

Lenovo Network

# Command Reference

For Lenovo Cloud Network Operating System 10.4

**Note:** Before using this information and the product it supports, read the general information in the *Safety information and Environmental Notices* and *User Guide* documents on the *Lenovo Documentation CD* and the *Warranty Information* document that comes with the product.

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# Preface

This *Command Reference* describes the commands included in the Lenovo Cloud Network Operating System 10.4 firmware and how to use them. This document covers the following Lenovo RackSwitches:

- *RackSwitch G8272*
- *RackSwitch G8296*
- *RackSwitch G8332*
- *ThinkSystem NE1032 RackSwitch*
- *ThinkSystem NE1032T RackSwitch*
- *ThinkSystem NE1072T RackSwitch*
- *ThinkSystem NE10032 RackSwitch*

For documentation on how to configure and use the Lenovo Cloud Network Operating System 10.4 firmware, see the *Lenovo Network Application Guide for Lenovo Cloud Network Operating System 10.4*.

For documentation on the Lenovo APIs, see the *REST API Programming Guide* and the *Python Programming Guide*.

For documentation on installing the switches physically, see the *Lenovo Installation Guide* for the corresponding switch:

- *Lenovo Rackswitch G8272 Installation Guide*
- *Lenovo Rackswitch G8296 Installation Guide*
- *Lenovo Rackswitch G8332 Installation Guide*
- *Lenovo ThinkSystem NE1032 RackSwitch Installation Guide*
- *Lenovo ThinkSystem NE1032T RackSwitch Installation Guide*
- *Lenovo ThinkSystem NE1072T RackSwitch Installation Guide*
- *Lenovo ThinkSystem NE10032 RackSwitch Installation Guide*

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## Who Should Use This Guide

This guide is intended for network installers and system administrators engaged in configuring and maintaining a network. The administrator should be familiar with Ethernet concepts, IP addressing, Spanning Tree Protocol, and SNMP configuration parameters.

---

## What You'll Find in This Guide

This guide will help you plan, implement, and administer Cloud NOS software. Where possible, each section provides feature overviews, usage Example, and configuration instructions. The following information is covered:

- [Chapter 1, “CNOS Basics”](#), explains how to get around in CNOS and describes the commands you can enter from User EXEC Mode.
- [Chapter 2, “Privileged EXEC Mode Commands”](#), describes Privileged EXEC Mode and the commands available in it.
- [Chapter 3, “Debugging Commands”](#), describes all available debugging commands.
- [Chapter 4, “Configuration Mode Commands”](#), describes commands available in Configuration Mode.
- [Chapter 5, “Interface Mode Commands”](#), describes commands available in Interface Mode.
- [Chapter 6, “Line Mode Commands”](#), describes commands available in Line Configuration Mode
- [Chapter 7, “Class Map Mode Commands”](#), describes commands available in Class Map Mode
- [Chapter 8, “Route Map Mode Commands”](#), describes commands available in Route Map Mode.
- [Chapter 9, “BGP Configuration Mode Commands”](#), describes commands available in BGP Configuration Mode.
- [Chapter 10, “Address Family Mode Commands”](#), describes the commands for entering and using BGP Address Family Mode.
- [Chapter 11, “Neighbor Mode Commands”](#), describes the commands for entering and using BGP Neighbor Mode.
- [Chapter 12, “Neighbor Address Family Commands”](#), describes the commands for entering and using BGP Neighbor Address Family Mode.
- [Chapter 13, “OSPF Configuration Mode Commands”](#), describes commands available in OSPF Configuration Mode.
- [Chapter 14, “Virtual Link Mode Commands”](#), describes the commands for entering and using OSPF Virtual Link Mode.
- [Chapter 15, “TACACS+ Server Mode Commands”](#), describes commands available in TACACS+ Server Configuration Mode.
- [Chapter 16, “RADIUS Server Mode Commands”](#), describes commands available in RADIUS Server Configuration Mode.
- [Chapter 17, “SPAN Session Mode Commands”](#), describes commands available in SPAN Session Configuration Mode.
- [Chapter 18, “Control Plane Mode Commands”](#), describes commands available in Control Plane Configuration Mode.
- [Chapter 19, “Key Chain Mode Commands”](#), describes commands available in Key Chain Configuration Mode.

- [Chapter 20, “IP ACL Mode Commands”](#), describes commands available in ACL Configuration Mode.
- [Chapter 21, “ARP ACL Mode Commands”](#), describes commands available in ARP ACL Configuration Mode.
- [Chapter 22, “MAC ACL Mode Commands”](#), describes commands available in MAC ACL Configuration Mode.
- [Chapter 23, “MST Mode Commands”](#), describes commands available in MST Configuration Mode.
- [Chapter 24, “PKI Mode Commands”](#), describes commands available in Public Key Infrastructure (PKI) Configuration Mode.
- [Chapter 25, “Policy Map Mode Commands”](#), describes commands available in Policy Map Configuration Mode.
- [Chapter 26, “VLAN Mode Commands”](#), describes commands available in VLAN Configuration Mode.
- [Chapter 27, “VRRP Mode Commands”](#), describes commands available in VRRP Configuration Mode.
- [Chapter 28, “VDM Commands”](#), describes commands available in VDM Configuration Mode.
- [Chapter 29, “EVC Service Mode Commands”](#), describes commands available in EVC Service Configuration Mode.
- [Chapter 30, “Display Commands”](#), describes commands available in various modes that display information and statistics about the switch.
- [Appendix A, “Getting help and technical assistance”](#), tells you who to contact with any questions about this product.
- [Appendix B, “Notices”](#), contains safety and environmental notices.

## Typographic Conventions

The following table describes the typographic styles used in this book.

**Table 1.** *Typographic Conventions*

| Typeface or Symbol | Meaning  | Example  |
|--------------------|--|--|
| ABC123             | This type is used for names of commands, files, and directories used within the text.<br><br>It also depicts on-screen computer output and prompts.  | View the readme.txt file.<br><br>Switch#   |
| <b>ABC123</b>      | This bold type appears in command Example. It shows text that must be typed in exactly as shown.   | Switch# <b>sys</b>   |
| <ABC123>           | This italicized type appears in command Example as a parameter placeholder. Replace the indicated text with the appropriate real name or value when using the command. Do not type the brackets.<br><br>This also shows book titles, special terms, or words to be emphasized. | To establish a Telnet session, enter:<br>Switch# <b>telnet</b> <IP address><br><br>Read your <i>User's Guide</i> thoroughly. |
| { }                | Command items shown inside brackets are mandatory and cannot be excluded. Do not type the brackets.  | Switch# <b>ls {-a}</b>   |
| [ ]                | Command items shown inside brackets are optional and can be used or excluded as the situation demands. Do not type the brackets.   | Switch# <b>ls [-a]</b>   |
|                    | The vertical bar ( ) is used in command Example to separate choices where multiple options exist. Select only one of the listed options. Do not type the vertical bar.   | Switch# <b>set {left right}</b>  |
| <b>AaBbCc123</b>   | This block type depicts menus, buttons, and other controls that appear in Web browsers and other graphical interfaces.   | Click the <b>&lt;Save&gt;</b> button.  |



---

# Chapter 1. CNOS Basics

Your Lenovo switch is ready to perform basic switching functions right out of the box. Some of the more advanced features, however, require some administrative configuration before they can be used effectively.

This guide describes the individual Industry-Standard Command Line Interface (ISCLI) commands available for the switch.

The ISCLI provides a direct method for collecting switch information and performing switch configuration. Using a basic terminal, the ISCLI allows you to view information and statistics about the switch, and to perform any necessary configuration.

This chapter explains how to access the ISCLI for the switch.

---

## ISCLI Command Modes

The ISCLI has three major command modes listed in order of increasing privileges, as follows:

- User EXEC Mode (e.g. `Switch>`)  
This is the initial mode of access. By default, password checking is disabled for this mode, on console.
- Privileged EXEC mode (e.g. `Switch#`)  
This mode is accessed from User EXEC Mode. This mode can be accessed using the following command: **enable**
- Configuration Mode (e.g. `Switch(config)#`)  
This mode allows you to make changes to the running configuration. If you save the configuration, the settings survive a reload of the switch. Several sub-modes can be accessed from the User EXEC Mode. This mode can be accessed using the following command: **configure device**

Each mode provides a specific set of commands. Most lower-privilege mode commands are accessible when using a higher-privilege mode.

**Note:** The word “Switch” is a generic term used throughout the *Command Reference Guide* to indicate the hostname of the switch when issuing commands. Depending on the switch type, the CLI prompt will display either G8272, G8296, G8332, NE1032, NE1032T, NE1072T, or NE10032 as the default hostname.



---

## Command Line Interface Shortcuts

The following shortcuts allow you to enter commands quickly and easily.

### CLI List and Range Inputs

For VLAN and port commands that allow an individual item to be selected from within a numeric range, lists and ranges of items can now be specified. For example, the `vlan` command permits the following options:

```
Switch(config)# vlan 1, 3, 3094           (access VLANs 1, 3, and 3094)
Switch(config)# vlan 1-20                 (access VLANs 1 through 20)
Switch(config)# vlan 1-5, 90-99, 3090-3094 (access multiple ranges)
Switch(config)# vlan 1-5, 19, 20, 3090-3094 (access a mix of lists and ranges)
```

The numbers in a range must be separated by a dash: `<start of range>-<end of range>`

Multiple ranges or items are permitted using a comma: `<range or item 1>, <range or item 2>`

Do not use spaces within list and range specifications.

Ranges can also be used to apply the same command option to multiple items. For example, to access multiple ports with one command:

```
Switch(config)# interface ethernet 1/10-12 (Ports 10 through 12)
Switch(config-if-range)#
```

### Command Abbreviation

Most commands can be abbreviated by entering the first characters which distinguish the command from the others in the same mode. For example, consider the following full command:

```
Switch(config)# spanning-tree mst max-age 30
```

It can be abbreviated as follows:

```
Switch(config)# sp ms max-a 30
```

### Tab Completion

By entering the first letter of a command at any prompt and pressing **<Tab>**, the ISCLI displays all available commands or options that begin with that letter. Entering additional letters further refines the list of commands or options displayed. If only one command fits the input text when **<Tab>** is pressed, that command is supplied on the command line, waiting to be entered.

If multiple commands share the typed characters, when you press **<Tab>**, the ISCLI completes the common part of the shared syntax.

## Line Editing

The following keystroke commands are available for editing command lines:

| Command         | Behavior  |
|-----------------|---|
| <b>Ctrl + A</b> | Moves the cursor to the beginning of the line.  |
| <b>Ctrl + B</b> | Moves the cursor one character to the left.   |
| <b>Ctrl + D</b> | Deletes the character at the cursor.  |
| <b>Ctrl + E</b> | Moves the cursor to the end of the line.  |
| <b>Ctrl + F</b> | Moves the cursor one character to the right.  |
| <b>Ctrl + K</b> | “Kills” all text to the right of the cursor, putting it into a buffer.                    |
| <b>Ctrl + L</b> | Blanks the screen, leaving the current line intact at the top.                            |
| <b>Ctrl + N</b> | Move to the next command in the command history.  |
| <b>Ctrl + P</b> | Move to the previous command in the command history.                                      |
| <b>Ctrl + T</b> | Swaps the character at the cursor with the character to the left of the cursor.           |
| <b>Ctrl + U</b> | Clears all text from the command line.  |
| <b>Ctrl + W</b> | Deletes from the cursor to the start of the “word.”                                       |
| <b>Ctrl + Y</b> | “Yank” the text from the kill buffer.   |
| <b>Esc + B</b>  | Moves the cursor backwards one “word.”  |
| <b>Esc + C</b>  | Capitalizes the first letter of the “word” or the character where the cursor is pointing. |
| <b>Esc + D</b>  | Deletes to the end of the word to the right of the cursor.                                |
| <b>Esc + F</b>  | Moves the cursor forwards one “word.”   |
| <b>Esc + L</b>  | Changes the text to lowercase from the cursor to the end of the “word.”                   |
| <b>Esc + U</b>  | Changes the text to uppercase from the cursor to the end of the “word.”                   |

---

## User Access Levels

To enable better switch management and user accountability, two levels or *classes* of user access have been implemented on the switch. Levels of access to CLI, Web management functions, and screens increase as needed to perform various switch management tasks. Conceptually, access classes are defined as follows:

- **network-operator**

Interaction with the switch is completely passive—nothing can be changed on the switch. Users may display information that has no security or privacy implications, such as switch statistics and current operational state information.

- **network-admin**

Administrators are the only ones that may make permanent changes to the switch configuration—changes that are persistent across a reboot/reset of the switch. Administrators can access switch functions to configure and troubleshoot problems on the switch. Because administrators can also make temporary (operator-level) changes as well, they must be aware of the interactions between temporary and permanent changes.

Access to switch functions is controlled through the use of unique surnames and passwords. Once you are connected to the switch via local Telnet, remote Telnet, or SSH, you are prompted to enter a password. The default user names/password for each access level are listed in the following table.

**Note:** To maintain security, change default switch passwords after initial configuration and as regularly as required under your network security policies.

| User Account          | Description and Tasks Performed   | Password |
|-----------------------|---|----------|
| Network Operator      | The network operator has no direct responsibility for switch management. He or she can view all switch status information and statistics, but cannot make any configuration changes to the switch.        |          |
| Network Administrator | The network administrator has complete access to all command modes, information, and configuration commands on the switch, including the ability to change both the operator and administrator passwords. | admin    |

**Note:** Access to network-operator user level can be disabled by setting the password to an empty value.

---

## Using User EXEC Commands

Some basic commands are recognized throughout the ISCLI command modes. These commands are useful for obtaining online help, navigating through the interface, and for saving configuration changes.

For general help with using the CNOS ISCLI, enter **help**.

---

## display

Displays information about the given parameter.

## Syntax

**display** <parameter>

where:

| Parameter        | Description                                  |
|------------------|--|
| <i>parameter</i> | The item about which information is desired. |

For full information about the **display** commands, see [Chapter 30, “Display Commands”](#).

## Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command shows the users logged into the switch:

```
Switch> display users
```

## Restrictions

Not all **display** commands work in all modes. See [Chapter 30, “Display Commands”](#) for more information about which **display** commands work in which modes.

---

## enable

Turns on Privileged EXEC Mode.

## Syntax

**enable**

## Modes

User EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables Privileged EXEC Mode:

```
Switch> enable
```

---

## exit

Leave the current command mode and returns to the previous command mode.

**Note:** If in User EXEC or Privileged EXEC Modes, executing the command will log off the switch.

## Syntax

**exit**

## Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Examples

The following command exists Configuration Command Mode and returns to the Privileged EXEC Mode:

```
Switch(config)# exit
Switch#
```

The following command exists Privileged EXEC Mode and returns to the login screen:

```
Switch# exit
Switch login:
```

---

## help

Gives a brief description of the interactive help system.

## Syntax

**help**

## Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays a short help text:

```
Switch> help

NOS CLI provides advanced help feature. When you need help, anytime at
the command line please press '?'.

If nothing matches, the help list will be empty and you must backup until
entering a '?' shows the available options.
Two styles of help are provided:
1. Full help is available when you are ready to enter a command argument
   (e.g. 'show ?') and describes each possible argument.
2. Partial help is provided when an abbreviated argument is entered and
   you want to know what arguments match the input (e.g. 'show ve?'.)
```



---

## logging terminal

Enables or disables the current SSH/Telnet terminal session logging output.

By default, terminal session logging is enabled.

### Syntax

**[no] logging terminal**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification   |
|---------|--|
| 10.2    | The command was introduced.                                      |
| 10.4    | The command can be also executed from Global Configuration mode. |

### Example

The following command disables terminal session logging:

```
Switch> no logging terminal
```

### Related Commands

| Command                              | Description  |
|--------------------------------------|--|
| <a href="#">display logging info</a> | Displays general logging information.                      |
| <a href="#">display monitor</a>      | Displays Ethernet Switch Port Analyzer (SPAN) information. |

---

## logout

Logs you off the switch.

## Syntax

**logout**

## Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command logs you off the switch:

```
Switch> logout  
Switch login:
```

---

## ntp sync-retry

Retries Network Time Protocol (NTP) synchronization with configured servers.

### Syntax

```
ntp sync-retry
```

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command retries NTP synchronization:

```
Switch> ntp sync-retry
```

---

## quit

Logs you off the switch.

## Syntax

**quit**

## Modes

- User EXEC Mode
- Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command logs off the switch:

```
Switch# quit
Switch login:
```

---

## remove aaa local user lockout

Unlocks a user that has been locked out during.

### Syntax

**remove aaa local user lockout username** *<username>*

where:

| Parameter       | Description                          |
|-----------------|--------------------------------------|
| <i>username</i> | The name of the user being unlocked. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command clears the lockout for the user user134:

```
Switch> remove aaa local user lockout username user134
```

---

## remove access-list counters

Resets Access Control List (ACL) statistics.

### Syntax

**remove access-list counters** [*<ACL>*]

where:

| Parameter  | Description  |
|------------|--|
| <i>ACL</i> | The name of an ACL for which its statistics will be reset. |

**Note:** If no access list is supplied, all access list statistics are reset.

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets the statistics for the access list `myList`:

```
Switch> remove access-list counters myList
```

---

## remove arp access-list counters

Resets Address Resolution Protocol (ARP) ACL statistics.

### Syntax

**remove arp access-list counters** [*<ARP ACL>*]

where:

| Parameter      | Description  |
|----------------|--|
| <i>ARP ACL</i> | The name of an ARP ACL for which its statistics will be reset. |

**Note:** If no access list is supplied, all ARP access list statistics are reset.

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets the statistics for the access list `myList`:

```
Switch> remove arp access-list counters myList
```

---

## remove bgp ipv4 unicast policy statistics redistribute

Resets Border Gateway Protocol (BGP) IPv4 policy-related information, route filter statistics, and statistics for redistribution.

### Syntax

```
remove bgp ipv4 unicast policy statistics redistribute  
{all|direct|static} [vrf {all|default}]
```

where:

| Parameter          | Description   |
|--------------------|---|
| <b>all</b>         | Resets all BGP statistics for redistributed protocols.                        |
| <b>direct</b>      | Resets BGP statistics for directly-connected switches.                        |
| <b>static</b>      | Resets BGP statistics for static addresses.                                   |
| <b>vrf all</b>     | Resets BGP statistics for all Virtual Routing And Forwarding (VRF) instances. |
| <b>vrf default</b> | Resets BGP statistics for the default VRF instance.                           |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets the statistics for the all redistributed protocols:

```
Switch> remove bgp ipv4 unicast policy statistics redistribute all
```



---

## remove bgp ipv6 unicast policy statistics redistribute

Resets Border Gateway Protocol (BGP) IPv6 policy-related information, route filter statistics, and statistics for redistribution.

### Syntax

```
remove bgp ipv6 unicast policy statistics redistribute  
{all|direct|static} [vrf {all|default}]
```

where:

| Parameter          | Description   |
|--------------------|---|
| <b>all</b>         | Resets all BGP statistics for redistributed protocols.                        |
| <b>direct</b>      | Resets BGP statistics for directly-connected switches.                        |
| <b>static</b>      | Resets BGP statistics for static addresses.                                   |
| <b>vrf all</b>     | Resets BGP statistics for all Virtual Routing And Forwarding (VRF) instances. |
| <b>vrf default</b> | Resets BGP statistics for the default VRF instance.                           |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command resets the statistics for the all redistributed protocols:

```
Switch> remove bgp ipv6 unicast policy statistics redistribute all
```

---

## remove cee pfc counters

Resets Priority Flow Control (PFC) statistics.

### Syntax

**remove cee pfc counters** [**interface ethernet** <*chassis number*/  
*port number*>]

where:

| Parameter  | Description   |
|--|---|
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Resets PFC statistics for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command resets PFC statistics for ethernet interface 1/12:

```
Switch> remove cee pfc counters interface ethernet 1/12
```

### Restrictions

This command is not supported on the NE1032T and the NE1072T.

---

## remove cli history

Resets the command line history.

### Syntax

```
remove cli history
```

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets the CLI history:

```
Switch> remove cli history
```

---

## remove copp statistics

Resets Control Plane Policing (CoPP) statistics.

### Syntax

```
remove copp statistics
```

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets all CoPP statistics:

```
Switch> remove copp statistics
```

---

## remove counters

Resets all statistics.

### Syntax

```
remove counters [interface {all|<interface name>}|ethernet <chassis number/port number>|loopback <loopback interface number>|mgmt 0|port-aggregation <LAG number>|vlan <VLAN ID>}]
```

where:

| Parameter   | Description  |
|---|--|
| <b>interface</b>                                  | Resets statistics for a switch interface.  |
| <b>all</b>  | Resets statistics for all switch interfaces.   |
| <i>interface name</i>                             | Resets statistics for the interface identified by its name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Resets statistics for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface number</i>  | Resets statistics for the specified loopback interface. The <i>loopback interface number</i> is an integer from 0 to 7.                  |
| <b>mgmt 0</b>                                     | Resets statistics for the management interface.  |
| <b>port-aggregation</b> <i>LAG number</i>         | Resets statistics for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.                    |
| <b>vlan</b> <i>VLAN ID</i>                        | Resets statistics for the specified VLAN interface. The <i>VLAN ID</i> is an integer from 1 to 4094.                                     |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Examples

The following command resets all statistics:

```
Switch> remove counters
```

The following command resets statistics for ethernet port 1/12:

```
Switch> remove counters interface ethernet 1/12
```

---

## remove ip access-list counters

Resets all IP access list statistics.

### Syntax

**remove ip access-list counters** [*<ACL name>*]

where:

| Parameter       | Description   |
|-----------------|---|
| <i>ACL name</i> | The name of the Access Control List (ACL) for which its statistics will be reset. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets all IP counters from access list myACL:

```
Switch> remove ip access-list counters myACL
```

---

## remove ip bgp statistics

Resets all Border Gateway Protocol (BGP) statistics.

### Syntax

```
remove ip bgp statistics
```

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets all BGP statistics:

```
Switch> remove ip bgp statistics
```



---

## remove ip dhcp snooping counters

Resets all Dynamic Host Configuration Protocol (DHCP) Snooping statistics.

