secure | standalone}

no openflow failmode

**Default** Secure

**Mode** Global Config

## 9.4.12. Clear openflow ca-cert

This command erases the Certificate Authority certificates used for validating the OpenFlow Controllers from the switch. Issuing this command automatically disables and re-enables the OpenFlow feature. The new SSL certificates are reloaded from the OpenFlow Controller on the first connection to the controller or can be manually loaded with a copy command.

**Format** clear openflow ca-cert

**Mode** Privileged Exec

# 10. Fluentd Commands

## 10.1. Show Commands

### 10.1.1. Show fluentd

This command is used to display fluentd status and configuration settings.

**Format** show fluentd [<fluentd-entry>]

| Fields | Definition |
|---|---|
| **<fluentd-entry>** | The fluentd entry name (up to 31 alphanumeric characters). |

**Default** None

**Mode** Privileged EXEC

**Display Message**

Example #1:

(Switch) #show fluentd
Fluentd mode: Disable
Current number of fluentd entries: 1
Current number of enabled fluentd entries: 1
Maximum number of fluentd entries: 20
---
Fluentd Entry : fluent
Fluentd Entry Status : Enable

Source Status : Enable
Source Tag : syslog.switch
Source Type : syslog

Match Pattern : syslog.**
Match Type : forward

Example #2:
(Quanta) #show fluentd fluent

Fluentd Entry : fluent

Fluentd Entry Status : Enable
Source Status : Enable
Source Tag : syslog.switch
Source Type : syslog
Port : 5140
Bind : 0.0.0.0
Protocol Ty[e : udp

Match Pattern : flu.**
Match Type : forward
Host Type : ipv4
Host : 172.16.2.101
Port : 24224
Heartbeat Interval : 1s
Heartbeat Type : UDP
Phi Failure Detector : Enable
Phi Threshold : 16
Send Timeout : 60s
Buffer Type : Memory
Buffer Queue Limit : 16
Buffer Chunk Limit : 8m
Buffer Flush Interval : 60s
---

## 10.2. Configuration Commands

### 10.2.1. Fluentd

This command enables or disables FluentD service.

**Format** fluentd
no fluentd

**Default** Disabled

**Mode** Global Config

### 10.2.2. Fluentd <fluentd-entry>

This command creates or deletes FluentD entry.

**Format** fluentd <fluentd-entry>

no fluentd <fluentd-entry>

| Fields | Definition |
|---|---|
| **<fluentd-entry>** | The fluentd entry name (up to 31 alphanumeric characters). |

**Default** None

**Mode** Global Config

## 10.2.3. Enable

This command enables FluentD entry.

**Format** enable

no enable

**Default** Disabled

**Mode** Fluentd Configuration

## 10.2.4. Sourcetag

This command configures the tag of the FluentD source.

**Format** sourcetag <tag> type {syslog | localsyslog | dstat | exec}

no sourcetag <tag>

| Fields | Definition |
|---|---|
| **<tag>** | The sourcetag (up to 31 alphanumeric characters). |

**Default** None

**Mode** Fluentd Configuration

### 10.2.4.1. Syslog

This command configures syslog settings.

**Format** [enable | advance [port <1-65534> | bind <bind> | protocol-type {tcp | udp}]]
no enable

| Fields | Definition |
|---|---|
| **<1-65534>** | The port to listen to. |
| **<bind>** | The bind address to listen to. |

**Default** Port: 5140
Bind: 0.0.0.0 (all address)
Protocol-type: udp

**Mode** Syslog configuration

### 10.2.4.2. Localsyslog

This command configures localsyslog settings.

**Format** [enable | severity <0-7>]
no enable

| Fields | Definition |
|---|---|
| **<0-7>** | The logging severity level. |

**Default** Severity: 5

**Mode** Localsyslog configuration

### 10.2.4.3. Dstat

This command configures dstat settings.

**Format** [enable | advance [option <option> | delay <1-86400>]
no enable

| Fields | Definition |
|---|---|
| **<option>** | The dstat option. |
| **<1-86400>** | The delay time (seconds). |

**Default** Option: -fcdnm
Delay: 1

**Mode** Dstat configuration

### 10.2.4.4. Exec

This command configures exec settings.

**Format** [enable | command <command> | format {tsv <keys> | json | msgpack} | advance [tag-key <tag-key>| time-key <time-key> <time-format> | run-interval <run-interval>]]

no enable

| Fields | Definition |
|---|---|
| **<command>** | The command (program) to execute. |
| **<keys>** | The comma-separated (,) keys parameter (contains alphanumeric characters, dots (.), dashes (-), and underscores (_)). |
| **<tag- key>** | The key to use as the event tag instead of the value in the event record (up to 31 alphanumeric characters including “.“). |
| **<time-key>** | The key to use as the event time instead of the value in the event record. |
| **<time-format>** | The format of the event time used for the time_key parameter. |
| **<run-interval>** | The interval time between periodic program runs (the value in the range <1 - 60>, and suffix s (seconds), m (minutes), or h (hours)). |

**Default** Time-key: current time

Time-format: %Y-%m-%d %H:%M:%S

**Mode** Exec configuration

## 10.2.5. Matchpattern

This command configures fluentd match.

**Format** matchpattern <pattern> type {forward | webhdfs | elasticsearch}

no matchpattern <pattern>

| Fields | Definition |
|---|---|
| **<pattern>** | The pattern (up to 31 alphanumeric characters). |

**Default** None

**Mode** Fluentd configuration

### 10.2.5.1. Forward

This command configures forward settings.