### Syntax

```
remove ip dhcp snooping counters
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command resets DHCP Snooping statistics:

```
Switch> remove ip dhcp snooping counters
```

---

## remove ip igmp snooping

Resets Internet Group Management Protocol (IGMP) Snooping statistics and deletes all IGMP Snooping entries.

### Syntax

```
remove ip igmp snooping [ecp statistics]{group|mrouter}  
{*|<mrouter IPv4 address>|vlan <VLAN ID>}|statistics {all|vlan  
<VLAN ID>}]
```

where:

| Parameter                                | Function  |
|--|---|
| <b>ecp statistics</b>                    | Resets IGMP Snooping ECP statistics.  |
| <b>group</b>                             | Deletes IGMP group entries.   |
| <b>mrouter</b>                           | Deletes IGMP multicast router cache entries.  |
| *  | Deletes all entries.  |
| <i>mrouter IPv4 address</i>              | Deletes IGMP entries for the specified multicast IP address.                                  |
| <b>vlan</b> <i>VLAN ID</i>               | Deletes IGMP entries for the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 4094. |
| <b>statistics all</b>                    | Resets all IGMP Snooping statistics.  |
| <b>statistics vlan</b><br><i>VLAN ID</i> | Resets IGMP Snooping statistics for the specified VLAN. The <i>VLAN ID</i> is from 1 to 4094. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                        |
|---------|-------------------------------------|
| 10.1    | The command was introduced.         |
| 10.3    | Added <b>ecp statistics</b> option. |

### Example

The following command resets all IGMP Snooping statistics:

```
Switch> remove ip igmp snooping statistics all
```

---

## remove ip ospf neighbors

Resets Open Shortest Path First (OSPF) neighbor statistics.

### Syntax

```
remove ip ospf [<OSPF instance>] neighbors {*|<OSPF neighbor address>|  
<interface name>|ethernet <chassis number/port number>|loopback <loopback  
interface number>|vlan <VLAN ID>} vrf {all|default}
```

where:

| Parameter   | Function   |
|---|--|
| <i>OSPF process ID</i>                            | Resets OSPF neighbor statistics for the specified OSPF instance. The <i>OSPF instance</i> is an integer from 0 to 65535.                               |
| <b>*</b>  | Resets OSPF statistics for all neighbors.  |
| <i>OSPF neighbor address</i>                      | Resets OSPF statistics for the neighbor identified by its IPv4 address.  |
| <i>interface name</i>                             | Resets OSPF neighbor statistics for the interface identified by its name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Resets OSPF neighbor statistics for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface number</i>  | Resets OSPF neighbor statistics for the specified loopback interface. The <i>loopback interface number</i> is an integer from 0 to 7.                  |
| <b>vlan</b> <i>VLAN ID</i>                        | Resets OSPF neighbor statistics for the specified VLAN interface. The <i>VLAN ID</i> is an integer from 1 to 4094.                                     |
| <b>vrf all</b>                                    | Resets OSPF neighbor statistics for all Virtual Routing and Forwarding (VRF) instances.  |
| <b>vrf default</b>                                | Resets OSPF neighbor statistics for the default VRF instance.  |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command resets all OSPF neighbor statistics:

```
Switch> remove ip ospf neighbors *
```

---

## remove ip ospf policy statistics redistribute

Resets Open Shortest Path First (OSPF) redistribution policy related statistics.

### Syntax

```
remove ip ospf policy statistics redistribute {bgp|direct|static}
```

where:

| Parameter     | Function   |
|---------------|--|
| <b>bgp</b>    | Resets statistics only for routes learned through the Border Gateway Protocol (BGP). |
| <b>direct</b> | Resets statistics only for directly connected routes.                                |
| <b>static</b> | Resets statistics only for static routes.  |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets OSPF redistribution policy related statistics only for directly connected routes:

```
Switch> remove ip ospf policy statistics redistribute direct
```

---

## remove ip ospf rib counters

Resets Open Shortest Path First (OSPF) Routing Information Base (RIB) statistics.

### Syntax

```
remove ip ospf rib counters [vrf {all|default}]
```

where:

| Parameter          | Function   |
|--------------------|--|
| <b>vrf all</b>     | Resets OSPF RIB statistics for all Virtual Routing and Forwarding (VRF) instances. |
| <b>vrf default</b> | Resets OSPF RIB statistics for the default VRF instance.                           |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets all OSPF RIB statistics:

```
Switch> remove ip ospf rib counters
```

---

## remove ip ospf statistics

Resets Open Shortest Path First (OSPF) statistics.

### Syntax

```
remove ip ospf [<OSPF instance>] statistics [vrf {all|default}]
```

where:

| Parameter            | Function  |
|----------------------|---|
| <i>OSPF instance</i> | Resets OSPF statistics for the specified OSPF instance. The <i>OSPF instance</i> is an integer from 0 to 65535. |
| <b>vrf all</b>       | Resets OSPF statistics for all Virtual Routing and Forwarding (VRF) instances.                                  |
| <b>vrf default</b>   | Resets OSPF statistics for the default VRF instance.  |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets all OSPF statistics:

```
Switch> remove ip ospf statistics
```

---

## remove ip ospf traffic

Resets Open Shortest Path First (OSPF) traffic statistics.

### Syntax

```
remove ip ospf [<OSPF instance>] traffic [<interface name> | ethernet  
<chassis number/port number> | loopback <loopback interface number> | vlan  
<VLAN ID>] [vrf {all | default}]
```

where:

| Parameter   | Function  |
|---|---|
| <i>OSPF instance</i>                              | Resets OSPF traffic statistics for the specified OSPF instance. The <i>OSPF instance</i> is from 0 to 65535.  |
| <i>interface name</i>                             | Resets OSPF traffic statistics for the interface identified by its name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Resets OSPF traffic statistics for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface number</i>  | Resets OSPF traffic statistics for the specified loopback interface. The <i>loopback interface number</i> is an integer from 0 to 7.                  |
| <b>vlan</b> <i>VLAN ID</i>                        | Resets traffic statistics for the specified VLAN interface. The <i>VLAN ID</i> is an integer from 1 to 4094.  |
| <b>vrf all</b>                                    | Resets OSPF traffic statistics for all Virtual Routing and Forwarding (VRF) instances.  |
| <b>vrf default</b>                                | Resets OSPF traffic statistics for the default VRF instance.  |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets all OSPF traffic statistics:

```
Switch> remove ip ospf traffic
```



---

## remove ip slp counters

Resets Service Location Protocol (SLP) traffic statistics.

### Syntax

```
remove ip slp counters
```

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command resets all SLP traffic statistics:

```
Switch> remove ip slp counters
```

---

## remove ipv6 adjacency

Resets the IPv6 adjacency table.

### Syntax

```
remove ipv6 adjacency [<interface name> | <neighbor address> | ethernet <chassis number/port number> | loopback <loopback interface number> | mgmt 0 | port-aggregation <LAG number> | vlan <VLAN ID>] [force-clear] [vrf {all | default | management}]
```

where:

| Parameter   | Description  |
|---|--|
| <i>interface name</i>                             | Resets the IPv6 adjacency table for the interface identified by its name.  |
| <i>neighbor address</i>                           | Resets the IPv6 adjacency table for the neighbor identified by its IPv6 address.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Resets the IPv6 adjacency table for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface number</i>  | Resets the IPv6 adjacency table for the specified loopback interface. The <i>loopback interface number</i> is an integer from 0 to 7.                  |
| <b>mgmt 0</b>                                     | Resets the IPv6 adjacency table for the management interface.  |
| <b>port-aggregation</b> <i>LAG number</i>         | Resets the IPv6 adjacency table for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.                    |
| <b>vlan</b> <i>VLAN ID</i>                        | Resets the IPv6 adjacency table for the specified VLAN interface. The <i>VLAN ID</i> is an integer from 1 to 4094.                                     |
| <b>force-clear</b>                                | Resets the IPv6 adjacency table without a refresh.   |
| <b>vrf all</b>                                    | Resets IPv6 adjacency entries for all Virtual Routing And Forwarding (VRF) instances.  |
| <b>vrf default</b>                                | Resets IPv6 adjacency entries for the default VRF instance.  |
| <b>vrf management</b>                             | Resets IPv6 adjacency entries for the management VRF instance.   |

## Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Examples

The following command resets all IPv6 adjacency table entries for the neighbor with IPv6 address 2001:db8:85a3::8a2e:370:7334:

```
Switch> remove ipv6 adjacency 2001:db8:85a3::8a2e:370:7334
```

The following command forces a reset of all default VRF IPv6 adjacency table entries for the management interface:

```
Switch> remove ipv6 adjacency mgmt 0 force-clear vrf default
```

---

## remove ipv6 neighbor

Deletes all IPv6 neighbors.

### Syntax

```
remove ipv6 neighbor [<interface name> | <neighbor address>] ethernet  
<chassis number/port number> | loopback <loopback interface number> | mgmt 0 |  
port-aggregation <LAG number> | vlan <VLAN ID>] [force-clear]  
[vrf {all | default | management}]
```

where:

| Parameter   | Function  |
|---|---|
| <i>interface name</i>                             | Deletes the IPv6 neighbors for the interface identified by its name.  |
| <i>neighbor address</i>                           | Deletes the IPv6 neighbors for the neighbor identified by its IPv6 address.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Deletes the IPv6 neighbors for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface number</i>  | Deletes the IPv6 neighbors for the specified loopback interface. The <i>loopback interface number</i> is an integer from 0 to 7.                  |
| <b>mgmt 0</b>                                     | Deletes the IPv6 neighbors for the management interface.  |
| <b>port-aggregation</b> <i>LAG number</i>         | Deletes the IPv6 neighbors for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.                    |
| <b>vlan</b> <i>VLAN ID</i>                        | Deletes the IPv6 neighbors for the specified VLAN interface. The <i>VLAN ID</i> is an integer from 1 to 4094.                                     |
| <b>force-clear</b>                                | Deletes the IPv6 neighbors without a refresh.   |
| <b>vrf all</b>                                    | Deletes the IPv6 neighbors for all Virtual Routing And Forwarding (VRF) instances.  |
| <b>vrf default</b>                                | Deletes the IPv6 neighbors for the default VRF instance.  |
| <b>vrf management</b>                             | Deletes the IPv6 neighbors for the management VRF instance.   |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command deletes all IPv6 neighbors:

```
Switch> remove ipv6 neighbor
```

---

## remove lacp counters

Resets Link Aggregation Control Protocol (LACP) statistics.

### Syntax

**remove lacp counters** [**interface port-aggregation** <LAG number>]

where:

| Parameter  | Description  |
|--|--|
| <b>interface port-aggregation</b><br><i>LAG number</i> | Resets LACP statistics for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets LACP statistics from LAG 85:

```
Switch> remove lacp counters interface port-aggregation 85
```

---

## remove lacp internal event-history

Deletes the Link Aggregation Control Protocol (LACP) internal event logs.

### Syntax

```
remove lacp internal event-history {all|errors|interface|
msgs}
```

where:

| Parameter        | Description                           |
|------------------|---------------------------------------|
| <b>all</b>       | Deletes all LACP event logs.          |
| <b>errors</b>    | Deletes only the LACP error logs.     |
| <b>interface</b> | Deletes only the LACP interface logs. |
| <b>msgs</b>      | Deletes only the LACP message logs.   |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes the LACP interface logs:

```
Switch> remove lacp internal event-history interface
```

---

## remove line

Deletes the session on the specified virtual terminal (VTY).

### Syntax

**remove line** <VTY name>

where:

| Parameter       | Description                                |
|-----------------|--|
| <i>VTY name</i> | The name of the VTY session being deleted. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command clears a VTY named myVTY:

```
Switch> remove line myVTY
```



---

## remove lldp counters

Resets Link Layer Discovery Protocol (LLDP) statistics.

### Syntax

```
remove lldp counters [interface {ethernet <chassis number/port number>|mgmt 0}]
```

where:

| Parameter   | Description   |
|---|---|
| <b>interface</b>                                  | Resets LLDP statistics for the specified interface.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Resets LLDP statistics for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>mgmt 0</b>                                     | Resets LLDP statistics for the management interface.  |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets LLDP statistics for ethernet interface 1/12:

```
Switch> remove lldp counters interface ethernet 1/12
```

---

## remove lldp internal event-history

Deletes the Link Layer Discovery Protocol (LLDP) internal event logs.

### Syntax

```
remove lldp internal event-history {all|errors|event|msgs|trace}
```

where:

| Parameter     | Description                         |
|---------------|-------------------------------------|
| <b>all</b>    | Deletes all LLDP event logs.        |
| <b>errors</b> | Deletes only the LLDP error logs.   |
| <b>event</b>  | Deletes only the LLDP event logs.   |
| <b>msgs</b>   | Deletes only the LLDP message logs. |
| <b>trace</b>  | Deletes only the LLDP trace logs.   |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes the LACP message logs:

```
Switch> remove lldp internal event-history msgs
```

---

## remove lldp neighbors

Deletes Link Layer Discovery Protocol (LLDP) neighbors.

### Syntax

```
remove lldp neighbors [interface {ethernet <chassis number/port number> | mgmt 0}]
```

where:

| Parameter   | Description   |
|---|---|
| <b>interface</b>                                  | Deletes LLDP neighbors for the specified interface.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Deletes LLDP neighbors for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>mgmt 0</b>                                     | Deletes LLDP neighbors for the management interface.  |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes LLDP neighbors for ethernet interface 1/1:

```
Switch> remove lldp neighbors interface ethernet 1/1
```

---

## remove mac access-list counters

Resets MAC Access Control Lists (ACLs) statistics.

### Syntax

```
remove mac access-list counters [<MAC ACL>]
```

where:

| Parameter      | Description                                       |
|----------------|---|
| <i>MAC ACL</i> | Resets statistics only for the specified MAC ACL. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets statistics for the MAC ACL named myMACList:

```
Switch> remove mac access-list counters myMACList
```

---

## remove mac address-table

Deletes MAC entries from the Forwarding Database (FDB).

### Syntax

```
remove mac address-table {dynamic|static} [address <MAC address>|interface {ethernet <chassis number/port number>|port-aggregation <LAG number>} [vlan <VLAN ID>]]
```

where:

| Parameter   | Description   |
|---|---|
| <b>dynamic</b>                                    | Deletes only dynamic MAC entries.   |
| <b>static</b>                                     | Deletes only static MAC entries.  |
| <b>address</b> <i>MAC address</i>                 | Deletes the specified MAC entry. The MAC address can be written as one of the following formats: <ul style="list-style-type: none"><li>• X.X.X</li><li>• XX-XX-XX-XX-XX-XX</li><li>• XX:XX:XX:XX:XX:XX</li><li>• XXXX.XXXX.XXXX</li></ul> |
| <b>interface</b>                                  | Deletes MAC entries associated with the specified switch interface.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Deletes MAC entries associated with the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.  |
| <b>port-aggregation</b> <i>LAG number</i>         | Deletes MAC entries associated with the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.   |
| <b>vlan</b> <i>VLAN ID</i>                        | Deletes MAC entries associated with the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 3999.  |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command resets all dynamic MAC addresses from the FDB:

```
Switch> remove mac address-table dynamic
```

---

## remove npa internal event-history

Deletes the Network Policy Agent (NPA) internal event logs.

### Syntax

```
remove npa internal event-history {all|errors|msgs}
```

where:

| Parameter     | Description                        |
|---------------|------------------------------------|
| <b>all</b>    | Deletes all NPA event logs.        |
| <b>errors</b> | Deletes only the NPA error logs.   |
| <b>msgs</b>   | Deletes only the NPA message logs. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command deletes only the NPA error logs:

```
Switch> remove npa internal event-history errors
```

---

## remove qos statistics

Resets Quality of Service (QoS) statistics.

### Syntax

```
remove qos statistics [interface <interface name>|ethernet <chassis  
number/port number>|port-aggregation <LAG number>|vlan <VLAN ID>]  
[input|output] [type {qos|queuing}]
```

where:

| Parameter   | Description  |
|---|--|
| <b>interface</b>                                  | Resets QoS statistics for the specified switch interface.  |
| <i>interface name</i>                             | Resets QoS statistics for the interface identified by its name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Resets QoS statistics for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>port-aggregation</b> <i>LAG number</i>         | Resets QoS statistics for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.                    |
| <b>vlan</b> <i>VLAN ID</i>                        | Resets QoS statistics for the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 4094.   |
| <b>input</b>                                      | Resets QoS input statistics.   |
| <b>output</b>                                     | Resets QoS output statistics.  |
| <b>type qos</b>                                   | Resets only QoS statistics.  |
| <b>type queuing</b>                               | Resets only queuing statistics.  |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command resets QoS statistics:

```
Switch> remove qos statistics input type qos
```

---

## remove rib ipc stats

Resets Routing Information Base (RIB) Inter-Process Communication (IPC) statistics.

### Syntax

```
remove rib ipc stats
```

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets RIB IPC statistics:

```
Switch> remove rib ipc stats
```

---

## remove snmp hostconfig

Resets the Simple Network Management Protocol (SNMP) host configuration.

### Syntax

```
remove snmp hostconfig
```

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets SNMP host configuration:

```
Switch> remove snmp hostconfig
```

---

## remove spanning-tree counters

Resets Spanning Tree statistics.

### Syntax

**remove spanning-tree counters** [**interface** {**ethernet** *<chassis number/port number>* | **port-aggregation** *<LAG number>* | **vlan** *<VLAN ID>*]

where:

| Parameter   | Description  |
|---|--|
| <b>interface</b>                                  | Resets Spanning Tree statistics for the specified switch interface.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Resets Spanning Tree statistics for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>port-aggregation</b> <i>LAG number</i>         | Resets Spanning Tree statistics for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.                    |
| <b>vlan</b> <i>VLAN ID</i>                        | Resets Spanning Tree statistics for the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 4094.   |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets spanning tree counters for ethernet port 1/12:

```
Switch> remove spanning-tree counters interface ethernet 1/12
```

---

## remove spanning-tree internal event-history

Deletes the Spanning Tree internal event history.

### Syntax

```
remove spanning-tree internal event-history {all|deleted|errors|msgs|tree}
```

where:

| Parameter      | Description                                       |
|----------------|---|
| <b>all</b>     | Deletes all event history.                        |
| <b>deleted</b> | Deletes event history of deleted trees and ports. |
| <b>errors</b>  | Deletes STP error event history logs.             |
| <b>msgs</b>    | Deletes STP message event history logs.           |
| <b>tree</b>    | Deletes STP instance information.                 |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets the STP internal event history of deleted trees and ports:

```
Switch> remove spanning-tree internal event-history deleted
```

---

## remove statistics microburst

Resets the microburst statistics for all ethernet interfaces that have microburst detection enabled.

### Syntax

**remove statistics microburst** [**interface ethernet** *<chassis number/port number>*]

where:

| Parameter  | Description   |
|--|---|
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Resets the microburst statistics for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets microburst statistics:

```
Switch> remove statistics microburst
```

---

## remove user

Logs out the specified user.

### Syntax

**remove user** <username>

where:

| Parameter       | Description   |
|-----------------|---|
| <i>username</i> | Logs out the user identified by its username. The <i>username</i> can be up to 28 characters in length. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command logs out the user notAdmin10:

```
Switch> remove user notAdmin10
```

---

## remove vlag internal event-history

Resets the Virtual Link Aggregation Group (vLAG) internal event history messages as specified.

### Syntax

```
remove vlag internal event-history {all|errors|msgs}
```

where:

| Parameter     | Description               |
|---------------|---------------------------|
| <b>all</b>    | Resets all vLAG events.   |
| <b>errors</b> | Resets all vLAG errors.   |
| <b>msgs</b>   | Resets all vLAG messages. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets vLAG message events:

```
Switch> remove vlag internal event-history msgs
```



---

## remove vlag statistics

Resets Virtual Link Aggregation Group (vLAG) statistics.

### Syntax

```
remove vlag statistics
```

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets vLAG statistics:

```
Switch> remove vlag statistics
```

---

## remove vlan access-list counters

Resets VLAN access list statistics.

### Syntax

**remove vlan access-list counters** [*<VLAN access map>*]

where:

| Parameter              | Description   |
|------------------------|---|
| <i>VLAN access map</i> | Resets the VLAN statistics for the specified VLAN access map. |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets access list statistics for the VLAN access map myVLANMap:

```
Switch> remove vlan access-list counters myVLANMap
```

---

## remove vrrp

Deletes statistics for the specified Virtual Router Redundancy Protocol (VRRP) session.

### Syntax

```
remove vrrp [ipv6] vr <VRRP group ID> interface {<interface name>|ethernet <chassis number/port number>|vlan <VLAN ID>}
```

where:

| Parameter   | Description  |
|---|--|
| <b>ipv6</b>                                       | Specifies that the VRRP session is an IPv6 VRRP session.   |
| <b>vr</b> <i>VRRP group ID</i>                    | Deletes VRRP statistics for the specified VRRP group. The <i>VRRP group ID</i> is an integer from 1 to 255.                                    |
| <b>interface</b>                                  | Deletes VRRP statistics for the specified interface.   |
| <i>interface name</i>                             | Deletes VRRP statistics for the interface identified by its name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Deletes VRRP statistics for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>vlan</b> <i>VLAN ID</i>                        | Deletes VRRP statistics for the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 4094.   |

### Modes

- User EXEC Mode
- Privileged EXEC Mode
- Global Configuration

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes IPv6 VRRP statistics for ethernet port 1/12:

```
Switch> remove vrrp ipv6 vr 2 interface ethernet 1/12
```

---

## terminal length

Configures the number of lines to display before the screen pauses.

The default value is 24 lines.

**Note:** Configuring 0 (zero) lines means that there are no screen pauses.

## Syntax

**terminal [no] length** <*number of lines*>

where:

| Parameter              | Description  |
|------------------------|--|
| <i>number of lines</i> | Configures the number of lines displayed on the screen before a pause. The <i>number of lines</i> is an integer from 0 to 511. |

The command **terminal no length** resets the terminal length to its default value.

## Modes

- User EXEC Mode
- Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the screen length to 70:

```
Switch> terminal length 70
```

---

## terminal width

Configures the number of columns to display before the screen wraps.

### Syntax

**terminal [no] width** <*number of columns*>

where:

| Parameter                | Description  |
|--------------------------|--|
| <i>number of columns</i> | Configures the number of columns before the screen wraps. The <i>number of columns</i> is an integer from 24 to 511. |

The command **terminal no width** resets the terminal width to its default value.

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the screen width to 160:

```
Switch> terminal width 160
```

---

## terminal session-timeout

Configures the time interval before an inactive session will expire.

The default value is 5 minutes.

### Syntax

**terminal session-timeout** *<time interval>*

where:

| Parameter            | Description   |
|----------------------|---|
| <i>time interval</i> | Configures the session timeout interval. The <i>time interval</i> consists of two parts: <i>minutes</i> (an integer from 1 to 35791) and <i>seconds</i> (an integer from 1 to 2147483). |

### Modes

- User EXEC Mode
- Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the terminal session timeout to 10 minutes and 30 seconds:

```
Switch> terminal session-timeout 10 30
```

---

## where

Displays the Command Mode you are currently in.

## Syntax

**where**

## Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command shows which ISCLI mode you are in:

```
Switch(config)# where
mode:          conf
username:     admin
```





---

## Chapter 2. Privileged EXEC Mode Commands

This chapter describes how to enter Privileged EXEC Mode and the commands available in this mode.

---

## enable

Enters Privileged EXEC Mode.

## Syntax

**enable**

## Modes

User EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enters Privileged EXEC Mode:

```
Switch> enable
Switch#
```

---

## disable

Turns off Privileged EXEC Mode and returns you to User EXEC Mode.

## Syntax

**disable**

## Modes

Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command disables Privileged EXEC Mode:

```
Switch# disable  
Switch>
```

---

## clock set

Configures the system time and date.

### Syntax

**clock set** <*time*> <*day*> <*month*> <*year*>

where:

| Parameter    | Function   |
|--------------|--|
| <i>time</i>  | The <i>time</i> format is HH:MM:SS, where: <ul style="list-style-type: none"><li>• HH is the hour of the day (range is 00 to 24)</li><li>• mm is the minute of the hour (range is 00 to 60)</li><li>• ss is the second of the minute (range is 00 to 60)</li></ul> |
| <i>day</i>   | The <i>day</i> of the month (range is 1 to 31).  |
| <i>month</i> | The <i>month</i> of the year (range is January to December).   |
| <i>year</i>  | The <i>year</i> of the calendar (range is 2000 to 2030).   |

### Modes

Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command set the system time to 12 hours 30 minutes and 00 seconds and the system date to January 1<sup>st</sup> 2016:

```
Switch# clock set 12:30:00 1 January 2016
Switch# display clock

12:30:03 UTC Fri Jan 1 2016
```

---

## configure

Enters Configuration Mode.

### Syntax

**configure** [device]

### Modes

Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enters Configuration Mode:

```
Switch# configure device  
Switch(config)#
```

---

## cp alias-config

Copies the specified command alias configuration file to the specified remote server.

### Syntax

```
cp alias-config {ftp|scp|sftp|tftp} [<server URL>] [vrf {default|management}]
```

where:

| Parameter             | Description   |
|-----------------------|---|
| <b>ftp</b>            | Uses File Transfer Protocol (FTP).                                      |
| <b>scp</b>            | Uses Secure Copy Protocol (SCP).  |
| <b>sftp</b>           | Uses Secure File Transfer Protocol (SFTP).                              |
| <b>tftp</b>           | Uses Trivial File Transfer Protocol (TFTP).                             |
| <i>server URL</i>     | The URL address of the server.  |
| <b>vrf default</b>    | Copies using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Copies using the management VRF instance.                               |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command copies the command alias configuration file using TFTP:

```
Switch# cp alias-config tftp tftp://10.112.71.18/aliasConfig.cfg vrf default
```

---

## cp file

Copies the specified file to a remote server.

## Syntax

```
cp file {all|bgpd|hostpd|imi|imish|nsm|ospfd|show-redirect}
{ftp|sftp|tftp} [<server URL>] [timeout <timeout interval>] [vrf
{default|management}]
```

```
cp file {all|bgpd|hostpd|imi|imish|nsm|ospfd|show-redirect}
scp [<server URL>] [timeout <timeout interval>] [vrf {default|
management}]
```

where:

| Parameter                              | Function  |
|--|---|
| <b>all</b>                             | Copies all binary files.  |
| <b>bgpd</b>                            | Copies Border Gateway Protocol (BGP) daemon files.  |
| <b>hostpd</b>                          | Copies Host Protocol daemon files.  |
| <b>imi</b>                             | Copies Integrated Management Interface (IMI) files.   |
| <b>imish</b>                           | Copies Integrated Management Interface Shell (IMISH) files.   |
| <b>nsm</b>                             | Copies Network Service Module (NSM) files.  |
| <b>ospfd</b>                           | Copies Open Shortest Path First (OSPF) daemon files.  |
| <b>show-redirect</b>                   | Copies saved output redirect file.  |
| <b>ftp</b>                             | Uses File Transfer Protocol (FTP).  |
| <b>scp</b>                             | Uses Secure Copy Protocol (SCP).  |
| <b>sftp</b>                            | Uses Secure File Transfer Protocol (SFTP).  |
| <b>tftp</b>                            | Uses Trivial File Transfer Protocol (TFTP).   |
| <i>server URL</i>                      | The URL address of the server.  |
| <b>timeout</b> <i>timeout interval</i> | Specifies the maximum time (in seconds) to wait for the server to reply to the connection request. If the timeout period expires, the connecting process stops. The <i>timeout interval</i> is from 1 to 150 seconds. |
| <b>vrf default</b>                     | Copies using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b>                  | Copies using the management VRF instance.   |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command copies all binary files using SFTP:

```
Switch# cp file all sftp sftp://10.112.71.18/binFiles vrf management
```



---

## cp ftp

Copies a file from a remote server using File Transfer Protocol (FTP).

## Syntax

```
cp ftp <server URL> {alias-config|file {bgpd|hostpd|imi|imish|nsm|ospfd}|running-config|startup-config|system-image {all|boot|onie|os}|usb1 <file name>} [vrf {default|management}]
```

```
cp ftp {alias-config|file {bgpd|hostpd|imi|imish|nsm|ospfd}|running-config|startup-config}
```

where:

| Parameter                    | Function   |
|------------------------------|--|
| <i>server URL</i>            | The URL address of the server.   |
| <b>alias-config</b>          | Copies to the command alias configuration file.  |
| <b>file bgpd</b>             | Copies Border Gateway Protocol (BGP) daemon files.   |
| <b>file hostpd</b>           | Copies Host Protocol daemon files.   |
| <b>file imi</b>              | Copies Integrated Management Interface (IMI) files.  |
| <b>file imish</b>            | Copies Integrated Management Interface Shell (IMISH) files.  |
| <b>file nsm</b>              | Copies Network Service Module (NSM) files.   |
| <b>file ospfd</b>            | Copies Open Shortest Path First (OSPF) daemon files.   |
| <b>running-config</b>        | Copies to the running configuration.   |
| <b>startup-config</b>        | Copies to the startup configuration.   |
| <b>system-image</b>          | Copies to the system image.  |
| <b>all</b>                   | Copies both boot and OS images.  |
| <b>boot</b>                  | Copies only the boot image.  |
| <b>onie</b>                  | Copies only the Open Network Install Environment (ONIE) image.<br><b>Note:</b> Not available on the G8332. |
| <b>os</b>                    | Copies only the OS image.  |
| <b>usb1</b> <i>file name</i> | Copies to the specified file on the USB device.  |
| <b>vrf default</b>           | Copies using the default Virtual Routing and Forwarding (VRF) instance.                                    |
| <b>vrf management</b>        | Copies using the management VRF instance.  |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                        |
|---------|-------------------------------------|
| 10.1    | The command was introduced.         |
| 10.2    | Added <b>running-config</b> option. |

## Example

The following command copies a file from a remote server to the startup configuration using FTP:

```
Switch# cp ftp ftp://admin@10.112.71.18/startConfig.cfg startup-config  
vrf default
```

---

## cp obs

Copies an On-Box Script (OBS) file to a remote server.

## Syntax

**cp obs** <script name> {sftp|tftp} <server URL> [vrf {default|management}]

where:

| Parameter             | Function  |
|-----------------------|---|
| <i>script name</i>    | The name of the OBS script file.  |
| <b>sftp</b>           | Uses Secure File Transfer Protocol (SFTP).                              |
| <b>tftp</b>           | Uses Trivial File Transfer Protocol (TFTP).                             |
| <i>server URL</i>     | The URL address of the server.  |
| <b>vrf default</b>    | Copies using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Copies using the management VRF instance.                               |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command copies an OBS script file to a remote server using SFTP:

```
Switch# cp obs myScript sftp sftp://root@example.com:22/scripts/myScript
```

---

## cp running-config

Copies the running configuration file to a remote server.

### Syntax

```
cp running-config {{ftp|sftp|tftp} [<server URL>] [vrf  
{default|management}]|usb1 <file name>|startup-config}
```

```
cp running-config scp [<server URL> [timeout <timeout interval>] [vrf  
{default|management}]]
```

where:

| Parameter                              | Function  |
|--|---|
| <b>ftp</b>                             | Uses File Transfer Protocol (FTP).  |
| <b>sftp</b>                            | Uses Secure File Transfer Protocol (SFTP).  |
| <b>tftp</b>                            | Uses Trivial File Transfer Protocol (TFTP).   |
| <i>server URL</i>                      | The URL address of the server.  |
| <b>vrf default</b>                     | Copies using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b>                  | Copies using the management VRF instance.   |
| <b>usb1</b> <i>file name</i>           | Copies the running configuration file to the specified file on the USB device.  |
| <b>startup-config</b>                  | Copies the running configuration file to the startup configuration file.  |
| <b>scp</b>                             | Uses Secure Copy Protocol (SCP).  |
| <b>timeout</b> <i>timeout interval</i> | Specifies the maximum time (in seconds) to wait for the server to reply to the connection request. If the timeout period expires, the connecting process stops. The <i>timeout interval</i> is from 1 to 150 seconds. |

### Modes

Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command copies the running configuration to the startup configuration file:

```
Switch# cp running-config startup-config
```

---

## cp scp

Copies a file from a remote server using Secure Copy Protocol (SCP).

### Syntax

```
cp scp <server URL> [timeout <timeout interval>] {alias-config|
file {bgpd|hostpd|imi|imish|nsm|ospfd}|running-config|
startup-config|system-image [all|boot|onie|os]|usb1 <file name>}
[vrf {default|management}]
```

```
cp scp {alias-config|file {bgpd|hostpd|imi|imish|nsm|ospfd}|
running-config|startup-config}
```

where:

| Parameter                              | Function  |
|--|---|
| <i>server URL</i>                      | The URL address of the server.  |
| <b>timeout</b> <i>timeout interval</i> | Specifies the maximum time (in seconds) to wait for the server to reply to the connection request. If the timeout period expires, the connecting process stops. The <i>timeout interval</i> is from 1 to 150 seconds. |
| <b>alias-config</b>                    | Copies the command alias configuration file.  |
| <b>file bgpd</b>                       | Copies Border Gateway Protocol (BGP) daemon files.  |
| <b>file hostpd</b>                     | Copies Host Protocol daemon files.  |
| <b>file imi</b>                        | Copies Integrated Management Interface (IMI) files.   |
| <b>file imish</b>                      | Copies Integrated Management Interface Shell (IMISH) files.   |
| <b>file nsm</b>                        | Copies Network Service Module (NSM) files.  |
| <b>file ospfd</b>                      | Copies Open Shortest Path First (OSPF) daemon files.  |
| <b>running-config</b>                  | Copies to the running configuration.  |
| <b>startup-config</b>                  | Copies to the startup configuration.  |
| <b>system-image</b>                    | Copies to the system image.   |
| <b>all</b>                             | Copies both boot and OS images.   |
| <b>boot</b>                            | Copies only the boot image.   |
| <b>onie</b>                            | Copies only the Open Network Install Environment (ONIE) image.<br><b>Note:</b> Not available on the G8332.  |
| <b>os</b>                              | Copies only the OS image.   |
| <b>usb1</b> <i>file name</i>           | Copies to the specified file on the USB device.   |

| Parameter             | Function  |
|-----------------------|---|
| <b>vrf default</b>    | Copies using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Copies using the management VRF instance.                               |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                        |
|---------|-------------------------------------|
| 10.1    | The command was introduced.         |
| 10.2    | Added <b>running-config</b> option. |

## Example

The following command copies a file from a remote server to the startup configuration using SCP:

```
Switch# cp scp scp://admin@10.112.71.18/startConfig.cfg startup-config vrf default
```

---

## cp script-log

Copies an On-Box Script (OBS) log file to a remote server.

### Syntax

```
cp script-log <script log name> {sftp|tftp} <server URL> [vrf  
{default|management}]
```

where:

| Parameter              | Function  |
|------------------------|---|
| <i>script log name</i> | The name of the OBS script log file.                                    |
| <b>sftp</b>            | Uses Secure File Transfer Protocol (SFTP).                              |
| <b>tftp</b>            | Uses Trivial File Transfer Protocol (TFTP).                             |
| <i>server URL</i>      | The URL address of the server.  |
| <b>vrf default</b>     | Copies using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b>  | Copies using the management VRF instance.                               |

### Modes

Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command copies an OBS script log file to a remote server using SFTP:

```
Switch# cp script-log myOBSLog sftp sftp://root@example.com/logs/myOBSLog
```



---

## cp sftp

Copies a file from a remote server using Secure File Transfer Protocol (SFTP).

## Syntax

```
cp sftp <server URL> {alias-config|file {bgpd|hostpd|imi|imish|nsm|ospfd}|obs <script name>|running-config|startup-config|system-image [all|boot|onie|os]|usb1 <file name>} [vrf {default|management}]
```

```
cp sftp {alias-config|file {bgpd|hostpd|imi|imish|nsm|ospfd}|running-config|startup-config}
```

where:

| Parameter                     | Function   |
|-------------------------------|--|
| <i>server URL</i>             | The URL address of the server.   |
| <b>alias-config</b>           | Copies the command alias configuration file.   |
| <b>file bgpd</b>              | Copies Border Gateway Protocol (BGP) daemon files.   |
| <b>file hostpd</b>            | Copies Host Protocol daemon files.   |
| <b>file imi</b>               | Copies Integrated Management Interface (IMI) files.  |
| <b>file imish</b>             | Copies Integrated Management Interface Shell (IMISH) files.  |
| <b>file nsm</b>               | Copies Network Service Module (NSM) files.   |
| <b>file ospfd</b>             | Copies Open Shortest Path First (OSPF) daemon files.   |
| <b>obs</b> <i>script name</i> | Copies to the specified OBS script file.   |
| <b>running-config</b>         | Copies to the running configuration.   |
| <b>startup-config</b>         | Copies to the startup configuration.   |
| <b>system-image</b>           | Copies to the system image.  |
| <b>all</b>                    | Copies both boot and OS images.  |
| <b>boot</b>                   | Copies only the boot image.  |
| <b>onie</b>                   | Copies only the Open Network Install Environment (ONIE) image.<br><b>Note:</b> Not available on the G8332. |
| <b>os</b>                     | Copies only the OS image.  |
| <b>usb1</b> <i>file name</i>  | Copies to the specified file on the USB device.  |
| <b>vrf default</b>            | Copies using the default Virtual Routing and Forwarding (VRF) instance.                                    |
| <b>vrf management</b>         | Copies using the management VRF instance.  |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                        |
|---------|-------------------------------------|
| 10.1    | The command was introduced.         |
| 10.2    | Added <b>running-config</b> option. |

## Example

The following command copies a file from a remote server to the startup configuration using SFTP:

```
Switch# cp sftp sftp://admin@10.112.71.18/startConfig.cfg startup-config  
vrf management
```

---

## cp startup-config

Copies the startup configuration file to a remote server.

### Syntax

```
cp startup-config {{ftp|running-config|scp|sftp|tftp}  
[<server URL>] [timeout <timeout value>] [vrf {default|management}] |  
usb1 <file name>}
```

where:

| Parameter                           | Function   |
|-------------------------------------|--|
| <b>ftp</b>                          | Uses File Transfer Protocol (FTP).   |
| <b>running-config</b>               | Copies to the running configuration.   |
| <b>scp</b>                          | Uses Secure Copy Protocol (SCP).   |
| <b>sftp</b>                         | Uses Secure File Transfer Protocol (SFTP).   |
| <b>tftp</b>                         | Uses Trivial File Transfer Protocol (TFTP).  |
| <i>server URL</i>                   | The URL address of the server.   |
| <b>timeout</b> <i>timeout value</i> | Specifies the maximum time (in seconds) to wait for the server to reply to the connection request. If the timeout period expires, the connecting process stops. The <i>timeout value</i> is from 1 to 150 seconds.<br><b>Note:</b> This parameter is available only using SCP. |
| <b>vrf default</b>                  | Copies using the default Virtual Routing and Forwarding (VRF) instance.  |
| <b>vrf management</b>               | Copies using the management VRF instance.  |
| <b>usb1</b> <i>file name</i>        | Copies the startup configuration file to the specified file on the USB device.   |

### Modes

Privileged EXEC Mode

## History

| Release | Modification                        |
|---------|-------------------------------------|
| 10.1    | The command was introduced.         |
| 10.2    | Added <b>running-config</b> option. |

## Example

The following command copies the startup configuration to the file `startup-config-copy.cfg` on the USB device:

```
Switch# cp startup-config usb1 startup-config-copy.cfg
```

---

## cp tech-support

Copies the technical support information dump file to a remote server.

### Syntax

```
cp tech-support {ftp|scp|sftp|tftp} <server URL> [timeout  
<timeout interval>] [vrf {default|management}]
```

where:

| Parameter                              | Function  |
|--|---|
| <b>ftp</b>                             | Uses File Transfer Protocol (FTP).  |
| <b>scp</b>                             | Uses Secure Copy Protocol (SCP).  |
| <b>sftp</b>                            | Uses Secure File Transfer Protocol (SFTP).  |
| <b>tftp</b>                            | Uses Trivial File Transfer Protocol (TFTP).   |
| <i>server URL</i>                      | The URL address of the server.  |
| <b>timeout</b> <i>timeout interval</i> | Specifies the maximum time (in seconds) to wait for the server to reply to the connection request. If the timeout period expires, the connecting process stops. The <i>timeout interval</i> is from 1 to 150 seconds.<br><b>Note:</b> This parameter is available only using SCP. |
| <b>vrf default</b>                     | Copies using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b>                  | Copies using the management VRF instance.   |

### Modes

Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command copies the technical support dump file to a remote server using SFTP:

```
Switch# cp tech-support sftp  
sftp://root@example.com:2222/dumpFiles/techSupport-EX67T
```

---

## cp tftp

Copies a file from a remote server using Trivial File Transfer Protocol (TFTP).

### Syntax

```
cp tftp <server URL> {alias-config|file {bgpd|hostpd|imi|
imish|nsm|ospfd}|lsm-cert|obs <script name>|running-config|
startup-config|system-image [all|boot|onie|os]|usb1 <file name>}
[vrf {default|management}]
```

```
cp tftp {file {alias-config|bgpd|hostpd|imi|imish|nsm|ospfd}|
running-config|startup-config}
```

where:

| Parameter                     | Function   |
|-------------------------------|--|
| <i>server URL</i>             | The URL address of the server.   |
| <b>alias-config</b>           | Copies the command alias configuration file.   |
| <b>file bgpd</b>              | Copies Border Gateway Protocol (BGP) daemon files.   |
| <b>file hostpd</b>            | Copies Host Protocol daemon files.   |
| <b>file imi</b>               | Copies Integrated Management Interface (IMI) files.  |
| <b>file imish</b>             | Copies Integrated Management Interface Shell (IMISH) files.  |
| <b>file nsm</b>               | Copies Network Service Module (NSM) files.   |
| <b>file ospfd</b>             | Copies Open Shortest Path First (OSPF) daemon files.   |
| <b>lsm-cert</b>               | Copies Low Security Mode (LSM) certificate.  |
| <b>obs</b> <i>script name</i> | Copies to the specified OBS script file.   |
| <b>running-config</b>         | Copies to the running configuration.   |
| <b>startup-config</b>         | Copies to the startup configuration.   |
| <b>system-image</b>           | Copies to the system image.  |
| <b>all</b>                    | Copies both boot and OS images.  |
| <b>boot</b>                   | Copies only the boot image.  |
| <b>onie</b>                   | Copies only the Open Network Install Environment (ONIE) image.<br><b>Note:</b> Not available on the G8332. |
| <b>os</b>                     | Copies only the OS image.  |
| <b>usb1</b> <i>file name</i>  | Copies to the specified file on the USB device.  |

| Parameter             | Function  |
|-----------------------|---|
| <b>vrf default</b>    | Copies using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Copies using the management VRF instance.                               |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                            |
|---------|---|
| 10.1    | The command was introduced.             |
| 10.2    | Added the <b>running-config</b> option. |

## Example

The following command a file from a remote server to the startup configuration using TFTP:

```
Switch# cp tftp tftp://10.112.71.18/startConfig.cfg startup-config vrf default
```

---

## cp usb1

Copies a file from the USB device to the system image.

### Syntax

```
cp usb1 <file name> {running-config|startup-config|system-image  
{all|boot|onie|os}}
```

where:

| Parameter             | Function  |
|-----------------------|---|
| <i>file name</i>      | The path and name of file to be copied.   |
| <b>running-config</b> | Copies to the running configuration.  |
| <b>startup-config</b> | Copies only to the boot image.  |
| <b>system-image</b>   | Copies to the system image.   |
| <b>all</b>            | Copies both to boot and OS images.  |
| <b>boot</b>           | Copies only to the boot image.  |
| <b>onie</b>           | Copies only to the Open Network Install Environment (ONIE) image.<br><b>Note:</b> Not available on the G8332. |
| <b>os</b>             | Copies only to the OS image.  |

### Modes

Privileged EXEC Mode

### History

| Release | Modification                        |
|---------|-------------------------------------|
| 10.1    | The command was introduced.         |
| 10.2    | Added <b>running-config</b> option. |

### Example

The following command copies an OS image from the USB device to the system image:

```
Switch# cp usb1 /os-images/CNOS-10.4.2.0.imgs system-image os
```



---

## edit script

Edits the specified On-Box Script (OBS) file.

### Syntax

**edit script** <*script name*>

where:

| Parameter          | Function                         |
|--------------------|----------------------------------|
| <i>script name</i> | The name of the OBS script file. |

### Modes

Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command edits the OBS script `obs-script-10`:

```
Switch# edit script obs-script-10
```

---

## **maint mode enable**

Enables or disables maintenance mode.

To configure a password to activate this option, use the following command:

- **maint password** (in Global Configuration Mode)

### **Syntax**

**maint mode enable**

To disable maintenance mode, use the following command:

**no maint mode**

### **Modes**

Privileged EXEC mode

### **History**

| <b>Release</b> | <b>Modification</b>         |
|----------------|-----------------------------|
| 10.1           | The command was introduced. |

### **Example**

The following command enables maintenance mode:

```
Switch# maint mode enable
```

### **Related Commands**

| <b>Command</b>                 | <b>Description</b>               |
|--------------------------------|----------------------------------|
| <a href="#">maint password</a> | Sets a maintenance mode password |

---

## ping

Polls the Internet Gateway or “pings” to see if the specified host is reachable.

## Syntax

```
ping [<destination address>|<hostname>] [vrf {default|management}]
[source <source address>] [interface {<interface name>|ethernet
<chassis number/port number>|loopback <loopback interface>|mgmt 0|
port-aggregation <LAG number>|vlan <VLAN ID>}] [count {<number>|
unlimited}] [df-bit] [interval <seconds>] [packet-size <bytes>]
[timeout <seconds>]
```

where:

| Parameter  | Description  |
|--|--|
| <i>destination address</i>                                     | The IP address of the host you are trying to ping.   |
| <i>hostname</i>  | The name of the host you are trying to ping.   |
| <b>vrf default</b>   | Pings the default VRF instance for the specified remote host.  |
| <b>vrf management</b>  | Pings the management VRF instance for the specified remote host.   |
| <b>source</b>  | Specifies the source IPv4 address to use.  |
| <i>source address</i>  | The IP address of the source host.   |
| <b>interface</b> <i>interface name</i>                         | The name of the interface to ping.   |
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Pings the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.   |
| <b>interface loopback</b><br><i>loopback interface</i>         | Pings the specified loopback interface. The <i>loopback interface</i> is an integer from 0 to 7.   |
| <b>interface mgmt 0</b>  | Pings the management interface.  |
| <b>interface port-aggregation</b><br><i>LAG number</i>         | Pings the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.  |
| <b>interface vlan</b><br><i>VLAN ID</i>                        | Pings the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 4094.   |
| <b>count</b> <number> <br><b>unlimited</b>                     | Specifies repeat counts of ping packets. You can either set an unlimited number of counts or specify a specific value from 1 to 655350. The default value is 5 ping packets. |
| <b>df-bit</b>  | Enables the do-not-fragment bit in the IPv4 header. The default value is disabled.   |

|                                 |   |
|---------------------------------|---|
| <b>interval</b> <i>seconds</i>  | Sets the interval of sending ping packets, in seconds (from 0 to 60). Default value is 0 seconds.                             |
| <b>packet-size</b> <i>bytes</i> | Sets the packet size of sending ping packets, in bytes (from 1 to 65468). The default value is 56 bytes.                      |
| <b>timeout</b> <i>seconds</i>   | Specifies non-responsive timeout interval of sending ping packets, in seconds (from 1 to 60). The default value is 2 seconds. |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

## Example

The following command pings host 10.148.22.18:

```
Switch# ping 10.148.22.18
```

---

## ping6

Polls the Internet Gateway or “pings” an IPv6 address to see if the specified host is reachable.

## Syntax

```
ping6 [<destination address>|<hostname>] [vrf {default|management}]  
[source <source address>] [interface {<interface name>|ethernet  
<chassis number/port number>|loopback <loopback interface>|mgmt 0|  
port-aggregation <LAG number>|vlan <VLAN ID>}] [count {<number>|  
unlimited}] [interval <seconds>] [packet-size <bytes>] [timeout  
<seconds>]
```

where:

| Parameter  | Description  |
|--|--|
| <i>destination address</i>                                     | The IPv6 address of the host you are trying to ping.   |
| <i>hostname</i>  | The name of the host you are trying to ping.   |
| <b>vrf default</b>   | Pings the default VRF instance for the specified remote host.  |
| <b>vrf management</b>  | Pings the management VRF instance for the specified remote host.   |
| <b>source</b>  | Specifies the source IPv6 address to use.  |
| <i>source address</i>  | The IPv6 address of the source host.   |
| <b>interface</b> <i>interface name</i>                         | The name of the interface to ping.   |
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Pings the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.   |
| <b>interface loopback</b><br><i>loopback interface</i>         | Pings the specified loopback interface. The <i>loopback interface</i> is an integer from 0 to 7.   |
| <b>interface mgmt 0</b>  | Pings the management interface.  |
| <b>interface port-aggregation</b><br><i>LAG number</i>         | Pings the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.  |
| <b>interface vlan</b><br><i>VLAN ID</i>                        | Pings the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 4094.   |
| <b>count</b> <number> <br><b>unlimited</b>                     | Specifies repeat counts of ping packets. You can either set an unlimited number of counts or specify a specific value from 1 to 655350. The default value is 5 ping packets. |

|                                 |   |
|---------------------------------|---|
| <b>interval</b> <i>seconds</i>  | Sets the interval of sending ping packets, in seconds (from 0 to 60). Default value is 0 seconds.                             |
| <b>packet-size</b> <i>bytes</i> | Sets the packet size of sending ping packets, in bytes (from 1 to 65468). The default value is 56 bytes.                      |
| <b>timeout</b> <i>seconds</i>   | Specifies non-responsive timeout interval of sending ping packets, in seconds (from 1 to 60). The default value is 2 seconds. |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

## Example

The following command pings host 2001:db8:85a3::8a2e:370:7334:

```
Switch# ping6 2001:db8:85a3::8a2e:370:7334
```

---

## python

Enters the Python Programming Shell. To exit the Python Shell either type **quit()**, **exit()**, or press **<Ctrl + D>**.

## Syntax

**python** [*<script name>*] [*<list of arguments>*]

where:

| Paramete                 | Function   |
|--------------------------|--|
| <i>script name</i>       | The name of the Python script file.                  |
| <i>list of arguments</i> | The list of arguments for the specified script file. |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enters the Python Shell:

```
Switch# python
>>> help()
Welcome to Python 2.7! This is the online help utility.

If this is your first time using Python, you should definitely check out
the tutorial on the Internet at http://docs.python.org/tutorial/.

Enter the name of any module, keyword, or topic to get help on writing
Python programs and using Python modules. To quit this help utility and
return to the interpreter, just type "quit".