**Format** [server {ipv4 <ipaddr> | hostname <hostname>} <1-65535> | advance[send-timeout <send-timeout> | heartbeat-type {tcp | udp} | heartbeat-interval <heartbeat-interval> | phi-failure-detector {disable | enable} | phi-threshold <1-60> | buffer [buffer-type {memory | file <buffer-path>} | buffer-queue-limit <1-16> | buffer-chunk-limit <chunk> | flush-interval <fluesh-interval>]

| Fields | Definition |
|---|---|
| **<ipaddr>** | The ipv4 address of server. |
| **<hostname>** | The host name of server. |
| **<1-65535>** | The host port number. |
| **<send-timeout>** | The timeout time when sending event logs (the value in the range <1 - 60>, and suffix s(seconds), m(minutes), or h(hours)). |
| **<heartbeat-interval>** | The interval of the heartbeat packer (the value in the range <1 - 60>, and suffix s(seconds), m(minutes), or h(hours)). |
| **<1-60>** | The interval time between periodic program runs (the value in the range <1 - 60>, and suffix s (seconds), m (minutes), or h (hours)). |
| **<buffer-path>** | The path where buffer chunks are stored. |
| **<1-16>** | The length limit of the chunk queue. |
| **<chunk>** | The size of each buffer chunk (the value in the range <1 - 8>, and suffix k(KB) or m(MB)). |
| **<flush-interval>** | The interval between data flushes (the value in the range <1 - 60>, and suffix s(seconds), m(minutes), or h(hours)). |

**Default** Port: 24224
Send-timeout: 60s
Heartbeat-type: udp
Heartbeat-interval: 1s
Phi-threshold: 16
Buffer-type: memory
Buffer-queue-limit: 16
Buffer-chunk-limit: 8m

Flush-interval: 60s

**Mode** Forward configuration

### 10.2.5.2. Webhdfs

This command configures webhdfs settings.

**Format** [host <host> | port <1-65535> | path <path> | advance [buffer [buffer-type {memory | file <buffer-path>}] | buffer-queue-limit <1-16> | buffer-chunk-limit <chunk> | flush-interval <flush-interval>] | localtime{disable | enable}]

| Fields | Definition |
|---|---|
| **<host>** | The namenode hostname. |
| **<1-65535>** | The namenode port number. |
| **<path>** | The path on HDFS. |
| **<buffer-path>** | The path where buffer chunks are stored. |
| **<1-16>** | The length limit of the chunk queue. |
| **<chunk>** | The size of each buffer chunk (the value in the range <1 - 8>, and suffix k(KB) or m(MB)). |
| **<flush-interval>** | The interval between data flushes (the value in the range <1 - 60>, and suffix s(seconds), m(minutes), or h(hours)). |

**Default** Localtime: enable

Buffer-type: memory

Buffer-queue-limit: 16

Buffer-chunk-limit: 8m

Flush-interval: 60s

**Mode** Webhdfs configuration

### 10.2.5.3. Elasticsearch

This command configures elasticsearch settings.

**Format** [advance[[host {ipv4 <ipaddr> | hostname <hostname>} <1-65535>] | hosts <host:port> | [user <user> <password> <path>] | logstash-format {disable | enable <prefix>} | scheme <scheme> | utc-index {disable | enable} | index-name <index-name> | type-name <type-name> | request-

timeout <request-timeout> | reload-connections {disable | enable} | reload-on-failure {disable | enable} | buffer [buffer-type {memory | file <buffer-path>} | buffer-queue-limit <queue> | buffer-chunk-limit <chunk> | flush-interval <flush-interval>]]]

| Fields | Definition |
|---|---|
| **<ipaddr>** | The ipv4 address of server. |
| **<hostname>** | The host name of server. |
| **<1-65535>** | The host port number. |
| **<host:port>** | Multiple elasticsearch hosts with separator ",". |
| **<user>** | The elasticsearch cluster host user info. |
| **<password>** | The elasticsearch cluster host user password. |
| **<path>** | The elasticsearch cluster host path. |
| **<prefix>** | The logstash-prefix (up to 31 alphanumeric characters). |
| **<index-name>** | Store in a document the index it belongs to (up to 31 alphanumeric characters). |
| **<type-name>** | Each type has a list of fields that can be specified for documents of that type (up to 31 alphanumeric characters). |
| **<tag-key>** | The tag-key (up to 31 alphanumeric characters, include dashes(-), and underscores(_)). |
| **<request-timeout>** | HTTP request timeout (the value in the range <1 - 60>, and suffix s(seconds), m(minutes), or h(hours)). |
| **<buffer-path>** | The path where buffer chunks are stored. |
| **<1-16>** | The length limit of the chunk queue. |
| **<chunk>** | The size of each buffer chunk (the value in the range <1 - 8>, and suffix k(KB) or m(MB)). |
| **<flush-interval>** | The interval between data flushes (the value in the range <1 - 60>, and suffix s(seconds), m(minutes), or h(hours)). |

**Default** Port: 9200

Logstash-format: disable

Prefix: logstash

Utc-index: enable

Index-name: fluentd

Type-name: fluentd

Tag-key: tag

Request-timeout: 5s

Reload-connections: enable

Reload-on-failure: disable

Buffer-type: memory

Buffer-queue-limit: 16

Buffer-chunk-limit: 8m

Flush-interval: 60s

Mode Elasticsearch configuration