To get a list of available modules, keywords, or topics, type "modules",
"keywords", or "topics". Each module also comes with a oneline summary of
what it does; to list the modules whose summaries contain a given word
such as "spam", type "modules spam".

help> quit
>>> quit()

Switch#
```

---

## reload

Restarts the switch. You will be prompted to confirm this action.

If the running configuration is different from the startup configuration, the switch will a message informing you of this. If you restart the switch without saving the running configuration, all unsaved changes will be lost.

To save the running configuration, use one of the following commands:

- **cp running-config startup-config**
- **write**

## Syntax

**reload**

## Modes

Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command restarts the switch:

```
Switch# reload
```



---

## remove ip arp

Deletes all Address Resolution Protocol (ARP) table entries.

### Syntax

```
remove ip arp [<IPv4 address> | <interface name> | ethernet <chassis number / port number> | loopback <loopback interface number> | mgmt 0 | vlan <VLAN ID>] [force-delete] [vrf {all | default | management}]
```

where:

| Parameter   | Function   |
|---|--|
| <i>IPv4 address</i>                                 | Deletes ARP entries for the specified IPv4 address.  |
| <i>interface name</i>                               | Deletes ARP entries for the interface specified by name.   |
| <b>ethernet</b> <i>chassis number / port number</i> | Deletes ARP entries for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>           | Deletes ARP entries for the specified loopback interface. The <i>loopback interface number</i> is an integer from 0 to 7.                  |
| <b>mgmt 0</b>                                       | Deletes ARP entries for the management interface.  |
| <b>vlan</b> <i>VLAN ID</i>                          | Deletes ARP entries for the specified VLAN interface. The <i>VLAN ID</i> is an integer from 1 to 4094.                                     |
| <b>force-delete</b>                                 | Deletes ARP entries without refreshing the table.  |
| <b>vrf all</b>                                      | Deletes ARP entries associated with all Virtual Routing and Forwarding (VRF) instances.  |
| <b>vrf default</b>                                  | Deletes ARP entries associated with the default VRF instance.  |
| <b>vrf management</b>                               | Deletes ARP entries associated with the management VRF instance.   |

### Modes

- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command deletes all ARP table entries:

```
Switch# remove ip arp
```

---

## remove ip bgp

Deletes Border Gateway Protocol (BGP) neighbors.

### Syntax

```
remove ip bgp {all|{ipv4|ipv6} unicast} [*|<AS number>|<neighbor address>[/<prefix length>]] [vrf {all|default}]
```

```
remove ip bgp {<AS number>|<neighbor address>|external|peer-group <peer group name>} [in [prefix-filter]|out|soft [in|out]]
```

```
remove ip bgp [*|<neighbor address>} [vrf default] [soft [in|out]]
```

```
remove ip bgp [*|<AS number>|<neighbor address>|external|peer-group <peer group name>} [ipv4 unicast {in [prefix-filter]|out|soft [in|out]}]
```

```
remove ip bgp [*|<AS number>} [ipv6 unicast [soft [in|out]]]
```

where:

| Parameter                                | Function  |
|--|---|
| <b>all</b>                               | Deletes BGP neighbors for all IP address families.  |
| <b>ipv4</b>                              | Deletes BGP neighbors only for the IPv4 address family.   |
| <b>ipv6</b>                              | Deletes BGP neighbors only for the IPv6 address family.   |
| <b>unicast</b>                           | Resets BGP neighbors only for the unicast IP address family.  |
| <b>*</b>                                 | Deletes all BGP neighbors.  |
| <i>AS number</i>                         | Deletes BGP neighbors from the specified autonomous system (AS). The <i>AS number</i> is an integer from 1 to 4294967295. |
| <i>neighbor address</i>                  | The IPv4 or IPv6 address of the BGP neighbor.   |
| <i>prefix length</i>                     | The IPv4 or IPv6 network mask.  |
| <b>external</b>                          | Deletes all BGP neighbors outside the local AS.   |
| <b>peer-group</b> <i>peer group name</i> | Deletes all BGP neighbors that are part of the specified peer group.  |
| <b>soft</b>                              | Triggers a soft reconfiguration (a routing update without resetting the BGP session).                                     |
| <b>in</b>                                | Triggers a soft reconfiguration and saves a copy of all received routes.  |

| Parameter            | Function  |
|----------------------|---|
| <b>prefix-length</b> | Pushes out the prefix list Outbound Route Filter (ORF) and then, triggers a soft reconfiguration and saves a copy of all received routes. |
| <b>out</b>           | Triggers a soft reconfiguration and saves a copy of all sent routes.  |
| <b>vrf all</b>       | Deletes BGP neighbors associated with all Virtual Routing and Forwarding (VRF) instances.   |
| <b>vrf default</b>   | Deletes BGP neighbors associated with the default VRF instance.   |

## Modes

Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command deletes all BGP neighbors:

```
Switch# remove ip bgp *
```

---

## remove ip bgp dampening

Resets Border Gateway Protocol (BGP) dampening information.

### Syntax

```
remove ip bgp [all | {ipv4 | ipv6} unicast] dampening [<neighbor address> / <prefix length>] [vrf {all | default}]
```

where:

| Parameter               | Function   |
|-------------------------|--|
| <b>all</b>              | Resets dampening information for all IP address families.  |
| <b>ipv4</b>             | Resets dampening information only for the IPv4 address family.   |
| <b>ipv6</b>             | Resets dampening information only for the IPv6 address family.   |
| <b>unicast</b>          | Resets dampening information only for the unicast IP address family.   |
| <i>neighbor address</i> | The IPv4 or IPv6 address of the BGP neighbor.  |
| <i>prefix length</i>    | The IPv4 or IPv6 network mask.   |
| <b>vrf all</b>          | Resets dampening information for BGP neighbors associated with all Virtual Routing and Forwarding (VRF) instances. |
| <b>vrf default</b>      | Resets dampening information for BGP neighbors associated with the default VRF instance.                           |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets BGP dampening information for all IP address families:

```
Switch# remove ip bgp all dampening
```

---

## remove ip bgp flap-statistics

Resets Border Gateway Protocol (BGP) flap statistics.

### Syntax

```
remove ip bgp [all|{ipv4|ipv6} unicast] flap-statistics  
[<neighbor address>[/<prefix length>]] [vrf {all|default}]
```

where:

| Parameter               | Function   |
|-------------------------|--|
| <b>all</b>              | Resets flap statistics for all IP address families.  |
| <b>ipv4</b>             | Resets flap statistics only for the IPv4 address family.   |
| <b>ipv6</b>             | Resets flap statistics only for the IPv6 address family.   |
| <b>unicast</b>          | Resets flap statistics only for the unicast IP address family.   |
| <i>neighbor address</i> | The IPv4 or IPv6 address of the BGP neighbor.  |
| <i>prefix length</i>    | The IPv4 or IPv6 network mask.   |
| <b>vrf all</b>          | Resets flap statistics for BGP neighbors associated with all Virtual Routing and Forwarding (VRF) instances. |
| <b>vrf default</b>      | Resets flap statistics for BGP neighbors associated with the default VRF instance.                           |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets BGP flap statistics for all IP address families:

```
Switch# remove ip bgp all flap-statistics
```

---

## remove ip ospf process

Resets the Open Shortest Path First (OSPF) process.

### Syntax

```
remove ip ospf process
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command resets the OSPF process:

```
Switch# remove ip ospf process
```

---

## remove ip prefix-list

Deletes an IPv4 prefix list.

### Syntax

```
remove ip prefix-list [<prefix list name> [<IP prefix>]]
```

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>prefix list name</i> | The name of the prefix list.   |
| <i>IP prefix</i>        | Deletes the specified prefix from the selected prefix list. The <i>IP prefix</i> format is:<br><i>IPv4 address/network mask length</i> |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes all IPv4 prefix lists:

```
Switch# remove ip prefix-list
```



---

## remove ip route

Deletes IPv4 routes.

### Syntax

```
remove ip route [vrf {all|default|management}] [* |<IP route>]
```

where:

| Parameter             | Function  |
|-----------------------|---|
| <b>vrf all</b>        | Deletes IPv4 routes associated with all Virtual Routing and Forwarding (VRF) instances.                     |
| <b>vrf default</b>    | Deletes IPv4 routes associated with the default VRF instance.   |
| <b>vrf management</b> | Deletes IPv4 routes associated with the management VRF instance.  |
| <b>*</b>              | Deletes all IPv4 routes.  |
| <i>IP route</i>       | Deletes the specified IPv4 route. The <i>IP route</i> format is:<br><i>IPv4 address/network mask length</i> |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes all IPv4 routes:

```
Switch# remove ip route *
```

---

## remove ipv6 bgp

Deletes IPv6 Border Gateway Protocol (BGP) neighbors.

### Syntax

```
remove ipv6 bgp [* | <neighbor address>] [vrf default [soft [in|out]]]
```

where:

| Parameter               | Function  |
|-------------------------|---|
| <b>*</b>                | Deletes all IPv6 BGP neighbors.   |
| <i>neighbor address</i> | Deletes only the specified BGP neighbor by its IPv6 address.  |
| <b>vrf default</b>      | Deletes IPv6 BGP neighbors associated with the default Virtual Routing and Forwarding (VRF) instance. |
| <b>soft</b>             | Triggers a soft reconfiguration (a routing update without resetting the BGP session).                 |
| <b>in</b>               | Triggers a soft reconfiguration and saves a copy of all received routes.                              |
| <b>out</b>              | Triggers a soft reconfiguration and saves a copy of all sent routes.                                  |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes all IPv6 BGP neighbors:

```
Switch# remove ipv6 bgp *
```

---

## remove ipv6 prefix-list

Deletes an IPv6 prefix list.

### Syntax

```
remove ipv6 prefix-list [<prefix list name> [<IP prefix>]]
```

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>prefix list name</i> | The name of the prefix list.   |
| <i>IP prefix</i>        | Deletes the specified prefix from the selected prefix list. The <i>IP prefix</i> format is:<br><i>IPv6 address/network mask length</i> |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes all IPv6 prefix lists:

```
Switch# remove ipv6 prefix-list
```

---

## remove ipv6 route

Deletes IPv6 routes.

### Syntax

```
remove ipv6 route [vrf {all|default|management}] [* | <IP route>]
```

where:

| Parameter             | Function  |
|-----------------------|---|
| <b>vrf all</b>        | Deletes IPv6 routes associated with all Virtual Routing and Forwarding (VRF) instances.                     |
| <b>vrf default</b>    | Deletes IPv6 routes associated with the default VRF instance.   |
| <b>vrf management</b> | Deletes IPv6 routes associated with the management VRF instance.  |
| <b>*</b>              | Deletes all IPv6 routes.  |
| <i>IP route</i>       | Deletes the specified IPv6 route. The <i>IP route</i> format is:<br><i>IPv6 address/network mask length</i> |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes all IPv6 routes:

```
Switch# remove ipv6 route *
```

---

## remove logging logfile

Deletes the logged messages stored in the log file.

### Syntax

```
remove logging logfile
```

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command deletes the logged messages from the log file:

```
Switch# remove logging logfile
```

---

## restart bgp

Restarts Border Gateway Protocol (BGP).

### Syntax

**restart bgp** <AS number>

where:

| Parameter        | Function   |
|------------------|--|
| <i>AS number</i> | Removes BGP peers associated with the specified autonomous system (AS). The <i>AS number</i> is an integer from 1 to 4294967295. |

### Modes

Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command restarts BGP and removes peers associated with AS 200:

```
Switch# restart bgp 200
```

---

## ssh

Creates a Secure Shell (SSH) connection.

## Syntax

```
ssh {<username@IP address>|<username@hostname>} [port <port number>]  
[vrf {default|management}]
```

where:

| Parameter                      | Function  |
|--------------------------------|---|
| <i>username</i>                | The ID used when establishing the SSH connection. The default user is <code>admin</code> .  |
| <i>IP address</i>              | The IP address of the network device at the other end of the SSH connection.  |
| <i>hostname</i>                | The hostname of the network device at the other end of the SSH connection.  |
| <b>port</b> <i>port number</i> | Creates a SSH connection using the specified port of the remote host. The <i>port number</i> is an integer from 1 to 65535. The default port is 22. |
| <b>vrf default</b>             | Creates a SSH connection using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b>          | Creates a SSH connection using the management VRF instance.   |

## Modes

Privileged EXEC mode

## History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

## Examples

The following commands create an SSH connection:

```
Switch# ssh admin1@10.144.187.17
```

```
Switch# ssh admin1@localSwitch port 2005 vrf management
```

---

## ssh6

Creates a Secure Shell version 6 (SSH6) connection.

### Syntax

```
ssh6 [<username@IPv6 address>|<username@hostname>] [port <port number>]  
[vrf {default|management}]
```

where:

| Parameter                      | Function   |
|--------------------------------|--|
| <i>username</i>                | The ID used when establishing the SSH6 connection. The default user is <code>admin</code> .  |
| <i>IPv6 address</i>            | The IPv6 address of the network device at the other end of the SSH6 connection.  |
| <i>hostname</i>                | The hostname of the network device at the other end of the SSH6 connection.  |
| <b>port</b> <i>port number</i> | Creates a SSH6 connection using the specified port of the remote host. The <i>port number</i> is an integer from 1 to 65535. The default port is 22. |
| <b>vrf default</b>             | Creates a SSH6 connection using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b>          | Creates a SSH6 connection using the management VRF instance.   |

### Modes

Privileged EXEC Mode

### History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

### Examples

The following commands create an SSH6 connection:

```
Switch# ssh6 admin1@2034:11df::98
```

```
Switch# ssh6 admin1@localSwitch port 2005 vrf management
```



---

## stop running-script

Stops the specified running Python script.

### Syntax

**stop running-script** <"script name">

where:

| Parameter          | Function   |
|--------------------|--|
| <i>script name</i> | The name of the running Python script. Its name must be specified using quotation marks as follows:<br>"script name" |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command stops a running Python script:

```
Switch# stop running-script "py-script-arg"
```

---

## telnet

Creates a Telnet connection.

## Syntax

```
telnet [<IP address>|<hostname>] [port <port number>] [vrf {default|management}]
```

where:

| Parameter                      | Function   |
|--------------------------------|--|
| <i>IP address</i>              | The IPv4 address to which to establish a connection.   |
| <i>hostname</i>                | The hostname to which to establish a connection.   |
| <b>port</b> <i>port number</i> | Creates a Telnet connection using the specified port of the remote host. The <i>port number</i> is an integer from 1 to 65535. The default port is 23. |
| <b>vrf default</b>             | Creates a Telnet connection using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b>          | Creates a Telnet connection using the management VRF instance.   |

## Modes

Privileged EXEC mode

## History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

## Examples

The following commands create a Telnet connection:

```
Switch# telnet 16.78.194.3
```

```
Switch# telnet localSwitch port 2005 vrf default
```

---

## telnet6

Creates a Telnet version 6 (Telnet6) connection.

## Syntax

```
telnet6 [<IPv6 address>|<hostname>] [port <port number>] [vrf  
{default|management}]
```

where:

| Parameter                      | Function  |
|--------------------------------|---|
| <i>IPv6 address</i>            | The IPv6 address from which to establish a connection.  |
| <i>hostname</i>                | The hostname to which to establish a connection.  |
| <b>port</b> <i>port number</i> | Creates a Telnet6 connection using the specified port of the remote host. The <i>port number</i> is an integer from 1 to 65535. The default port is 23. |
| <b>vrf default</b>             | Creates a Telnet6 connection using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b>          | Creates a Telnet6 connection using the management VRF instance.   |

## Modes

Privileged EXEC mode

## History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

## Examples

The following command creates a Telnet6 connection:

```
Switch# telnet6 fe80::21b:21ff:fe22:e865
```

```
Switch# telnet6 localSwitch port 2005 vrf management
```

---

## terminal terminal-type

Sets the terminal type.

### Syntax

```
[no] terminal terminal-type <name>
```

where:

| Parameter   | Description         |
|-------------|---------------------|
| <i>name</i> | Terminal type name. |

Using **no** before this command without the last argument deletes the terminal type.

### Modes

Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the terminal type to vt100:

```
Switch# terminal terminal-type vt100
```

---

## traceroute

Traces the route from the switch to the specified IPv4 remote host.

### Syntax

```
traceroute [{<remote address>|<hostname>} [vrf {default |  
management}] [source <source address>]]
```

where:

| Parameter             | Description   |
|-----------------------|---|
| <i>remote address</i> | The IPv4 address of the host you are trying to reach.               |
| <i>hostname</i>       | The name of the host you are trying to reach.                       |
| <b>vrf default</b>    | Searches the default VRF instance for the specified remote host.    |
| <b>vrf management</b> | Searches the management VRF instance for the specified remote host. |
| <b>source</b>         | Includes the source IPv4 address in the IP header.                  |
| <i>source address</i> | The IPv4 address of the source host.                                |

### Modes

Privileged EXEC Mode

### History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

### Example

The following command traces the route from the switch to 10.2.3.47:

```
Switch# traceroute 10.200.3.47 vrf default source 10.124.25.90
```

---

## traceroute6

Traces the route from the switch to the specified IPv6 host.

### Syntax

```
traceroute6 {<remote address>|<hostname>} [vrf {default|management}] [source <source address>] [interface {<interface name>|ethernet <chassis number/port number>|loopback <loopback interface number>|mgmt 0|port-aggregation <LAG number>|vlan <VLAN ID>}]
```

where:

| Parameter   | Description   |
|---|---|
| <i>remote address</i>                                       | The IPv6 address of the host you are trying to reach.   |
| <i>hostname</i>   | The name of the host you are trying to reach.   |
| <b>vrf default</b>  | Searches the default VRF instance for the specified remote host.  |
| <b>vrf management</b>                                       | Searches the management VRF instance for the specified remote host.   |
| <b>source</b>   | Includes the source IPv6 address in the IP header.  |
| <i>source address</i>                                       | The IPv6 address of the source host.  |
| <b>interface</b> <i>interface name</i>                      | Uses the ethernet interface identified by its name to trace the route to the remote host.   |
| <b>interface ethernet</b> <i>chassis number/port number</i> | Uses the specified ethernet port to trace the route to the remote host. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>interface loopback</b> <i>loopback interface number</i>  | Uses the specified loopback interface to trace the route to the remote host. The <i>loopback interface number</i> is an integer from 0 to 7.                  |
| <b>interface mgmt 0</b>                                     | Uses the management interface to trace the route to the remote host.  |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Uses the specified Link Aggregation Group (LAG) to trace the route to the remote host. The <i>LAG number</i> is an integer from 1 to 4096.                    |
| <b>interface vlan</b> <i>VLAN ID</i>                        | Uses the specified VLAN to trace the route to the remote host. The <i>VLAN ID</i> is an integer from 1 to 4094.   |

### Modes

Privileged EXEC Mode

## History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

## Example

The following command traces the route from the switch to a remote IPv6 host:

```
Switch# traceroute6 tracehost source fe80::aa97:dcff:fede:2501 interface  
ethernet 1/12
```

---

## save

Copies the running configuration to the startup configuration.

## Syntax

**save [erase|file|memory|terminal]**

where:

| Parameter       | Function   |
|-----------------|--|
| <b>erase</b>    | Deletes the current startup configuration.   |
| <b>file</b>     | Copies the running configuration file to the startup configuration file.           |
| <b>memory</b>   | Copies the running configuration to the Non-volatile Random-access Memory (NVRAM). |
| <b>terminal</b> | Displays the running configuration.  |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Examples

The following command deletes the current startup configuration:

```
Switch# save erase

Warning: This command will erase the startup-configuration.
Do you wish to proceed anyway? (y/n) [n] n
```

The following command copies the running configuration to the NVRAM:

```
Switch# save memory

Building configuration...
[OK]

Switch#
```



---

## Chapter 3. Debugging Commands

The commands in this chapter enable and disable debugging of the switch.

---

## dbg aaa

Enables or disables Authentication, Authorization, and Accounting (AAA) debugging.

By default, AAA debugging is disabled.

## Syntax

**[no] dbg aaa**

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command debugs AAA on the switch:

```
Switch> dbg aaa
```

---

## dbg alias

Enables or disables command alias debugging.

By default, command alias debugging is disabled.

## Syntax

**[no] dbg alias**

## Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command enables command alias debugging:

```
Switch> dbg alias
```

---

## dbg bfd

Enables or disables Bidirectional Forwarding Detection (BFD) debugging.

By default, BFD debugging is disabled.

## Syntax

**[no] dbg bfd [all|event|ipc-error|ipc-event|nsm|packet|session]**

where:

| Parameter        | Description                      |
|------------------|----------------------------------|
| <b>all</b>       | Enables all debugging.           |
| <b>event</b>     | Enables BFD event debugging.     |
| <b>ipc-error</b> | Enables BFD IPC-error debugging. |
| <b>ipc-event</b> | Enables BFD IPC-event debugging. |
| <b>nsm</b>       | Enables BFD NSM debugging.       |
| <b>packet</b>    | Enables BFD packet debugging.    |
| <b>session</b>   | Enables BFD session debugging.   |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables BFD packet debugging:

```
Switch> dbg bfd packet
```

---

## dbg bgp

Enables or disables Border Gateway Protocol (BGP) debugging.

By default, BGP debugging is disabled.

## Syntax

```
[no] dbg bgp [all|bfd|dampening|events|filters|fsm|keepalives|nht|nsm|packets|updates]
```

where:

| Parameter         | Description   |
|-------------------|---|
| <b>all</b>        | Enables all BGP debugging.                                      |
| <b>bfd</b>        | Enables Bidirectional Forwarding Detection (BFD) BGP debugging. |
| <b>dampening</b>  | Enables BGP dampening debugging.                                |
| <b>events</b>     | Enables BGP events debugging.                                   |
| <b>filters</b>    | Enables BGP filter debugging.                                   |
| <b>fsm</b>        | Enables BGP Finite State Machine (FSM) debugging.               |
| <b>keepalives</b> | Enables BGP keep-alive message debugging.                       |
| <b>nht</b>        | Enables NHT message debugging.                                  |
| <b>nsm</b>        | Enables Network Service Module (NSM) message debugging.         |
| <b>packets</b>    | Enables BGP packet debugging.                                   |
| <b>updates</b>    | Enables BGP update debugging.                                   |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables BGP BFD debugging:

```
Switch> dbg bgp bfd
```

---

## dbg cee

Enables or disables Converged Enhanced Ethernet (CEE) debugging.

By default, CEE debugging is disabled.

## Syntax

**[no] dbg cee [all|error]**

where:

| Parameter    | Description                       |
|--------------|-----------------------------------|
| <b>all</b>   | Enables all CEE events debugging. |
| <b>error</b> | Enables CEE error debugging.      |

Using **no** before the command disables CEE debugging on the switch.

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command enables CEE error debugging:

```
Switch(config)# dbg cee error
```

## Restrictions

This command is not supported on the NE1032T and the NE1072T.

---

## dbg diag

Debugs diagnostic or Low Layer Information (LLI) commands.

By default, LLI debugging is disabled.

## Syntax

**dbg diag** <*diagnostic command*>

where:

| Parameter                 | Function                    |
|---------------------------|-----------------------------|
| <i>diagnostic command</i> | The command to be debugged. |

## Modes

Privileged EXEC Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command debugs the diagnostic command `DiagCommand`:

```
Switch# dbg diag DiagCommand
```



---

## dbg dns client

Enables or disables Domain Name Service (DNS) client debugging.

By default, DNS client debugging is disabled.

### Syntax

**[no] dbg dns client**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command enables DNS client debugging:

```
Switch> dbg dns client
```

---

## dbg hal

Enables or disables Hardware Abstraction Layer (HAL) debugging.

By default, HAL debugging is disabled.

### Syntax

**[no] dbg hal [all]**

where:

| Parameter  | Function                 |
|------------|--------------------------|
| <b>all</b> | Debugs all HAL commands. |

### Modes

- Privileged EXEC Mode
- Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command debugs the HAL:

```
Switch# dbg hal all
```

---

## dbg hsl

Enables or disables Hardware Specific Layer (HSL) debugging.

By default, HSL debugging is disabled.

## Syntax

**dbg hsl {enable|disable} {0|1|2|3|4|5|6|7|8}**

where:

| Parameter      | Description         |
|----------------|---------------------|
| <b>enable</b>  | Enables debugging.  |
| <b>disable</b> | Disables debugging. |
| <b>0</b>       | All HSL parameters. |
| <b>1</b>       | HSL information.    |
| <b>2</b>       | HSL debugging.      |
| <b>3</b>       | HSL warnings.       |
| <b>4</b>       | HSL errors.         |
| <b>5</b>       | HSL fatal events.   |
| <b>6</b>       | HSL administration. |
| <b>7</b>       | HSL counters.       |
| <b>8</b>       | HSL packets.        |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables HSL packet debugging:

```
Switch> dbg hsl enable 8
```

---

## dbg ip arp

Enables or disables Address Resolution Protocol (ARP) debugging.

By default, ARP debugging is disabled.

**Note:** To display ARP debugging messages, you also need to run the following commands:

```
Switch(config)# logging console 7
Switch(config)# logging level ndd 7
Switch(config)# logging level hsl 6
```

## Syntax

**[no] dbg ip arp {event|packet}**

where:

| Parameter     | Description         |
|---------------|---------------------|
| <b>event</b>  | ARP related events. |
| <b>packet</b> | ARP packets.        |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables debugging of ARP packets:

```
Switch> dbg ip arp packet
```

---

## dbg ip bgp packets

Enables or disables the debugging of Border Gateway Protocol (BGP) packet.

By default, BGP packet debugging is disabled.

### Syntax

**[no] dbg ip bgp packets**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of BGP packets:

```
Switch> dbg ip bgp packets
```

---

## dbg ip igmp snooping

Enables or disables Internet Group Management Protocol (IGMP) Snooping debugging.

By default, IGMP Snooping debugging is disabled.

### Syntax

```
[no] dbg ip igmp snooping {all|decode|encode|events|fsm|stp|tib}
```

where:

| Parameter     | Description   |
|---------------|---|
| <b>all</b>    | Enables the debugging of all IGMP Snooping parameters.        |
| <b>decode</b> | Enables IGMP Snooping decoder debugging.                      |
| <b>encode</b> | Enables IGMP Snooping encoder debugging.                      |
| <b>events</b> | Enables IGMP Snooping event debugging.                        |
| <b>fsm</b>    | Enables IGMP Snooping Finite State Machine (FSM) debugging.   |
| <b>stp</b>    | Enables IGMP Snooping Spanning Tree Protocol (STP) debugging. |
| <b>tib</b>    | Enables IGMP Snooping Tree-Info-Base (TIB) debugging.         |

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables IGMP Snooping decoder debugging:

```
Switch# dbg ip igmp snooping decode
```

---

## dbg ip ospf

Enables or disables Open Shortest Path First (OSPF) debugging.

By default, OSPF debugging is disabled.

### Syntax

**[no] dbg ip ospf [all]**

where:

| Parameter  | Description                                   |
|------------|---|
| <b>all</b> | Enables the debugging of all OSPF parameters. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of all OSPF parameters:

```
Switch> dbg ip ospf all
```

---

## dbg ip ospf database-timer rate-limit

Enables or disables the debugging of Open Shortest Path First (OSPF) database timer rate limiting values for link state advertisement (LSA) throttling events.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf database-timer rate-limit
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of all OSPF database timer rate limiting values for LSA throttling events:

```
Switch> dbg ip ospf database-timer rate-limit
```



---

## dbg ip ospf events

Enables or disables the debugging of all Open Shortest Path First (OSPF) events.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf events [abr] [asbr] [lsa] [nssa] [os]  
[router] [type3-range] [vlink]
```

where:

| Parameter          | Description   |
|--------------------|---|
| <b>abr</b>         | Enables only the debugging of OSPF area border router (ABR) events.                 |
| <b>asbr</b>        | Enables only the debugging of OSPF Autonomous System Boundary Router (ASBR) events. |
| <b>lsa</b>         | Enables only the debugging of OSPF link-state advertisement (LSA) events.           |
| <b>nssa</b>        | Enables only the debugging of OSPF not-so-stubby area (NSSA) events.                |
| <b>os</b>          | Enables only the debugging of OSPF operating system (OS) interaction events.        |
| <b>router</b>      | Enables only the debugging of Other router events.                                  |
| <b>type3-range</b> | Enables only the debugging of OSPF type 3 range events.                             |
| <b>vlink</b>       | Enables only the debugging of OSPF virtual link events.                             |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables debugging of OSPF ABR and OS events:

```
Switch> dbg ip ospf events abr os
```

---

## dbg ip ospf ifsm

Enables or disables the debugging of all Open Shortest Path First (OSPF) interface state machine (IFSM) parameters.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf ifsm [events|status|timers]
```

where:

| Parameter     | Description                         |
|---------------|-------------------------------------|
| <b>events</b> | Enables only IFSM event debugging.  |
| <b>status</b> | Enables only IFSM status debugging. |
| <b>timers</b> | Enables only IFSM timers debugging. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of only OSPF IFSM events:

```
Switch> dbg ip ospf ifsm events
```

---

## dbg ip ospf lsa

Enables or disables the debugging of all Open Shortest Path First (OSPF) link state advertisement (LSA) parameters.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf lsa [flooding] [generate] [install] [maxage] [refresh]
```

where:

| Parameter       | Description  |
|-----------------|--|
| <b>flooding</b> | Enables only LSA flooding debugging.               |
| <b>generate</b> | Enables only LSA generation debugging.             |
| <b>install</b>  | Enables only LSA installation debugging.           |
| <b>maxage</b>   | Enables only LSA maximum age processing debugging. |
| <b>refresh</b>  | Enables only LSA refresh debugging.                |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of OSPF LSA installations:

```
Switch> dbg ip ospf lsa flooding install
```

---

## dbg ip ospf nfsm

Enables or disables the debugging of all Open Shortest Path First (OSPF) neighbor state machine (NFSM) parameters.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf nfsm [events|status|timers]
```

where:

| Parameter     | Description                         |
|---------------|-------------------------------------|
| <b>events</b> | Enables only NFSM event debugging.  |
| <b>status</b> | Enables only NFSM status debugging. |
| <b>timers</b> | Enables only NFSM timers debugging. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of all OSPF NFSM events:

```
Switch> dbg ip ospf nfsm events
```

---

## dbg ip ospf nsm

Enables or disables the debugging of all Open Shortest Path First (OSPF) Network and Security Manager (NSM) parameters.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf nsm [interface] [redistribute]
```

where:

| Parameter           | Description                                |
|---------------------|--|
| <b>interface</b>    | Enables only NSM interface debugging.      |
| <b>redistribute</b> | Enables only NSM redistribution debugging. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of OSPF NSM interface events:

```
Switch> dbg ip ospf nsm interface
```

---

## dbg ip ospf packet

Enables or disables the debugging of all Open Shortest Path First (OSPF) packet parameters.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf packet [dd] [detail] [hello] [ls-ack]
[ls-request] [ls-update] [recv] [send]
```

where:

| Parameter         | Description  |
|-------------------|--|
| <b>dd</b>         | Enables only OSPF database description debugging.      |
| <b>detail</b>     | Offers more detailed debugging information.            |
| <b>hello</b>      | Enables only OSPF hello debugging.                     |
| <b>ls-ack</b>     | Enables only OSPF link state acknowledgment debugging. |
| <b>ls-request</b> | Enables only OSPF link state request debugging.        |
| <b>ls-update</b>  | Enables only OSPF link state update debugging.         |
| <b>recv</b>       | Enables only OSPF packets received debugging.          |
| <b>send</b>       | Enables only OSPF packets sent debugging.              |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of all OSPF hello and link state request events:

```
Switch> dbg ip ospf packet hello ls-request
```

---

## dbg ip ospf policy

Enables or disables Open Shortest Path First (OSPF) policy debugging.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf policy
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables OSPF policy debugging:

```
Switch> dbg ip ospf policy
```



---

## dbg ip ospf redistrib

Enables or disables Open Shortest Path First (OSPF) redistribution debugging.

By default, OSPF debugging is disabled.

### Syntax

**[no] dbg ip ospf redistrib [detail|terse]**

where:

| Parameter     | Description                                       |
|---------------|---|
| <b>detail</b> | Enables debugging of OSPF redistribution details. |
| <b>terse</b>  | Enables debugging of OSPF redistribution terse.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables OSPF redistribution debugging:

```
Switch> dbg ip ospf redistrib
```

---

## dbg ip ospf retransmission

Enables or disables Open Shortest Path First (OSPF) retransmission debugging.

By default, OSPF debugging is disabled.

### Syntax

```
[no] dbg ip ospf retransmission
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables OSPF retransmission debugging:

```
Switch> dbg ip ospf retransmission
```

---

## dbg ip ospf rib

Enables or disables Open Shortest Path First (OSPF) Routing Information Base (RIB) debugging.

By default, OSPF debugging is disabled.

### Syntax

**[no] dbg ip ospf rib [client] [interface] [redistribute]**

where:

| Parameter           | Description  |
|---------------------|--|
| <b>client</b>       | Enables only the debugging of RIB client events.       |
| <b>interface</b>    | Enables only the debugging of RIB interface events.    |
| <b>redistribute</b> | Enables only the debugging of RIB redistribute events. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables OSPF RIB client and interface debugging:

```
Switch> dbg ip ospf rib client interface
```

---

## dbg ip ospf route

Enables or disables Open Shortest Path First (OSPF) route debugging.

By default, OSPF debugging is disabled.

### Syntax

**[no] dbg ip ospf route [ase] [ia] [install] [spf]**

where:

| Parameter      | Description  |
|----------------|--|
| <b>ase</b>     | Enables only OSPF external route calculation debugging.            |
| <b>ia</b>      | Enables only OSPF inter-area route calculation debugging.          |
| <b>install</b> | Enables only OSPF route installation debugging.                    |
| <b>spf</b>     | Enables only OSPF shortest path first (SPF) calculation debugging. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables OSPF external route calculation and route installation debugging:

```
Switch> dbg ip ospf route ase install
```

---

## dbg ip ospf spf-trigger

Enables or disables Open Shortest Path First (OSPF) shortest path first (SPF) trigger debugging.

By default, OSPF debugging is disabled.

### Syntax

**[no] dbg ip ospf spf-trigger [detail|terse]**

where:

| Parameter     | Description                                       |
|---------------|---|
| <b>detail</b> | Enables debugging of OSPF redistribution details. |
| <b>terse</b>  | Enables debugging of OSPF redistribution terse.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables OSPF SPF trigger debugging:

```
Switch> dbg ip ospf spf-trigger
```

---

## dbg ip packet

Enables or disables IP packet debugging.

By default, IP packet debugging is disabled.

## Syntax

```
[no] dbg ip packet [address {<IP address>|<IP address>/<prefix length>}]  
[dest {<IP address>|<IP address>/<prefix length>}] [detail] [protocol  
{icmp|ospf|tcp|udp}] [source {<IP address>|<IP address>/<prefix  
length>}]
```

where:

| Parameter                       | Description  |
|---------------------------------|--|
| <b>address</b>                  | Enables the debugging of packets for the specified IP address.                 |
| <i>IP address</i>               | The IP address for which to enable packet debugging.                           |
| <i>IP address/prefix length</i> | The IP address and network prefix for which to enable packet debugging.        |
| <b>dest</b>                     | Enables debugging of packets sent to the specified IP destination address.     |
| <b>source</b>                   | Enables debugging of packets received the specified IP source address.         |
| <b>detail</b>                   | Offers more detailed debugging information.                                    |
| <b>protocol</b>                 | Enables debugging of packets for the specified networking protocol.            |
| <b>icmp</b>                     | Enables debugging of packets for the Internet Control Message Protocol (ICMP). |
| <b>ospf</b>                     | Enables debugging of packets for the Open Shortest Path First (OSPF) protocol. |
| <b>tcp</b>                      | Enables debugging of packets for the Transmission Control Protocol (TCP).      |
| <b>udp</b>                      | Enables debugging of packets for the User Datagram Protocol (UDP).             |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables IP packet debugging for an IP address:

```
Switch> dbg ip packet address 10.248.59.6
```

---

## dbg ip routing

Enables or disables the debugging of all IP routing events.

By default, IP route debugging is disabled.

### Syntax

**[no] dbg ip routing [add-route|delete-route|mod-route]**

where:

| Parameter           | Description                                     |
|---------------------|---|
| <b>add-route</b>    | Enables debugging only for add-route events.    |
| <b>delete-route</b> | Enables debugging only for delete-route events. |
| <b>mod-route</b>    | Enables debugging only for modify-route events. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of all IP routing events:

```
Switch> dbg ip routing
```



---

## dbg ipv6 nd

Enables or disables Internet Control Message Protocol (ICMP) version 6 Neighbor Discovery (ND) debugging.

By default, ICMPv6 ND debugging is disabled.

### Syntax

**[no] dbg ipv6 nd {event|packet}**

where:

| Parameter     | Description                                      |
|---------------|--|
| <b>event</b>  | Enables only the debugging of ND related events. |
| <b>packet</b> | Enables only the debugging of ND packets.        |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables ICMPv6 ND packet debugging:

```
Switch> dbg ipv6 nd packet
```

---

## dbg ipv6 packet

Enables or disables the debugging of IPv6 packet information.

By default, IPv6 packet debugging is disabled.

## Syntax

```
[no] dbg ipv6 packet [address {<IPv6 address>|<IPv6 address>/<prefix length>}] [dest {<IPv6 address>|<IPv6 address>/<prefix length>}] [detail] [protocol {icmp|ospf|tcp|udp}] [source {<IPv6 address>|<IPv6 address>/<prefix length>}]
```

where:

| Parameter                         | Description  |
|-----------------------------------|--|
| <b>address</b>                    | Enables the debugging of packets for the specified IP address.                 |
| <i>IPv6 address</i>               | The IPv6 address for which to enable packet debugging.                         |
| <i>IPv6 address/prefix length</i> | The IPv6 address and network prefix for which to enable packet debugging.      |
| <b>dest</b>                       | Enables debugging of packets sent to the specified IP destination address.     |
| <b>source</b>                     | Enables debugging of packets received the specified IP source address.         |
| <b>detail</b>                     | Offers more detailed debugging information.                                    |
| <b>protocol</b>                   | Enables debugging of packets for the specified networking protocol.            |
| <b>icmp</b>                       | Enables debugging of packets for the Internet Control Message Protocol (ICMP). |
| <b>ospf</b>                       | Enables debugging of packets for the Open Shortest Path First (OSPF) protocol. |
| <b>tcp</b>                        | Enables debugging of packets for the Transmission Control Protocol (TCP).      |
| <b>udp</b>                        | Enables debugging of packets for the User Datagram Protocol (UDP).             |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables IPv6 packet debugging for an IPv6 address:

```
Switch> dbg ipv6 packet address 2001:0db8:85a3:0000:0000:8a2e:0370:7334
```

---

## dbg ipv6 routing

Enables or disables debugging for IPv6 routing events.

By default, IPv6 route debugging is disabled.

### Syntax

**[no] dbg ipv6 routing [add-route|delete-route|mod-route]**

where:

| Parameter           | Description                                     |
|---------------------|---|
| <b>add-route</b>    | Enables debugging only for add-route events.    |
| <b>delete-route</b> | Enables debugging only for delete-route events. |
| <b>mod-route</b>    | Enables debugging only for modify-route events. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging for IPv6 routing events:

```
Switch> dbg ipv6 routing
```

---

## dbg lacp

Enables or disables Link Aggregation Control Protocol (LACP) debugging.

By default, LACP debugging is disabled.

## Syntax

```
[no] dbg lacp {all|cli|error|event|individual|interface {all|  
ethernet <chassis number/port number>}}|message {both|recv|send}|  
min-links|packet {both|rx|tx}|sync|timer|trace}
```

where:

| Parameter  | Description   |
|--|---|
| <b>all</b>   | Enables debugging of all LACP parameters.   |
| <b>cli</b>   | Enables debugging of the LACP command-line interface.   |
| <b>error</b>   | Enables debugging of LACP error events.   |
| <b>event</b>   | Enables debugging of LACP events.   |
| <b>individual</b>  | Enables debugging of LACP individual.   |
| <b>interface all</b>   | Enables debugging on all interfaces.  |
| <b>interface ethernet</b><br><i>chassis number/port<br/>number</i> | Enables debugging on the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>message</b>   | Enables debugging of LACP message events.   |
| <b>both</b>  | Enables the debugging of both sent and received LACP message events.  |
| <b>recv</b>  | Enables the debugging of only received LACP message events.   |
| <b>send</b>  | Enables the debugging of only sent LACP message events.   |
| <b>min-links</b>   | Enables the debugging of LACP minimum link events.  |
| <b>packet</b>  | Enables debugging of LACP packet events.  |
| <b>both</b>  | Enables the debugging of both received and transmitted LACP packet events.  |
| <b>rx</b>  | Enables the debugging of only received LACP packet events.  |
| <b>tx</b>  | Enables the debugging of only received LACP packet events.  |

| Parameter    | Description                                       |
|--------------|---|
| <b>sync</b>  | Enables debugging of LACP synchronization events. |
| <b>timer</b> | Enables debugging of LACP timer.                  |
| <b>trace</b> | Enables debugging of LACP trace events.           |

## Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                   |
|---------|--------------------------------|
| 10.1    | The command was introduced.    |
| 10.4    | Added <b>min-links</b> option. |

## Example

The following command enables LACP debugging for all interfaces:

```
Switch> dbg lacp interface all
```

---

## dbg lldp

Enables or disables Link Layer Discovery Protocol (LLDP) debugging.

By default, LLDP debugging is disabled.

## Syntax

```
[no] dbg lldp {all|dcbx|decode|encode|error|event|interface  
{all|ethernet <chassis number/port number>}|message|rx|trace|tx}
```

where:

| Parameter  | Description  |
|--|--|
| <b>all</b>   | Enables the debugging of all LLDP parameters.  |
| <b>dcbx</b>  | Enables the debugging of Data Center Bridging Capability Exchange protocol (DCBX) events.  |
| <b>decode</b>  | Enables LLDP decoder debugging.  |
| <b>encode</b>  | Enables LLDP encoder debugging.  |
| <b>error</b>   | Enables the debugging of LLDP errors.  |
| <b>event</b>   | Enables the debugging of LLDP events.  |
| <b>interface all</b>   | Enables LLDP debugging for all interfaces.   |
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Enables LLDP debugging for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>message</b>   | Enables the debugging of LLDP messages.  |
| <b>rx</b>  | Enables the debugging of received LLDP packets.  |
| <b>trace</b>   | Enables the debugging of LLDP trace events.  |
| <b>tx</b>  | Enables the debugging of transmitted LLDP packets.   |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables LLDP debugging for all interfaces:

```
Switch> dbg lldp interface all
```



---

## dbg logging syslog-id

Generates a specified logging message by simulating a call to the logging application program interface (API). The logging message must be identified by its syslog ID.

### Syntax

**dbg logging syslog-id** <syslog ID> **count** <number of messages>

where:

| Parameter                              | Function  |
|--|---|
| <i>syslog ID</i>                       | The syslog ID of the logging message to be generated. The syslog ID has the following structure:<br><br><facility>-<severity level>-<mnemonic><br><br>For example: <b>bgp-3-connect_error</b> |
| <b>count</b> <i>number of messages</i> | Specifies the number of messages to generate. The <i>number of messages</i> is an integer from 1 to 1000.   |

The syslog ID of a logging message can be identified by running the following command:

**display logging mnemonics** [<facility>]

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command generates five logging messages with the syslog ID **bgp-3-connect\_error**:

```
Switch> dbg logging syslog-id bgp-3-connect_error count 5
```

---

## dbg npa

Enables or disables Network Policy Agent (NPA) debugging.

By default, NPA debugging is disabled.

## Syntax

**[no] dbg npa {all|curl|error|event|vlan|vm|vnet|vnic|web-hook}**

where:

| Parameter       | Function   |
|-----------------|--|
| <b>all</b>      | Enables the debugging of all NPA parameters.                           |
| <b>curl</b>     | Enables NPA libcurl debugging.   |
| <b>error</b>    | Enables the debugging of NPA errors.                                   |
| <b>event</b>    | Enables the debugging of NPA events.                                   |
| <b>vlan</b>     | Enables NPA VLAN action debugging.                                     |
| <b>vm</b>       | Enables NPA virtual machine (VM) query debugging.                      |
| <b>vnet</b>     | Enables NPA virtual network (VNET) query debugging.                    |
| <b>vnic</b>     | Enables NPA virtualized Network Interface Card (vNIC) query debugging. |
| <b>web-hook</b> | Enables NPA web-hook subscription debugging.                           |

## Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command enables the debugging of NPA errors:

```
Switch> dbg npa error
```

---

## dbg nsm

Enables or disables the debugging of all Network Service Module (NSM) parameters.

By default, NSM debugging is disabled.

## Syntax

**[no] dbg nsm [all|bfd|events|ha [all]]|hal ipc]**

where:

| Parameter      | Description   |
|----------------|---|
| <b>all</b>     | Enables the debugging of all NSM parameters.  |
| <b>bfd</b>     | Enables NSM Bidirectional Forwarding Detection (BFD) debugging.                           |
| <b>events</b>  | Enables NSM event debugging.  |
| <b>ha</b>      | Enables NSM high availability debugging.  |
| <b>hal ipc</b> | Enables NSM Hardware Abstraction Layer (HAL) inter-process communication (IPC) debugging. |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the debugging of NSM events:

```
Switch> dbg nsm events
```

---

## dbg nsm hsl

Enables or disables the debugging of Network Service Module (NSM) Hardware Specific Layer (HSL).

By default, NSM debugging is disabled.

## Syntax

```
[no] dbg nsm hsl {0|1} [<interface name>|ethernet <chassis number/port number>|loopback <loopback interface number>|mgmt 0|port-aggregation <LAG number>|vlan <VLAN ID>]
```

where:

| Parameter   | Description  |
|---|--|
| <b>0</b>  | Enables the debugging of all NSM HSL events.   |
| <b>1</b>  | Enables the debugging of NSM HSL interface statistics.   |
| <i>interface name</i>                             | Enables NSM HSL debugging on the interface identified by its name.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Enables NSM HSL debugging on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface number</i>  | Enables NSM HSL debugging on the specified loopback interface. The <i>loopback interface number</i> is an integer from 0 to 7.                       |
| <b>mgmt 0</b>                                     | Enables NSM HSL debugging on the management interface.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Enables NSM HSL debugging on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.                         |
| <b>vlan</b> <i>VLAN ID</i>                        | Enables NSM HSL debugging on the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 4094.  |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the debugging of NSM HSL interface statistics:

```
Switch> dbg nsm hsl 1
```

---

## dbg nsm packet

Enables or disables Network Service Module (NSM) packet debugging.

By default, NSM debugging is disabled.

### Syntax

```
[no] dbg nsm packet [recv|send] [detail]
```

where:

| Parameter     | Description   |
|---------------|---|
| <b>recv</b>   | Enables only the debugging of NSM received packets. |
| <b>send</b>   | Enables only the debugging of NSM sent packets.     |
| <b>detail</b> | Offers detailed debugging information.              |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of NSM packets with detailed information displayed:

```
Switch> dbg nsm packet detail
```

---

## dbg ntp

Enables or disables Network Time Protocol (NTP) debugging.

By default, NTP debugging is disabled.

### Syntax

**[no] dbg ntp**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables NTP debugging:

```
Switch> dbg ntp
```

---

## dbg pki

Enables or disables Private Key Infrastructure (PKI) debugging.

By default, PKI debugging is disabled.

### Syntax

**[no] dbg pki**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command enables PKI debugging messages:

```
Switch> dbg pki
```



---

## dbg radius

Enables or disables the Remote Authentication Dial-In User Service (RADIUS) debugging.

By default, RADIUS debugging is disabled.

## Syntax

**[no] dbg radius {aaa-request|aaa-request-lowlevel|all|config|config-lowlevel|server-monitor|server-monitor-errors}**

where:

| Parameter                    | Description  |
|------------------------------|--|
| <b>aaa-request</b>           | Enables RADIUS Authentication, Authorization and Accounting (AAA) request debugging.           |
| <b>aaa-request-lowlevel</b>  | Enables RADIUS Authentication, Authorization and Accounting (AAA) low level request debugging. |
| <b>all</b>                   | Enables debugging of all RADIUS events.  |
| <b>config</b>                | Enables RADIUS configuration debugging.  |
| <b>config-lowlevel</b>       | Enables RADIUS low level configuration debugging.  |
| <b>server-monitor</b>        | Enables RADIUS server monitoring debugging.  |
| <b>server-monitor-errors</b> | Enables RADIUS server monitoring error debugging.  |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command RADIUS AAA request debugging:

```
Switch> dbg radius aaa-request
```

---

## dbg rib

Enables or disables Routing Information Base (RIB) debugging.

By default, RIB debugging is disabled.

## Syntax

```
[no] dbg rib {all|bfd|events|hal events|nsm|packet [recv|send] [detail]}
```

where:

| Parameter         | Definition  |
|-------------------|---|
| <b>all</b>        | Enables the debugging of all RIB parameters.  |
| <b>bfd</b>        | Enables only RIB Bidirectional Forwarding Detection (BFD) debugging.                    |
| <b>events</b>     | Enables only the debugging of RIB events.   |
| <b>hal events</b> | Enables only the debugging of RIB Hardware Abstraction Layer (HAL) asynchronous events. |
| <b>nsm</b>        | Enables only RIB Network Service Module (NSM) debugging.                                |
| <b>packet</b>     | Enables only RIB debugging for both received and sent packets.                          |
| <b>recv</b>       | Enables only RIB received packets debugging.  |
| <b>send</b>       | Enables only RIB sent packets debugging.  |
| <b>detail</b>     | Offers detailed debugging information.  |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the debugging of RIB received packets:

```
Switch> dbg rib packet recv
```

---

## dbg slp

Enables or disables Service Location Protocol (SLP) debugging.

By default, SLP debugging is disabled.

## Syntax

**[no] dbg slp [agents|all|attributes|decode|encode|interfaces|rx|services|tx]**

where:

| Parameter         | Description                                       |
|-------------------|---|
| <b>agents</b>     | Enables SLP agent debugging.                      |
| <b>all</b>        | Enables all SLP events debugging.                 |
| <b>attributes</b> | Enables SLP attribute debugging.                  |
| <b>decode</b>     | Enables SLP decoder debugging.                    |
| <b>encode</b>     | Enables SLP encoder debugging.                    |
| <b>interfaces</b> | Enables SLP interface debugging.                  |
| <b>rx</b>         | Enables the debugging of received SLP packets.    |
| <b>services</b>   | Enables SLP service debugging.                    |
| <b>tx</b>         | Enables the debugging of transmitted SLP packets. |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command enables SLP debugging:

```
Switch> dbg slp
```

---

## dbg snmp-server

Enables or disables Simple Network Management Protocol (SNMP) agent debugging.

By default, SNMP agent debugging is disabled.

### Syntax

**[no] dbg snmp-server**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables SNMP agent debugging:

```
Switch> dbg snmp-server
```

---

## dbg spanning-tree all

Enables or disables debugging of all spanning tree commands.

By default, Spanning Tree debugging is disabled.

### Syntax

```
[no] dbg spanning-tree all
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of all spanning tree commands:

```
Switch> dbg spanning-tree all
```

---

## dbg spanning-tree bpdu-rx

Enables or disables the debugging of Spanning Tree Bridge Protocol Data Unit (BPDU) receive packets.

By default, Spanning Tree debugging is disabled.

## Syntax

```
[no] dbg spanning-tree bpdu-rx [interface {ethernet <chassis number/port number>|port-aggregation <LAG number>}] [tree <tree ID>] [detail]
```

where:

| Parameter   | Description   |
|---|---|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Enables the debugging of Spanning Tree BPDU receive packets for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                 |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Enables the debugging of Spanning Tree BPDU receive packets for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.   |
| <b>tree</b> <i>tree ID</i>                                  | Enables the debugging of Spanning Tree BPDU receive packets for the specified spanning tree instance. The <i>tree ID</i> is an integer from 0 to 4094. A value of 0 specifies Common and Internal Spanning Tree (CIST). |
| <b>detail</b>   | Offers detailed Spanning Tree packet information.   |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables debugging of spanning tree Bridge Protocol Data Unit (BPDU) receive packets for ethernet interface 1/10 on tree 25:

```
Switch> dbg spanning-tree bpdurx interface ethernet 1/10 tree 25
```

---

## dbg spanning-tree bpdu-tx

Enables or disables debugging of spanning-tree Bridge Protocol Data Unit (BPDU) transmit packets for the specified ethernet interface.

By default, Spanning Tree debugging is disabled.

## Syntax

```
[no] dbg spanning-tree bpdu-tx [interface ethernet <chassis number/port number>|port-aggregation <LAG number>] [tree <tree ID>] [detail]
```

where:

| Parameter   | Description  |
|---|--|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Enables the debugging of Spanning Tree BPDU transmit packets for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                 |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Enables the debugging of Spanning Tree BPDU transmit packets for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.   |
| <b>tree</b> <i>tree ID</i>                                  | Enables the debugging of Spanning Tree BPDU transmit packets for the specified spanning tree instance. The <i>tree ID</i> is an integer from 0 to 4094. A value of 0 specifies Common and Internal Spanning Tree (CIST). |
| <b>detail</b>   | Offers detailed Spanning Tree packet information.  |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables debugging of spanning tree Bridge Protocol Data Unit (BPDU) receive packets for ethernet interface 1/10 on tree 25:

```
Switch> dbg spanning-tree bpdv-tx interface ethernet 1/10 tree 25
```

---

## dbg spanning-tree cfg

Enables or disables debugging of spanning tree configuration.

By default, Spanning Tree debugging is disabled.

### Syntax

**[no] dbg spanning-tree cfg**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of spanning tree configuration:

```
Switch> dbg spanning-tree cfg
```

---

## dbg spanning-tree error

Enables or disables debugging of all spanning tree errors.

By default, Spanning Tree debugging is disabled.

### Syntax

**[no] dbg spanning-tree error**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of all spanning tree errors:

```
Switch> dbg spanning-tree error
```

---

## dbg spanning-tree event

Enables or disables debugging of all spanning tree events.

By default, Spanning Tree debugging is disabled.

### Syntax

**[no] dbg spanning-tree event [interface ethernet <chassis number/port number>|port-aggregation <LAG number>] [tree <tree ID>]**

where:

| Parameter   | Description   |
|---|---|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Enables the debugging of Spanning Tree events for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                 |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Enables the debugging of Spanning Tree events for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.   |
| <b>tree</b> <i>tree ID</i>                                  | Enables the debugging of Spanning Tree events for the specified spanning tree instance. The <i>tree ID</i> is an integer from 0 to 4094. A value of 0 specifies Common and Internal Spanning Tree (CIST). |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of all spanning tree events:

```
Switch> dbg spanning-tree event
```

---

## dbg spanning-tree protocol

Enables or disables debugging of the Spanning Tree Protocol (STP).

By default, Spanning Tree debugging is disabled.

### Syntax

**[no] dbg spanning-tree protocol [interface {ethernet <chassis number/port number>|port-aggregation <LAG number>}] [tree <tree ID>]**

where:

| Parameter  | Description   |
|--|---|
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Enables STP debugging on the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                       |
| <b>interface port-aggregation</b> <i>LAG number</i>            | Enables STP debugging on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.  |
| <b>tree</b> <i>tree ID</i>                                     | Enables STP debugging for the specified Spanning Tree instance. The <i>tree ID</i> is an integer from 0 to 4094. A value of 0 specifies Common and Internal Spanning Tree (CIST). |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command enables debugging of STP protocol:

```
Switch> dbg spanning-tree protocol
```

---

## dbg spanning-tree timer

Enables or disables debugging of all spanning tree timers.

By default, Spanning Tree debugging is disabled.

### Syntax

```
[no] dbg spanning-tree timer [interface {ethernet <chassis  
number/port number>|port-aggregation <LAG number>}] [tree <tree ID>]
```

where:

| Parameter   | Description   |
|---|---|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Enables Spanning Tree timer debugging on the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                       |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Enables Spanning Tree timer debugging on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.  |
| <b>tree</b> <i>tree ID</i>                                  | Enables Spanning Tree timer debugging for the specified Spanning Tree instance. The <i>tree ID</i> is an integer from 0 to 4094. A value of 0 specifies Common and Internal Spanning Tree (CIST). |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of all spanning tree timers:

```
Switch> dbg spanning-tree timer
```

---

## dbg spanning-tree topology

Enables or disables debugging of all spanning tree topologies.

By default, Spanning Tree debugging is disabled.

### Syntax

```
[no] dbg spanning-tree topology [interface {ethernet <chassis  
number/port number>|port-aggregation <LAG number>}] [tree <tree ID>]
```

where:

| Parameter   | Description  |
|---|--|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Enables Spanning Tree topology debugging on the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                       |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Enables Spanning Tree topology debugging on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.  |
| <b>tree</b> <i>tree ID</i>                                  | Enables Spanning Tree topology debugging for the specified Spanning Tree instance. The <i>tree ID</i> is an integer from 0 to 4094. A value of 0 specifies Common and Internal Spanning Tree (CIST). |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of all spanning tree topologies:

```
Switch> dbg spanning-tree topology
```

---

## dbg spanning-tree trace

Enables or disables debugging of all spanning tree traces.

By default, Spanning Tree debugging is disabled.

### Syntax

```
[no] dbg spanning-tree trace [interface {ethernet <chassis  
number/port number>|port-aggregation <LAG number>}] [tree <tree ID>]
```

where:

| Parameter   | Description   |
|---|---|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Enables Spanning Tree trace debugging on the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                       |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Enables Spanning Tree trace debugging on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.  |
| <b>tree</b> <i>tree ID</i>                                  | Enables Spanning Tree trace debugging for the specified Spanning Tree instance. The <i>tree ID</i> is an integer from 0 to 4094. A value of 0 specifies Common and Internal Spanning Tree (CIST). |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of all spanning tree traces:

```
Switch> dbg spanning-tree trace
```



---

## dbg spanning-tree warning

Enables or disables debugging of all spanning tree warnings.

By default, Spanning Tree debugging is disabled.

### Syntax

```
[no] dbg spanning-tree warning [interface {ethernet <chassis  
number/port number>|port-aggregation <LAG number>}] [tree <tree ID>]
```

where:

| Parameter   | Description   |
|---|---|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Enables Spanning Tree warning debugging on the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                       |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Enables Spanning Tree warning debugging on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.  |
| <b>tree</b> <i>tree ID</i>                                  | Enables Spanning Tree warning debugging for the specified Spanning Tree instance. The <i>tree ID</i> is an integer from 0 to 4094. A value of 0 specifies Common and Internal Spanning Tree (CIST). |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of all spanning tree warnings:

```
Switch> dbg spanning-tree warning
```

---

## dbg ssh

Enables or disables Secure Shell (SSH) debugging.

By default, SSH debugging is disabled.

### Syntax

**[no] dbg ssh {client|server}**

where:

| Parameter     | Description                   |
|---------------|-------------------------------|
| <b>client</b> | Enables SSH client debugging. |
| <b>server</b> | Enables SSH server debugging. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables SSH client debugging:

```
Switch> dbg ssh client
```

---

## dbg syslog

Enables or disables system logging (syslog) debugging.

By default, syslog debugging is disabled.

### Syntax

**[no] dbg syslog**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables syslog debugging:

```
Switch> dbg syslog
```

---

## dbg tacacs+

Enables or disables Terminal Access Controller Access Control System (TACACS+) debugging.

By default, TACACS+ debugging is disabled.

### Syntax

**[no] dbg tacacs+**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables debugging of the Terminal Access Controller Access Control System (TACACS+) feature:

```
Switch> dbg tacacs+
```

---

## dbg telemetry

Enables or disables telemetry debugging messages.

By default, telemetry debugging messages are disabled.

### Syntax

```
[no] dbg telemetry {all-bview-messages|all-daemon-messages|all-messages|bview-bst|bview-bst-json|bview-buffer-pool|bview-heartbeat|bview-module-mgr|bview-sb-plugin|bview-sb-redirect|bview-sys-json|bview-sys-utils|daemon-cli|daemon-db|daemon-msg-queue|daemon-mutex|daemon-nsm-client|daemon-push|daemon-smi-server|if-i2n|if-n2i}
```

where:

| Parameter                  | Description  |
|----------------------------|--|
| <b>all-bview-messages</b>  | Enables debugging messages for all broadview event types.              |
| <b>all-daemon-messages</b> | Enables debugging messages for all telemetry daemon event types.       |
| <b>all-messages</b>        | Enables debugging messages for all event types.                        |
| <b>bview-bst</b>           | Enables broadview Buffer Statistics Tracking (BST) debugging messages. |
| <b>bview-bst-json</b>      | Enables broadview BST json encoding debugging messages.                |
| <b>bview-buffer-pool</b>   | Enables broadview buffer pool debugging messages.                      |
| <b>bview-heartbeat</b>     | Enables broadview heartbeat debugging messages.                        |
| <b>bview-module-mgr</b>    | Enables broadview module manager debugging messages.                   |
| <b>bview-sb-plugin</b>     | Enables broadview south-bound plugin debugging messages.               |
| <b>bview-sb-redirect</b>   | Enables broadview south-bound redirector debugging messages.           |
| <b>bview-sys-json</b>      | Enables broadview system json encoding debugging messages.             |
| <b>bview-sys-utils</b>     | Enables broadview system utilities debugging messages.                 |
| <b>daemon-cli</b>          | Enables telemetry daemon CLI debugging messages.                       |
| <b>daemon-db</b>           | Enables telemetry daemon database debugging messages.                  |

| Parameter                | Description   |
|--------------------------|---|
| <b>daemon-msg-queue</b>  | Enables telemetry daemon message queue debugging messages.                            |
| <b>daemon-mutex</b>      | Enables telemetry daemon mutex debugging messages.                                    |
| <b>daemon-nsm-client</b> | Enables telemetry daemon Network Service Module (NSM) client debugging messages.      |
| <b>daemon-push</b>       | Enables telemetry daemon asynchronous report push debugging messages.                 |
| <b>daemon-smi-server</b> | Enables telemetry daemon Simple Management Interface (SMI) server debugging messages. |
| <b>if-i2n</b>            | Obtain the interface name by its index number.  |
| <b>if-n2i</b>            | Obtain the interface index number by its name.  |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command enables broadview heartbeat debugging messages:

```
Switch> dbg telemetry bview-heartbeat
```

## Restrictions

Options **if-i2n** and **if-n2i** are not available in Global Configuration mode.

---

## dbg telnet

Enables or disables Telnet server debugging.

By default, Telnet debugging is disabled.

### Syntax

**[no] dbg telnet server**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the debugging of the Telnet server:

```
Switch> dbg telnet server
```

---

## dbg um

Enables or disables User Management (UM) debugging.

By default, UM debugging is disabled.

### Syntax

**[no] dbg um**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables UM debugging:

```
Switch> dbg um
```



---

## dbg vlag

Enables or disables Virtual Link Aggregation Group (vLAG) debugging.

By default, vLAG debugging is disabled.

## Syntax

**[no] dbg vlag {all|cons|error|fdb|hc|instance|main|sm}**

where:

| Parameter       | Description   |
|-----------------|---|
| <b>all</b>      | Enables all vLAG debugging parameters.                        |
| <b>cons</b>     | Enables only vLAG consistency check debugging.                |
| <b>error</b>    | Enables only vLAG error debugging.                            |
| <b>fdb</b>      | Enables only vLAG Forwarding Database (FDB) thread debugging. |
| <b>hc</b>       | Enables only vLAG health check thread debugging.              |
| <b>instance</b> | Enables only vLAG instance debugging.                         |
| <b>main</b>     | Enables only vLAG main thread debugging.                      |
| <b>sm</b>       | Enables only vLAG State Machine (SM) thread debugging.        |

## Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

## Example

The following command enables vLAG error debugging:

```
Switch(config)# dbg vlag error
```

---

## dbg vlan

Enables or disables Virtual Local Area Network (VLAN) debugging.

By default, VLAN debugging is disabled.

## Syntax

**[no] dbg vlan {all|error|message {both|rx|tx}}**

where:

| Parameter      | Description   |
|----------------|---|
| <b>all</b>     | Enables all VLAN debugging parameters.                        |
| <b>error</b>   | Enables only VLAN error debugging.                            |
| <b>message</b> | Enables only VLAN message debugging.                          |
| <b>both</b>    | Enables VLAN debugging for received and transmitted messages. |
| <b>rx</b>      | Enables VLAN debugging only for received messages.            |
| <b>tx</b>      | Enables VLAN debugging only for transmitted messages.         |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables debugging of all VLAN parameters:

```
Switch> dbg vlan all
```

---

## dbg vrrp engine

Enables or disables debugging of the Virtual Router Redundancy Protocol (VRRP) engine. To display VRRP debugging messages, you also need to run the following commands:

```
Switch(config)# logging console 7
Switch(config)# logging level vrrp 7
```

By default, VRRP engine debugging is disabled.

## Syntax

```
[no] dbg vrrp engine {all|events|packet {recv|send}|vlag
{error|event}}
```

where:

| Parameter          | Description  |
|--------------------|--|
| <b>all</b>         | Enables all VRRP debugging parameters.   |
| <b>events</b>      | Enables only VRRP event debugging.   |
| <b>packet recv</b> | Enables only VRRP received packets debugging.                                    |
| <b>packet send</b> | Enables only VRRP sent packets debugging.  |
| <b>vlag error</b>  | Enables only the debugging of VRRP Virtual Link Aggregation Group (vLAG) errors. |
| <b>vlag event</b>  | Enables only the debugging of VRRP vLAG events.                                  |

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables debugging of all VRRP engine events:

```
Switch> dbg vrrp engine events
```

---

## no dbg all

Disables the debugging of all switch processes.

### Syntax

```
no dbg all
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command disables the debugging of all switch processes:

```
Switch> no dbg all
```

---

## Chapter 4. Configuration Mode Commands

This chapter describes how to enter Global Configuration Mode and the commands available in this mode.

---

## configure

Enters Global Configuration Mode.

### Syntax

**configure** [**device**]

### Modes

Privileged EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enters Global Configuration Mode:

```
Switch# configure device  
Switch(config)#
```

---

## aaa accounting console group

Enables or disables Authentication, Authorization, and Accounting (AAA) accounting using the specified list of Terminal Access Controller Access-Control System Plus (TACACS+) or Remote Authentication Dial-In User Service (RADIUS) server groups. This command configures AAA accounting for console user login authentication.

### Syntax

**[no] aaa accounting console group** *<list of groups>* **[local]**

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>list of groups</i> | The name of the group of TACACS+ or RADIUS servers. Up to 8 groups can be specified.       |
| <b>local</b>          | If the configured TACACS+ or RADIUS server group is unavailable, local accounting is used. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command enables AAA accounting using the TACACS+ or RADIUS server groups `tacacs-s1` and `tacacs-s2`:

```
Switch(config)# aaa accounting console groups tacacs-s1 tacacs-s2
```

---

## aaa accounting console local

Enables or disables Authentication, Authorization, and Accounting (AAA) accounting locally. This command configures AAA accounting for console user login authentication.

### Syntax

```
[no] aaa accounting console local
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command enables AAA accounting locally:

```
Switch(config)# aaa accounting console local
```



---

## aaa accounting default group

Enables or disables Authentication, Authorization, and Accounting (AAA) accounting using the specified list of Terminal Access Controller Access-Control System Plus (TACACS+) or Remote Authentication Dial-In User Service (RADIUS) server groups. This command configures AAA accounting for user login authentication using remote protocol connections such as SSH or Telnet.

### Syntax

**[no] aaa accounting default group** *<list of groups>* **[local]**

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>list of groups</i> | The name of the group of TACACS+ or RADIUS servers. Up to 8 groups can be specified.       |
| <b>local</b>          | If the configured TACACS+ or RADIUS server group is unavailable, local accounting is used. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables AAA accounting using the TACACS+ or RADIUS server groups `tacacs-s1` and `tacacs-s2`:

```
Switch(config)# aaa accounting default groups tacacs-s1 tacacs-s2
```

---

## aaa accounting default local

Enables or disables Authentication, Authorization, and Accounting (AAA) accounting locally. This command configures AAA accounting for user login authentication using remote protocol connections such as SSH or Telnet.

### Syntax

```
[no] aaa accounting default local
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables AAA accounting locally:

```
Switch(config)# aaa accounting default local
```

---

## aaa authentication login console

Enables or disables Authentication, Authorization, and Accounting (AAA) console user login authentication.

### Syntax

```
[no] aaa authentication login console {group <list of groups> | local|none}
```

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>list of groups</i> | The name of the group of TACACS+ or RADIUS servers. Up to 8 groups can be specified. The groups are accessed in the specified order. The list of groups can be followed by <code>local</code> , <code>none</code> , or both. They are used if the TACACS+ or RADIUS server group is unavailable. |
| <b>local</b>          | Local user database is used for authentication.  |
| <b>none</b>           | No user authentication is required.  |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables AAA console user login authentication using local authentication:

```
Switch(config)# aaa authentication login console local
```

---

## aaa authentication login default

Enables or disables Authentication, Authorization, and Accounting (AAA) remote user login authentication for remote protocol connections such as SSH or Telnet.

### Syntax

```
[no] aaa authentication login default {group <list of groups>|  
local|none}
```

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>list of groups</i> | The name of the group of TACACS+ or RADIUS servers. Up to 8 groups can be specified. The groups are accessed in the specified order. The list of groups can be followed by <code>local</code> , <code>none</code> , or both. They are used if the TACACS+ or RADIUS server group is unavailable. |
| <b>local</b>          | Local user database is used for authentication.  |
| <b>none</b>           | No user authentication is required.  |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables AAA remote user login authentication using local authentication:

```
Switch(config)# aaa authentication login default local
```

---

## aaa authentication login error-enable

Enable or disables the displays of errors when the user fails to authenticate.

### Syntax

```
[no] aaa authentication login error-enable
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the display of errors when the user fails to authenticate:

```
Switch(config)# aaa authentication login error-enable
```

---

## aaa authentication login mschapv2 enable

Enable or disables Microsoft Challenge/Reply Handshake Protocol version 2 (MSChapv2) authentication option.

### Syntax

```
[no] aaa authentication login mschapv2 enable
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command enables the MSChapv2 authentication option:

```
Switch(config)# aaa authentication login mschapv2 enable
```

---

## aaa authorization commands default

Enables or disables User EXEC and Configuration command modes level authorization.

### Syntax

```
[no] aaa authorization commands default {groups <list of groups> | local}
```

where:

| Parameter             | Function   |
|-----------------------|--|
| <b>groups</b>         | The authorization process will use a list of Terminal Access Controller Access-Control System Plus (TACACS+) server groups.  |
| <i>list of groups</i> | The name of the group of TACACS+ servers. Up to 8 groups can be specified. The groups are accessed in the specified order. The list of groups can be followed by <code>local</code> . This is used if the TACACS+ server group is unavailable. |
| <b>local</b>          | Specifies that the local user database will be used for authorization.   |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables User EXEC and CONFIG command level authorization using local authorization:

```
Switch(config)# aaa authorization commands default local
```

---

## aaa group server

Creates or deletes a group of Terminal Access Controller Access-Control System Plus (TACACS+) or Remote Authentication Dial-In User Service (RADIUS) servers for Authentication, Authorization, and Accounting (AAA). After creating a group, you enter its Server Configuration command mode.

### Syntax

**[no] aaa group server {radius|tacacs+} <server group name>**

where:

| Parameter                | Function   |
|--------------------------|--|
| <b>radius</b>            | Creates a RADIUS server group.   |
| <b>tacacs+</b>           | Creates a TACACS+ server group.  |
| <i>server group name</i> | The name of the server group. The <i>server group name</i> can be up to 127 characters in length, must start with a letter, and must contain only lowercase letters and numbers. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |
| 10.3    | Added <b>radius</b> option. |

### Examples

The following command creates TACACS+ server group 'tacacs-group-1':

```
Switch(config)# aaa group server tacacs+ tacacs-group-1
```

The following command creates RADIUS server group 'radius-group-1':

```
Switch(config)# aaa group server radius radius-group-1
```

### Restrictions

- The server group name cannot be *radius*, *tacacs+*, or *ldap*.
- A default group named *tacacs+* includes all TACACS+ servers.
- A default group named *radius* includes all RADIUS servers.



---

## aaa local authentication attempts max-fail

Sets the number of unsuccessful authentication attempts until a user is locked out. To remove this limit use the **no** form of the command.

By default, the number of unsuccessful authentication attempts is unlimited.

### Syntax

**[no] aaa local authentication attempts max-fail** <*number of attempts*>

where:

| Parameter                 | Function  |
|---------------------------|---|
| <i>number of attempts</i> | The maximum number of unsuccessful authentication attempts. The <i>number of attempts</i> is an integer from 1 to 25. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the number of unsuccessful authentication attempts until a user is locked out to 3:

```
Switch(config)# aaa local authentication attempts max-fail 3
```

### Restrictions

An administrator cannot be locked out.

---

## aaa user default-role

Enables or disables users to login even if the TACACS+ server does not provide a role. The default role is network-operator. If this option is disabled then users without a role provided by the TACACS+ server will be unable to login.

### Syntax

```
aaa user default-role
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables a user to login even if the TACACS+ server does not provide a role:

```
Switch(config)# aaa user default-role
```

---

## alias

Creates an alias command that replaces an already defined CLI command. It can be used to create an alias command that acts as an abbreviation of a CLI command or as a replacement for an entire command syntax.

## Syntax

**alias** <command alias> <replaced command>

where:

| Parameter               | Description   |
|-------------------------|---|
| <i>command alias</i>    | The string that will replace the specified command. The <i>command alias</i> must contain only alphanumeric characters and must start with a letter. It can be up to 30 characters in length. |
| <i>replaced command</i> | The command syntax that will be replaced by the command alias.  |

To delete a command alias, use the following command:

**no alias** {<command alias>|**all**}

where:

| Parameter            | Description                                 |
|----------------------|---|
| <i>command alias</i> | Deletes the specified command alias.        |
| <b>all</b>           | Deletes all the configured command aliases. |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Examples

The following command creates a command alias (dv) that replaces the command **display version**:

```
Switch(config)# alias dv display version
Switch(config)# dv

Lenovo Networking Operating System (NOS) Software
Technical Assistance Center: http://www.lenovo.com
Copyright (C) Lenovo, 2016. All rights reserved.

Software:
  Bootloader version: 10.4.1.1
  System version: 10.4.1.1
  System compile time: Thu Apr 13 20:46:29 PDT 2017
  ...
```

The following command creates a command alias (dvlan135) that replaces the command **display vlan id 135**:

```
Switch(config)# alias dvlan135 display vlan id 135
Switch(config)# dvlan135

Flags:
u - untagged egress traffic for this VLAN
t - tagged egress traffic for this VLAN

d - auto-provisioned VLAN
h - static and auto-provisioned VLAN

VLAN      Name                               Status  IPMC FLOOD Ports
=====  =====
135       VLAN0135                          ACTIVE  IPv4,IPv6  Ethernet1/12(u)
```

## Restrictions

- The command alias must be unique. Multiple command aliases can be assigned to the same command, but multiple commands cannot be assigned to the same command alias. For example:

```
Switch(config)# alias dv display version
Switch(config)# alias dver display version
Switch# display alias

CLI alias information
Total number : 2
=====
dv      : display version
dver   : display version
```

- Command aliases take precedence over the CLI command syntax. For example, you configure the following command alias:

```
Switch(config)# alias lacp display
```

The following CLI command is invalid because the previously configured alias overwrites **lacp** with **display**.

```
Switch(config)# lacp system-priority  
% Unrecognized command
```

---

## arp access-list

Creates or removes an Address Resolution Protocol (ARP) Access Control List (ACL). After creating an ACL, you enter its Configuration command mode.

### Syntax

**[no] arp access-list** <ACL name>

where:

| Parameter       | Function   |
|-----------------|--|
| <i>ACL name</i> | The name of the ARP ACL. The <i>ACL name</i> can be up to 64 characters in length. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates an ARP ACL named 'arp-acl-1':

```
Switch(config)# arp access-list arp-acl-1
```

---

## banner motd

Enables or disables the message of the day (MOTD) banner displayed of the user logs in.

### Syntax

**[no] banner motd {<message>|default}**

where:

| Parameter      | Function  |
|----------------|---|
| <i>message</i> | The message that is displayed after a user logs in. |
| <b>default</b> | Resets the MOTD banner to the default message.      |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the MOTD banner to display 'This is a test.':

```
Switch(config)# banner motd This is a test.  
Switch(config)# exit  
Switch# display banner motd  
  
This is a test.
```

---

## bfd gtsm

Enables or disables the Bidirectional Forwarding Detection (BFD) Generalized TTL Security Mechanism (GTSM).

By default, BFD GTSM is disabled.

## Syntax

**bfd gtsm {enable|disable}**

where:

| Parameter      | Function           |
|----------------|--------------------|
| <b>enable</b>  | Enables BFD GTSM.  |
| <b>disable</b> | Disables BFD GTSM. |

## Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables BFD GTSM:

```
Switch(config)# bfd gtsm enable
```



---

## bfd gtsm ttl

Configures the Bidirectional Forwarding Detection (BFD) Generalized TTL Security Mechanism (GTSM) hop limit or Time-to-Live (TTL).

Use the **no** form to reset the hop limit to its default value.

The default hop limit is 255.

## Syntax

**[no] bfd gtsm ttl** *<hop limit>*

where:

| Parameter        | Function  |
|------------------|---|
| <i>hop limit</i> | Specifies the number of maximum hops a BFD packet is allowed to travel through until it is discarded. The <i>hop limit</i> is an integer from 1 to 255. |

## Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configure the BFD hop limit to 30:

```
Switch(config)# bfd gtsm ttl 30
```

---

## bfd interval

Configures Bidirectional Forwarding Detection (BFD) global session parameters, including sent and received packet rates and hello messages multiplier.

Use the **no** form to delete a configured set of parameters.

## Syntax

**[no] bfd [ipv4|ipv6] interval** <send packet rate> **minrx** <receive packet rate> **multiplier** <hello multiplier>

where:

| Parameter                                 | Function   |
|---|--|
| <b>ipv4</b>                               | Configures BFD parameters only for IPv4 addresses.   |
| <b>ipv6</b>                               | Configures BFD parameters only for IPv6 addresses.   |
| <b>interval</b> <i>send packet rate</i>   | Specifies how often the switch sends BFD control packets to other BFD peers. The <i>send packet rate</i> is from 50 to 999 milliseconds. The default value is 50 milliseconds.   |
| <b>minrx</b> <i>receive packet rate</i>   | Specifies the minimum time period during which the switch should expect to receive BFD control packets from other BFD peers. The <i>receive packet rate</i> is from 50 to 999 milliseconds. The default value is 50 milliseconds.  |
| <b>multiplier</b> <i>hello multiplier</i> | Specifies the number of consecutive BFD control packets that have to be missed from a BFD peer before the switch declares that peer unavailable and informs the Layer 3 BFD peer of the failure. The <i>hello multiplier</i> is an integer from 3 to 50. The default value is 3. |

## Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures BFD send packet rate to 120 milliseconds, the minimum expected receive rate to 120 milliseconds, and the hello multiplier to 7:

```
Switch(config)# bfd interval 120 minrx 120 multiplier 7
```

---

## bfd multihop-peer auth

Configures Bidirectional Forwarding Detection (BFD) authentication for a multi-hop peer.

Use the **no** form of the command to disable the use of a BFD authentication.

By default, BFD authentication is disabled.

## Syntax

```
[no] bfd multihop-peer <peer address> auth type {keyed-md5|  
keyed-sha1|meticulous-keyed-md5|meticulous-keyed-sha1|  
simple} {key-chain <key chain name>|key-id <key number> key  
<authentication key string>}
```

where:

| Parameter                                   | Function   |
|---|--|
| <i>peer address</i>                         | Configures the BFD authentication key for the specified destination. The <i>peer address</i> can be either an IPv4 address or an IPv6 address. |
| <b>type</b>                                 | Specify the type of encryption used.   |
| <b>keyed-md5</b>                            | Keyed Message Digest 5 hash algorithm.   |
| <b>keyed-sha1</b>                           | Keyed Secure Hash Algorithm I.   |
| <b>meticulous-keyed-md5</b>                 | Meticulous keyed Message Digest 5 hash algorithm.  |
| <b>meticulous-keyed-sha1</b>                | Meticulous keyed Secure Hash Algorithm I.  |
| <b>simple</b>                               | Plain-text password.   |
| <b>key-chain</b> <i>key chain name</i>      | Specifies the use an already configured authentication key chain. The maximum length for the <i>key chain name</i> is 32 characters.           |
| <b>key-id</b> <i>key number</i>             | Specifies the use of a new authentication key. The <i>key number</i> is from 0 to 255.   |
| <b>key</b> <i>authentication key string</i> | Specifies the key to be used for BFD authentication. It will be encrypted with the previously selected algorithm.                              |

## Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Examples

The following command configures BFD authentication using Keyed SHA-1 encryption and key chain 'bfd-chain-3':

```
Switch(config)# bfd multihop-peer 10.90.200.15 auth type keyed-sha1  
key-chain bfd-chain-3
```

The following command configures BFD authentication using Keyed SHA-1 encryption and a new key:

```
Switch(config)# bfd multihop-peer 10.90.200.15 auth type keyed-sha1  
key-id 35 key test-bfd-auth-key
```

---

## bfd multihop-peer interval

Configures Bidirectional Forwarding Detection (BFD) multi-hop peer parameters, including sent and received packet rates and hello messages multiplier.

Use the **no** form to delete a configured set of parameters.

### Syntax

**[no] bfd multihop-peer** <peer address> **interval** <send packet rate> **minrx** <receive packet rate> **multiplier** <hello multiplier>

where:

| Parameter                                 | Function   |
|---|--|
| <i>peer address</i>                       | Configures BFD parameters for the specified destination. The <i>peer address</i> can be either an IPv4 address or an IPv6 address.   |
| <b>interval</b> <i>send packet rate</i>   | Specifies how often the switch sends BFD control packets to other BFD peers. The <i>send packet rate</i> is from 50 to 999 milliseconds. The default value is 50 milliseconds.   |
| <b>minrx</b> <i>receive packet rate</i>   | Specifies the minimum time period during which the switch should expect to receive BFD control packets from other BFD peers. The <i>receive packet rate</i> is from 50 to 999 milliseconds. The default value is 50 milliseconds.  |
| <b>multiplier</b> <i>hello multiplier</i> | Specifies the number of consecutive BFD control packets that have to be missed from a BFD peer before the switch declares that peer unavailable and informs the Layer 3 BFD peer of the failure. The <i>hello multiplier</i> is an integer from 3 to 50. The default value is 3. |

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures a multi-hop peer BFD parameters:

```
Switch(config)# bfd multihop-peer 10.145.11.123 interval 120 minrx 120  
multiplier 7
```

---

## bfd slow-timer

Globally configures the slow-timer used in the Bidirectional Forwarding Detection (BFD) echo function. This value determines how fast BFD starts up new sessions and at what speed asynchronous sessions use for BFD control packets when the echo function is enabled. The slow-timer value is used as the new control packet interval, while echo packets use the configured BFD intervals.

Use the **no** form of this command to reset the slow-timer to its default value.

The default value is 2000 milliseconds.

## Syntax

**[no] bfd slow-timer** <*slow-timer interval*>

where:

| Parameter                  | Function   |
|----------------------------|--|
| <i>slow-timer interval</i> | The time interval used for the slow-timer in the BFD echo function. The <i>slow-timer interval</i> is from 1000 to 30000 milliseconds. |

## Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures a BFD slow-timer interval of 3000 milliseconds:

```
Switch(config)# bfd slow-timer 3000
```

---

## cee enable

Globally enables or disables Converged Enhanced Ethernet (CEE) on the switch. Data Center Bridging Capabilities eXchange (DCBX), Priority Flow Control (PFC), and Enhanced Transmission Selection (ETS) are also globally enabled or disabled by this command.

By default, CEE is disabled on the switch.

## Syntax

**[no] cee enable**

Using **no** before the command disables CEE.

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command globally enables CEE on the switch:

```
Switch(config)# cee enable
```

## Restrictions

This command is not supported on the NE1032T and the NE1072T.

---

## cee app-proto

Configures an application protocol to be sent to the Data Center Bridging eXchange Capability (DCBX) peer.

### Syntax

```
cee app-proto <application name> {ethertype <ethertype>|fcoe|iscsi|roce|rocev2|tcp destination-port <service port>|udp destination-port <service port>} [priority <priority>]
```

```
no cee app-proto <application name>
```

where:

| Parameter                                   | Description   |
|---|---|
| <i>application name</i>                     | The description of the configured application protocol. The <i>application name</i> can be up to 63 characters in length.                     |
| <b>ethertype</b> <i>ethertype</i>           | Configures a custom ethertype. The <i>ethertype</i> value in hexadecimal format: <i>0xHHHH</i> . For example, 0x8947.                         |
| <b>fcoe</b>                                 | Selects Fibre Channel over Ethernet (FCoE) as the application protocol. Ethertype is set to 0x8906 and priority to 3.                         |
| <b>iscsi</b>                                | Selects Internet Small Computer Systems Interface (iSCSI) as the application protocol. TCP destination port is set to 3260 and priority to 4. |
| <b>roce</b>                                 | Selects RDMA over Converged Ethernet (RoCE) as the application protocol. Ethertype is set to 0x8915 and priority to 3.                        |
| <b>rocev2</b>                               | Selects RDMA over Converged Ethernet version 2 (RoCEv2) as the application protocol. UDP destination port is set to 4791 and priority to 3.   |
| <b>tcp</b>                                  | Configures a custom TCP service port.   |
| <b>udp</b>                                  | Configures a custom UDP service port.   |
| <b>destination-port</b> <i>service port</i> | Configures a custom service port. The <i>service port</i> is an integer from 1 to 65536.  |
| <b>priority</b> <i>priority</i>             | Configures a custom priority. The <i>priority</i> is an integer from 0 to 7.  |

Using the **no** form of the command will remove the specified application protocol.



## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Examples

The following command configures custom ethertype and priority values:

```
Switch(config)# cee app-proto Ether8947 ethertype 0x8947 priority 3
```

The following command configures iSCSI as the application protocol:

```
Switch(config)# cee app-proto myIscsi iscsi
```

## Restrictions

This command is not supported on the NE1032T and the NE1072T.

---

## cee ets bandwidth-percentage

Configures the bandwidth percentage allocated for each Enhanced Transmission Selection (ETS) priority group.

**Note:** The total configured bandwidth percentage of each priority group cannot exceed 100%.

### Syntax

**cee ets bandwidth-percentage** <priority group ID> <bandwidth percentage>  
[<priority group ID> <bandwidth percentage>] [<priority group ID> <bandwidth percentage>] [<priority group ID> <bandwidth percentage>] [<priority group ID> <bandwidth percentage>] [<priority group ID> <bandwidth percentage>] [<priority group ID> <bandwidth percentage>]

where:

| Parameter                   | Description   |
|-----------------------------|---|
| <i>priority group ID</i>    | The priority group for which to configure the bandwidth percentage. The <i>priority group ID</i> is an integer between 0 and 7.       |
| <i>bandwidth percentage</i> | The bandwidth percentage allocated for the specified priority group. The <i>bandwidth percentage</i> is an integer between 0 and 100. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures a bandwidth percentage of 15% for priority group 1, 35% for priority group 2, 23% for priority 3, and 27% for priority 4:

```
Switch(config)# cee ets bandwidth-percentage 1 15 2 35 3 23 4 27
```

### Restrictions

This command is not supported on the NE1032T and the NE1072T.

---

## cee ets priority-group pgid

Configures the specified Enhanced Transmission Selection (ETS) priority group.

### Syntax

```
[no] cee ets priority-group pgid <priority group ID> {description  
<description>|priority <traffic priority> [<traffic priority> ...]}
```

where:

| Parameter                                | Description   |
|--|---|
| <i>priority group ID</i>                 | The ETS priority group to be configured. The <i>priority group ID</i> is an integer between 0 and 7, or 15.                             |
| <b>description</b><br><i>description</i> | Configures the description of the specified ETS priority group.   |
| <b>priority</b> <i>traffic priority</i>  | Configures the 802.1p priority value attributed to the ETS priority group. The <i>traffic priority</i> value is an integer from 0 to 7. |

Using **no** before the command removes the description or the traffic priority of the specified priority group.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Examples

The following command configures a description for priority group 5:

```
Switch(config)# cee ets priority-group pgid 5 description pgID_5
```

The following command configures a priority value for priority group 5:

```
Switch(config)# cee ets priority-group pgid 5 priority 3
```

### Restrictions

- This command is not supported on the NE1032T and the NE1072T.
- The priority value attributed to priority group 15 cannot be removed.

---

## cee pfc enable

Globally enables or disables Priority Flow Control (PFC) on the switch.

By default, PFC is disabled on the switch.

**Note:** By default, PFC is enabled on all switch interfaces. PFC will not function on an interface until PFC is also globally enabled.

## Syntax

**[no] cee pfc enable**

Using **no** before the command disables PFC.

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command will enable PFC on the switch:

```
Switch(config)# cee pfc enable
```

## Restrictions

This command is not supported on the NE1032T and the NE1072T.

## Related Commands

| Command                        | Description                            |
|--------------------------------|--|
| <a href="#">cee pfc enable</a> | Enable or disable PFC on an interface. |

---

## cee pfc priority

Configures the Priority Flow Control (PFC) priority state.

By default, PFC priority 3 is enabled on the switch.

### Syntax

```
[no] cee pfc priority <priority> {enable|description <description>}
```

where:

| Parameter                                | Description   |
|--|---|
| <i>priority</i>                          | The PFC priority value (an integer from 0 to 7).          |
| <b>enable</b>                            | Enables the configured PFC priority.                      |
| <b>description</b><br><i>description</i> | Configures the description of the specified PFC priority. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Examples

The following command enables PFC priority 6 on the switch:

```
Switch(config)# cee pfc priority 6 enable
```

The following command configures a description for PFC priority 3:

```
Switch(config)# cee pfc priority 3 description PFC_priority_3
```

### Restrictions

- This command is not supported on the NE1032T and the NE1072T.
- G8272, G8296, G8332, and NE1032: up to two PFC priorities can be simultaneously enabled on the switch.
- NE10032: only one PFC priority can be enabled on the switch at any time.
- You cannot configure switch interfaces with different PFC priorities. The same PFC priority is enabled on all interfaces.

---

## class-map

Creates or deletes a class map that is used to match packets to a specified class. After creating a class map, you enter Class Map Configuration mode.

### Syntax

**[no] class-map {match-all|match-any} <class map name>**

where:

| Parameter             | Function   |
|-----------------------|--|
| <b>match-all</b>      | Configures the class map to use the logical AND function for packet evaluation when dealing with multiple match rules. |
| <b>match-any</b>      | Configures the class map to use the logical OR function for packet evaluation when dealing with multiple match rules.  |
| <i>class map name</i> | The name of the class map.   |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates class map 'cmap-01' that uses the logical OR function when evaluating packets:

```
Switch(config)# class-map match-any cmap-01
```

---

## class-map type qos

Creates or deletes a Quality of Service (QoS) class map that is used to match packets to a specified class. After creating a class map, you enter QoS Class Map Configuration mode.

### Syntax

**[no] class-map type qos {match-all|match-any} <class map name>**

where:

| Parameter             | Function   |
|-----------------------|--|
| <b>match-all</b>      | Configures the class map to use the logical AND function for packet evaluation when dealing with multiple match rules. |
| <b>match-any</b>      | Configures the class map to use the logical OR function for packet evaluation when dealing with multiple match rules.  |
| <i>class map name</i> | The name of the class map.   |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates QoS class map 'cmap-qos-01' that uses the logical AND function when evaluating packets:

```
Switch(config)# class-map type qos match-all cmap-qos-01
```

---

## class-map type queuing

Creates or deletes a queuing class map that is used to match packets to a specified class. After creating a class map, you enter Queuing Class Map Configuration mode.

### Syntax

**[no] class-map type queuing match-any** *<queue name>*

where:

| Parameter         | Function  |
|-------------------|---|
| <b>match-any</b>  | Configures the class map to use the logical OR function for packet evaluation when dealing with multiple match rules.   |
| <i>queue name</i> | The name of the queue. The possible options are: <ul style="list-style-type: none"><li>• 1p7q1t-out-q-default (queue 0 or default queue)</li><li>• 1p7q1t-out-pq1 (queue 1 or priority queue)</li><li>• 1p7q1t-out-q2 (queue 2)</li><li>• 1p7q1t-out-q3 (queue 3)</li><li>• 1p7q1t-out-q4 (queue 4)</li><li>• 1p7q1t-out-q5 (queue 5)</li><li>• 1p7q1t-out-q6 (queue 6)</li><li>• 1p7q1t-out-q7 (queue 7)</li></ul> |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates queuing class map 1p7q1t-out-q2 that uses the logical OR function when evaluating packets:

```
Switch(config)# class-map type queuing match-any 1p7q1t-out-q2
```



---

## clock format

Configures the system time format.

### Syntax

**clock format {12|24}**

where:

| Parameter | Function  |
|-----------|---|
| 12        | Displays the time in 12 hour format. This is the default time format. |
| 24        | Displays the time in 24 hour format.                                  |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the system time in 24 hour format:

```
Switch(config)# clock format 24
```

---

## clock summer-time

Enables or disables the use of a summer time (daylight saving time) offset.

### Syntax

**[no] clock summer-time** <time zone name> [*<start week>* *<start day>* *<start month>* *<start time>* *<end week>* *<end day>* *<end month>* *<end time>* [*<offset>*]]

where:

| Parameter             | Function  |
|-----------------------|---|
| <i>time zone name</i> | The name of the time zone in 3 character format, such as PST, MST, CST, EST etc.  |
| <i>start week</i>     | The starting week of the offset. The range is from 1 (first week of the month) to 5 (last week of the month).   |
| <i>start day</i>      | The starting day of the offset. The range is from Monday to Sunday.   |
| <i>start month</i>    | The starting month of the offset. The range is from January to December.  |
| <i>start time</i>     | The starting time of the offset. The format is <i>HH:mm</i> , where: <ul style="list-style-type: none"><li>• <i>HH</i> is the hour of the day (range is 00 to 24)</li><li>• <i>mm</i> is the minute of the hour (range is 00 to 60)</li></ul> |
| <i>end week</i>       | The ending week of the offset. The range is from 1 (first week of the month) to 5 (last week of the month).   |
| <i>end day</i>        | The ending day of the offset. The range is from Monday to Sunday.   |
| <i>end month</i>      | The ending month of the offset. The range is from January to December.  |
| <i>end time</i>       | The ending time of the offset. The format is <i>HH:mm</i> , where: <ul style="list-style-type: none"><li>• <i>HH</i> is the hour of the day (range is 00 to 24)</li><li>• <i>mm</i> is the minute of the hour (range is 00 to 60)</li></ul>   |
| <i>offset</i>         | The number of minutes to offset the time. The <i>offset</i> is from 1 to 1440.  |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables summer-time for Pacific Standard Time:

```
Switch(config)# clock summer-time PST
```

---

## clock timezone

Enables or disables the use of time zones.

### Syntax

**[no] clock timezone** <time zone> <hour offset> <minute offset>

where:

| Parameter            | Function  |
|----------------------|---|
| <i>time zone</i>     | The name of the time zone in 3 character format, such as PST, MST, CST, or EST. |
| <i>hour offset</i>   | The hour offset from UTC. The range is from -23 to 23.                          |
| <i>minute offset</i> | The minute offset from UTC. The range is from 0 to 59.                          |

Using **no** before the command without arguments disables the use of time zones.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the use of the EST time zone with an offset of -5 hour and 0 minutes from UTC:

```
Switch(config)# clock timezone EST -5 0
```

---

## do

Executes the specified command.

## Syntax

**do** <command>

where:

| Parameter      | Function                    |
|----------------|-----------------------------|
| <i>command</i> | The command to be executed. |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command executes the **display cli history** command:

```
Switch(config)# do display cli history

 1 enable
 2 terminal session-timeout 0
 3 write
 4 clock set 11:23:35 27 January 2016
 5 conf t
 6 clock format 24
 7 clock timezone EET +2
 8 clock timezone EET +2 0
 9 display clock
10 exit
11 dis
12 ena
13 conf t
14 en
15 exit
16 conf t
17 dis
18 enable
19 display license brief
20 display license host-id
...
```

---

## enable password

Enables or disables the use of a password to enter Privileged EXEC mode.

### Syntax

**[no] enable password [8] <password>**

where:

| Parameter       | Function   |
|-----------------|--|
| <b>8</b>        | Indicates that a encrypted password will follow.   |
| <i>password</i> | The password required to enter Privileged EXEC mode. The <i>password</i> can be up to 8 characters long. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures `code-sec` as the encrypted password required to enter Privileged EXEC mode:

```
Switch(config)# enable password 8 code-sec
```

---

## end

Exits the current command mode and enters Privileged EXEC mode.

## Syntax

**end**

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command exits the current command mode and enters Privileged EXEC mode:

```
Switch(config)# end
Switch#
```

---

## errdisable recovery cause bpduguard

Enables or disables the timeout mechanism for a port to be recovered automatically from being operationally shut down by Bridge Protocol Data Units (BPDU) guard.

### Syntax

```
[no] errdisable recovery cause bpduguard
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables error recovery:

```
Switch(config)# errdisable recovery cause bpduguard
```



---

## errdisable recovery interval

Enables and disables a time interval after which an error-disabled port shall be recovered automatically.

### Syntax

**[no] errdisable recovery interval** <*time interval*>

where:

| Parameter            | Function   |
|----------------------|--|
| <i>time interval</i> | The time that the switch waits until it will automatically recover an error-disabled port. The <i>time interval</i> is from 30 to 65535 seconds. The default value is 300 seconds. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the error recovery time interval to 600 seconds:

```
Switch(config)# errdisable recovery interval 600
```

---

## feature

Enables or disables certain switch processes.

## Syntax

```
[no] feature {dhcp|ntp|restApi [http]|ssh|tacacs+|telemetry|telnet}
```

where:

| Parameter        | Function   |
|------------------|--|
| <b>dhcp</b>      | Enables or disables the Dynamic Host Configuration Protocol (DHCP). By default, DHCP is enabled on the management port, but disabled on all other switch interfaces.   |
| <b>ntp</b>       | Enables or disables the Network Time Protocol (NTP). By default, NTP is enabled on the switch.   |
| <b>restApi</b>   | Enables or disables the REpresentational State Transfer (REST) server. By default, the RESP API is enabled on the switch.<br><br>Please refer to the <i>Lenovo REST API Programming Guide</i> for details on how to use the Lenovo REST API. |
| <b>http</b>      | Enables or disables the REST server to listen in Hypertext Transfer Protocol (HTTP) mode on port 8090. By default, the REST server is disabled from listening in HTTP mode.  |
| <b>ssh</b>       | Enables or disables the Secure Shell (SSH) service. By default, SSH is enabled on the switch.  |
| <b>tacacs+</b>   | Enables or disables the Terminal Access Controller Access-Control System Plus (TACACS+) service. By default, the TACACS+ service is disabled on the switch.  |
| <b>telemetry</b> | Enables or disables the Telemetry service. By default, the Telemetry service is enabled on the switch.   |
| <b>telnet</b>    | Enables or disables the Telnet service. By default, Telnet is enabled on the switch.   |

## Modes

Global Configuration Mode

## History

| Release | Modification                   |
|---------|--------------------------------|
| 10.1    | The command was introduced.    |
| 10.4    | Added <b>telemetry</b> option. |

## Example

The following command enables the REST service:

```
Switch(config)# feature restApi
```

---

## graceful-restart ospf helper max-grace-period

The Cloud NOS design provides a complete separation of its control plane from the forwarding plane, thus allowing the restart or upgrade of control plane software without disturbing forwarding. Such a restart/upgrade is called graceful-restart.

The router attempting a graceful restart originates link-local Opaque-LSAs, called Grace-LSAs, announcing its intention to perform a graceful restart within a specified amount of time called grace period.

This commands configures the maximum grace period. To disable the grace period use the **no** form of the command.

### Syntax

**[no] graceful-restart ospf helper max-grace-period** *<grace period>*

where:

| Parameter           | Function   |
|---------------------|--|
| <i>grace period</i> | The maximum grace period in seconds. The <i>grace period</i> is from 1 to 1800. The default value is 60. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the grace period to 300 seconds:

```
Switch(config)# graceful-restart ospf helper max-grace-period 300
```

---

## graceful-restart ospf helper never

The Cloud NOS design provides a complete separation of its control plane from the forwarding plane, thus allowing the restart or upgrade of control plane software without disturbing forwarding. Such a restart/upgrade is called graceful-restart.

In graceful-restart the OSPF neighbors help the restarting router by announcing links to it in their LSAs. These neighbors are said to be in “helper mode” for the duration of the graceful restart.

This commands enables or disables helper mode. Helper mode is enabled by default.

**Note:** When this command is enabled, helper mode is disabled on the router. When using the **no** form of this command, helper mode is enabled on the router.

### Syntax

```
[no] graceful-restart ospf helper never [router-id <neighbor address>]
```

where:

| Parameter                                | Function   |
|--|--|
| <b>router-id</b> <i>neighbor address</i> | Helper mode will be enabled or disabled only for the specified OSPF neighbor. The <i>neighbor address</i> is specified in IPv4 address format. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command disables helper mode on the router:

```
Switch(config)# graceful-restart ospf helper never
```

---

## hardware ecmp hash-offset

Configures the Open Shortest Path First (OSPF) Equal Cost Multiple Paths (ECMP) hash offset.

### Syntax

**[no] hardware ecmp hash-offset** *<offset value>*

where:

| Parameter           | Function  |
|---------------------|---|
| <i>offset value</i> | The value of the ECMP hash offset. The <i>offset value</i> is from 0 to 15. The default value is 0. |

Using **no** before the command disables the OSPF hash offset.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures an ECMP hash offset of 3:

```
Switch(config)# hardware ecmp hash-offset 3
```

---

## hardware esn

A customer support representative can assign your switch an Entitlement Serial Number (ESN) at the time you request support. The ESN helps to locate your switch's identifying information when you call technical support for help in future.

This command configures the switch's ESN.

## Syntax

**hardware esn** <serial number>

where:

| Parameter            | Function   |
|----------------------|--|
| <i>serial number</i> | The ESN assigned to the switch by a customer support representative. The <i>serial number</i> is valid only as a 7 to 11 characters long alpha-numeric string. |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the switch ESN as 'LNV109ty442':

```
Switch(config)# hardware esn LNV109ty442
```

---

## hardware mtm

Configures the switch's Machine Type Model (MTM) number. The MTM number is applied when the switch reloads and persist across firmware upgrades.

### Syntax

**hardware mtm** <*serial number*>

where:

| Parameter            | Function   |
|----------------------|--|
| <i>serial number</i> | The new MTM number for the switch. The <i>serial number</i> depends on the switch model. Valid serial numbers are listed below this table. |

You can change the switch MTM number with one of the following:

- G8272:
  - 7159-CFV
  - 7159-CRW
  - 7159-HCV
  - 7159-HCW
- G8296:
  - 1611-96E
  - 8036-BFX
  - 8036-BRX
  - 8036-HC3
  - 8036-HC4
- G8332:
  - 1611-16E
  - 8036-AFX
  - 8036-ARX
  - 8036-HC1
  - 8036-HC2
  - 7120-16E
- NE1032:
  - 7159-A1X
  - 7159-A2X
- NE1032T:
  - 7159-B1X
  - 7159-B2X



- NE1072T:
  - 7159-C1X
  - 7159-C2X
- NE10032:
  - 7159-D1X
  - 7159-D2X

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the switch MTM number to '1611-16E':

```
Switch(config)# hardware mtm 1611-16E
New MTM value: 1611-16E
Please reset the system for the new changes to take effect.
```

---

## hardware profile portmode

Enables or disables different hardware profiles for the switch ports.

### Syntax

For G8272:

```
[no] hardware profile portmode {72x10G|custom 4x10G ethernet  
<chassis number/port number>|default}
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <b>72x10G</b>                     | Configures all switch ports as 10Gb SFP+ ports. The switch can be configured with 72 x 10Gb SFP+ ports.                                |
| <b>custom 4x10G ethernet</b>      | Configures the specified QSFP+ ports from 40Gb mode to 4 x 10Gb SFP+ port mode.  |
| <i>chassis number/port number</i> | The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> is an integer from 1 to 54. |
| <b>default</b>                    | Configures 48 x 10Gb SFP+ ports and 6 x 40Gb QSFP+ ports.  |

For G8296:

```
[no] hardware profile portmode {94x10G+8x40G|custom 4x10G  
ethernet <chassis number/port number>|default}
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <b>94x10G+8x40G</b>               | Configures the switch with 94 x 10Gb SFP+ ports and 8 x 40Gb QSFP+ ports.  |
| <b>custom 4x10G ethernet</b>      | Configures the specified QSFP+ ports from 40Gb mode to 4 x 10Gb SFP+ port mode.  |
| <i>chassis number/port number</i> | The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> is an integer from 1 to 96. |
| <b>default</b>                    | Configures 86 x 10Gb SFP+ ports and 10 x 40Gb QSFP+ ports.   |

For G8332:

**[no] hardware profile portmode {96x10G+8x40G|custom 4x10G ethernet <chassis number/port number>|default}**

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <b>96x10G+8x40G</b>               | Configures the switch with 96 x 10Gb SFP+ ports and 8 x 40Gb QSFP+ ports.  |
| <b>custom 4x10G ethernet</b>      | Configures the specified QSPF+ ports from 40Gb mode to 4 x 10Gb SFP+ port mode.  |
| <i>chassis number/port number</i> | The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> is an integer from 1 to 32. |
| <b>default</b>                    | Configures 24 x 40Gb QSFP+ ports and 8 x 40Gb Media Dependent Adapter (MDA) module QSFP+ ports.  |

For NE1072T:

**[no] hardware profile portmode {72x10G|custom 4x10G ethernet <chassis number/port number>|default}**

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <b>72x10G</b>                     | Configures all switch ports as 10Gb ports. The switch can be configured with 48 x 10Gb Base-T ports and 24 x 10Gb SFP+ ports.          |
| <b>custom ethernet</b>            | Configures the specified QSFP+ ports from 40Gb mode to 4 x 10Gb SFP+ port mode.  |
| <i>chassis number/port number</i> | The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> is an integer from 1 to 54. |
| <b>default</b>                    | Configures 48 x 10Gb Base-T ports and 6 x 40Gb QSFP+ ports.  |

For NE10032:

```
[no] hardware profile portmode {128x10G|128x25G|32x40G|
64x50G|custom {1x40G|2x50G|4x10G|4x25G} ethernet <chassis
number/port number>|default}
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <b>128x10G</b>                    | Configures all switch ports as 10Gb SFP+ ports. The switch can be configured with 128 x 10Gb SFP+ ports.                               |
| <b>128x25G</b>                    | Configures the switch ports as 25Gb SFP+ ports. The switch can be configured with 128 x 25Gb SFP+ ports.                               |
| <b>32x40G</b>                     | Configures the switch ports as 40Gb QSFP28 ports. The switch can be configured with 32 x 40Gb QSFP28 ports.                            |
| <b>64x50G</b>                     | Configures the switch ports as 50Gb QSFP28 ports. The switch can be configured with 64 x 50Gb QSFP28 ports.                            |
| <b>custom ethernet</b>            | Configures a custom hardware profile for the switch ports.   |
| <b>1x40G</b>                      | Configures the specified QSFP28 ports to 40Gb QSFP+ port mode.   |
| <b>2x50G</b>                      | Configures the specified QSFP28 ports to 2 x 50Gb QSFP+ port mode.   |
| <b>4x10G</b>                      | Configures the specified QSFP28 ports to 4 x 10Gb SFP+ port mode.  |
| <b>4x25G</b>                      | Configures the specified QSFP28 ports to 4 x 25Gb SFP+ port mode.  |
| <i>chassis number/port number</i> | The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> is an integer from 1 to 32. |
| <b>default</b>                    | Configures 32 x 100Gb QSFP28 ports.  |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures all ports for the G8272 as 10 Gb ports:

```
Switch(config)# hardware profile portmode 72x10G
```

## Restrictions

This command is unavailable on the NE1032 and the NE1032T.

---

## hostname

Configures or resets the switch network name.

### Syntax

**[no] hostname** <network name>

where:

| Parameter           | Function                        |
|---------------------|---------------------------------|
| <i>network name</i> | The network name of the switch. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Examples

The following command configures the switch network name to 'sw-lab-33':

```
Switch(config)# hostname sw-lab-33  
sw-lab-33(config)#
```

The following command resets the switch network name to the default value:

```
sw-lab-33(config)# no hostname  
Switch(config)#
```

---

## install license

Install a Feature on Demand (FoD) license.

### Syntax

```
license install {ftp|scp|sftp|tftp|usb1} <source>
```

where:

| Parameter     | Function  |
|---------------|---|
| <b>ftp</b>    | Installs the FoD license using the File Transfer Protocol (FTP).          |
| <b>scp</b>    | Installs the FoD license using the Secure Copy Protocol (SCP).            |
| <b>sftp</b>   | Installs the FoD license using the Secure File Transfer Protocol (SFTP).  |
| <b>tftp</b>   | Installs the FoD license using the Trivial File Transfer Protocol (TFTP). |
| <b>usb1</b>   | Installs the FoD license using a removable USB drive.                     |
| <i>source</i> | The address where the FoD license file can be found.                      |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command installs a FoD license from a USB device:

```
Switch(config)# license install usb1 /FoD/FoD-330T
```

---

## interface

Enter the Interface Configuration Mode.

### Syntax

```
interface {<interface name>|ethernet <chassis number/port number>|  
loopback <loopback interface>|mgmt 0|port-aggregation <LAG>|  
vlan <VLAN ID>}
```

where:

| Parameter   | Function  |
|---|---|
| <i>interface name</i>                             | Enters Interface Configuration mode for the named ethernet interface.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Enters Ethernet Interface Configuration mode for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Enters Loopback Interface Configuration mode for the specified loopback interface (an integer from 0 to 7).   |
| <b>mgmt 0</b>                                     | Enters Management Interface Configuration mode for the specified management interface (0).  |
| <b>port-aggregation</b> <i>LAG</i>                | Enters LAG Configuration mode for the specified LAG (an integer from 1-4096).   |
| <b>vlan</b> <i>VLAN ID</i>                        | Enters VLAN Interface Configuration mode for the specified VLAN (an integer from 1-3999).   |

### Mode

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |



## Example

The following command enters interface command mode for LAG 4001:

```
Switch(config)# interface port-aggregation 4001  
Switch(config-if)#
```

## Restrictions

If you use **interface** *<interface name>*, the command will not work unless an interface with that name exists.

---

## ip arp inspection filter

Adds or removes an Address Resolution Protocol (ARP) inspection filter.

### Syntax

**[no] ip arp inspection filter** <ACL name> **vlan** <VLAN number>

where:

| Parameter          | Function  |
|--------------------|---|
| <i>ACL name</i>    | The name of the ARP Access Control List (ACL).  |
| <b>vlan</b>        | Applies the specified ACL to the list of VLANs. |
| <i>VLAN number</i> | The VLAN number. Range is from 1 to 4094.       |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables an ARP inspection filter by applying the ARP ACL 'arp-acl-5' to VLANs 100, 101 and 102:

```
Switch(config)# ip arp inspection filter arp-acl-5 vlan 100-102
```

---

## ip arp timeout

Dynamic ARP entries expire after a set amount of time and then they are removed from the table. The default value is 1500 seconds (25 minutes).

This commands configures a global timeout value for dynamic ARP entries.

### Syntax

**[no] ip arp timeout** *<timeout value>*

where:

| Parameter            | Function  |
|----------------------|---|
| <i>timeout value</i> | The time in seconds until an ARP entry expires. The <i>timeout value</i> is from 60 to 28800. |

### Modes

- Global Configuration Mode
- Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures ARP timeout to 1800 seconds (30 minutes):

```
Switch(config)# ip arp timeout 1800
```

---

## ip as-path access-list

Creates or deletes a Border Gateway Protocol (BGP) autonomous system (AS) access list.

### Syntax

**[no] ip as-path access-list** <ACL name> {deny|permit} <regular expression>

where:

| Parameter                 | Function  |
|---------------------------|---|
| <i>ACL name</i>           | The name of the BGP Access Control List (ACL).  |
| <b>deny</b>               | Enables the rejection of packets.               |
| <b>permit</b>             | Enables the forwarding of packets.              |
| <i>regular expression</i> | A regular-expression to match the BGP AS paths. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command forwards packets from networks belonging to AS 340:

```
Switch(config)# ip as-path access-list as-acl-3 permit ^340$
```

---

## ip community-list expanded

Adds or removes an expanded entry to or from the specified Border Gateway Protocol (BGP) community list.

### Syntax

```
[no] ip community-list expanded <community list name> {deny|permit} <regular expression>
```

where:

| Parameter                  | Function  |
|----------------------------|---|
| <i>community list name</i> | The name of the community list.   |
| deny                       | Rejects routes that match the specified community list.                     |
| permit                     | Accepts routes that match the specified community list.                     |
| <i>regular expression</i>  | A regular expression specifying a pattern to match against an input string. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds an expanded community list entry that denies routes from network 28 to autonomous system (AS) 3000:

```
Switch(config)# ip community-list expanded exp-list-28 deny 3000:28
```

---

## ip community-list standard

Adds or removes a standard entry to or from the specified Border Gateway Protocol (BGP) community list.

### Syntax

```
[no] ip community-list standard <community list name> {deny|
permit} {[<community number>] [internet] [local-AS]
[no-advertise] [no-export]}
```

where:

| Parameter                  | Function   |
|----------------------------|--|
| <i>community list name</i> | The name of the community list.  |
| <b>deny</b>                | Rejects routes that match the specified community list.  |
| <b>permit</b>              | Accepts routes that match the specified community list.  |
| <i>community number</i>    | Rejects or accepts routes based on their community number. The format for the community number is AA:NN (autonomous system number:community number). |
| <b>internet</b>            | Rejects or accepts only routes that are part of the well-known internet community.   |
| <b>local-AS</b>            | Rejects or accepts only routes not advertised outside the local autonomous system (AS).  |
| <b>no-advertise</b>        | Rejects or accepts only routes not advertised to any peers (internal or external).   |
| <b>no-export</b>           | Rejects or accepts only routes only advertised to peers in the same AS.  |

### Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command adds a standard community list entry that accepts routes only not advertised outside the local AS:

```
Switch(config)# ip community-list standard clist-local permit local-AS
```

---

## ip dhcp relay

Globally enables or disables IPv4 Dynamic Host Configuration Protocol (DHCPv4) service.

### Syntax

**[no] ip dhcp relay [information option]**

where:

| Parameter          | Function  |
|--------------------|---|
| information option | Enables or disables DHCPv4 option 82, which inserts DHCP relay agent information in BOOTREQUEST messages forwarded to a DHCP server. By default, this option is disabled. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command globally enables DHCPv4:

```
Switch(config)# ip dhcp relay
```



---

## ip dhcp snooping

Globally enables or disables Dynamic Host Configuration Protocol (DHCP) Snooping on the switch.

By default, DHCP Snooping is globally disabled on the switch.

### Syntax

**[no] ip dhcp snooping**

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command enables DHCP Snooping on the switch:

```
Switch(config)# ip dhcp snooping
```

---

## ip dhcp snooping binding

Adds an entry to the Dynamic Host Configuration Protocol (DHCP) Snooping binding table.

### Syntax

```
ip dhcp snooping binding <MAC address> vlan <VLAN ID> <IPv4 address>  
interface ethernet <chassis number/port number> expiry <lease time>
```

where:

| Parameter  | Description  |
|--|--|
| <i>MAC address</i>   | Configures the MAC address of the DHCP Snooping binding entry. The <i>MAC address</i> can be written in one of the following formats: <ul style="list-style-type: none"><li>• X.X.X</li><li>• XX-XX-XX-XX-XX-XX</li><li>• XX:XX:XX:XX:XX:XX</li><li>• XXXX.XXXX.XXXX</li></ul> |
| <b>vlan</b> <i>VLAN ID</i>                                     | Configures the VLAN of the DHCP Snooping binding entry. The <i>VLAN ID</i> is from 1 to 3999.  |
| <i>IPv4 address</i>  | Configures the IP address of the DHCP Snooping binding entry.  |
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Configures the ethernet port of the DHCP Snooping binding entry. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.   |
| <b>expiry</b> <i>lease time</i>                                | Configures the lease time of the DHCP Snooping entry. The <i>lease time</i> is an integer from 1 to 4294967295 seconds.  |

### Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command adds an entry to the DHCP Snooping binding table:

```
Switch(config)# ip dhcp snooping binding 00:0a:95:9d:68:16 vlan 138  
10.57.144.208 interface ethernet 1/12 expiry 604800
```

---

## no ip dhcp snooping binding

Deletes an entry from the Dynamic Host Configuration Protocol (DHCP) Snooping binding table.

### Syntax

**no ip dhcp snooping binding** {<MAC address>|**all** [**interface ethernet** <chassis number/port number>|**vlan** <VLAN ID>]}

where:

| Parameter   | Description   |
|---|---|
| <i>MAC address</i>  | Deletes an entry from the DHCP Snooping binding table based on its MAC address. The <i>MAC address</i> can be written in one of the following formats: <ul style="list-style-type: none"><li>• X.X.X</li><li>• XX-XX-XX-XX-XX-XX</li><li>• XX:XX:XX:XX:XX:XX</li><li>• XXXX.XXXX.XXXX</li></ul> |
| <b>all</b>  | Deletes all entries from the DHCP Snooping binding table.   |
| <b>interface ethernet</b> <i>chassis number/port number</i> | Deletes all entries from the DHCP Snooping table that are associated with the specified ethernet port. The <i>chassis</i> and <i>port numbers</i> depend on the switch type.  |
| <b>vlan</b> <i>VLAN ID</i>                                  | Deletes all entries from the DHCP Snooping table that are associated with the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 3999.  |

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command deletes an entry from the DHCP Snooping binding table based on its MAC address:

```
Switch(config)# no ip dhcp snooping binding 00:0a:95:9d:68:16
```

---

## ip dhcp snooping information option

Enables or disables Dynamic Host Configuration Protocol (DHCP) Snooping option 82. This provides additional security when DHCP is used to allocate network addresses by enabling the switch to act as a DHCP relay agent to prevent DHCP client requests from untrusted sources. This command configures the switch to add option 82 information to DHCP requests from clients before forwarding the requests to the DHCP server.

By default, DHCP Snooping option 82 is disabled.

### Syntax

```
[no] ip dhcp snooping information option
```

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command enables DHCP Snooping option 82:

```
Switch(config)# ip dhcp snooping information option
```

---

## ip dhcp snooping vlan

Enables or disables Dynamic Host Configuration Protocol (DHCP) Snooping on the specified VLAN.

By default, DHCP Snooping is disabled on all VLANs.

**Note:** DHCP Snooping is enabled on a VLAN only if it is also enabled globally on the switch.

## Syntax

```
[no] ip dhcp snooping vlan <VLAN ID>
```

where:

| Parameter      | Description  |
|----------------|--|
| <i>VLAN ID</i> | Configures DHCP Snooping on the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 3999. |

## Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command enables DHCP Snooping on VLAN 138:

```
Switch(config)# ip dhcp snooping vlan 138
```

---

## ip domain-lookup

Enables or disables Domain Name Service (DNS).

### Syntax

```
[no] ip domain-lookup
```

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command enables DNS on the switch:

```
Switch(config)# ip domain-lookup
```

---

## ip domain-list

Adds a domain to the list used by the Domain Name Service (DNS) client.

### Syntax

```
ip domain-list <domain name> vrf {default|management}
```

where:

| Parameter             | Description   |
|-----------------------|---|
| <i>domain name</i>    | The DNS domain name. The <i>domain name</i> can be up to 64 characters in length.       |
| <b>vrf default</b>    | Adds a DNS domain name using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Adds a DNS domain name using the management VRF instance.                               |

To delete a DNS domain name from the list, use the following command:

```
no ip domain-list <domain name> vrf {default|management}
```

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command adds a DNS domain name:

```
Switch(config)# ip domain-list example.com vrf default
```

### Restrictions

Only up to six DNS domains can be configured on the switch.



---

## ip domain-name

Configures the Domain Name Service (DNS) default domain name.

### Syntax

```
[no] ip domain-name <domain name> vrf {default|management}
```

where:

| Parameter             | Description   |
|-----------------------|---|
| <i>domain name</i>    | The DNS default domain name. The <i>domain name</i> can be up to 64 characters in length.               |
| <b>vrf default</b>    | Configures the DNS default domain name using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Configures the DNS default domain name using the management VRF instance.                               |

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command configures the DNS default domain name:

```
Switch(config)# ip domain-name example.com vrf management
```

---

## ip extcommunity-list expanded

Adds or removes an expanded entry to or from the specified extended Border Gateway Protocol (BGP) community list.

### Syntax

**[no] ip extcommunity-list expanded** <extended community list name>  
**{deny|permit}** <regular expression>

where:

| Parameter                           | Function  |
|-------------------------------------|---|
| <i>extended community list name</i> | The name of the extended community list.                                    |
| <b>deny</b>                         | Rejects routes that match the specified extended community list.            |
| <b>permit</b>                       | Accepts routes that match the specified extended community list.            |
| <i>regular expression</i>           | A regular expression specifying a pattern to match against an input string. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds an expanded entry to an extended community list that denies routes from network 28 to autonomous system (AS) 3000:

```
Switch(config)# ip extcommunity-list expanded extlist-28 deny 3000:28
```

---

## ip extcommunity-list standard

Adds or removes a standard entry to or from the specified extended Border Gateway Protocol (BGP) community list.

### Syntax

```
[no] ip extcommunity-list standard <extended community list name>  
{deny|permit} [{rt|soo} [<community number>]]
```

where:

| Parameter                  | Function  |
|----------------------------|---|
| <i>community list name</i> | The name of the community list.   |
| <b>deny</b>                | Rejects routes that match the specified community list.   |
| <b>permit</b>              | Accepts routes that match the specified community list.   |
| <i>community number</i>    | Rejects or accepts routes based on their community number. The format for the community number is <i>AA:NN</i> (autonomous system number:community number). |
| <b>rt</b>                  | Rejects or accepts only routes based on their route target.   |
| <b>soo</b>                 | Rejects or accepts only routes based on their source of origin.   |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds a standard entry to an extended community list that accepts only routes with the community number 32500:34:

```
Switch(config)# ip extcommunity-list standard ext-32500 permit rt  
32500:34
```

---

## ip forwarding

Enables or disables the forwarding of IPv4 packets.

### Syntax

**[no] ip forwarding**

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the forwarding of IPv4 packets:

```
Switch(config)# ip forwarding
```

---

## ip host

Assigns a hostname to an IP address.

## Syntax

```
[no] ip host <hostname> <IP address> [<IP address>] vrf {default|  
management}
```

where:

| Parameter             | Description   |
|-----------------------|---|
| <i>hostname</i>       | The hostname to associate with the IP address. The <i>hostname</i> can be up to 64 characters in length.    |
| <i>IP address</i>     | The IP address associated with the specified hostname.  |
| <b>vrf default</b>    | Associates the hostname and the IP address using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Associates the hostname and the IP address using the management VRF instance.                               |

## Modes

Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command assigns a hostname to an IP address:

```
Switch(config)# ip host HostExample 10.158.55.69 vrf default
```

## Restrictions

Only up to 100 hostname to IP address mapping can be configured on the switch.

---

## ip igmp snooping

Globally enables or disables Internet Group Management Protocol (IGMP) snooping.

By default, IGMP Snooping is enabled.

## Syntax

```
[no] ip igmp snooping [report-forwarding-rate <rate value>|  
report-suppression|static-group max-limit <max value>|tcn]
```

where:

| Parameter                                       | Function   |
|---|--|
| <b>report-forwarding-rate</b> <i>rate value</i> | Configures the rate the switch uses to send IGMP reports to the multicast router. The <i>rate value</i> is from 3000 to 20000. The default value is 6000 packets per second.   |
| <b>report-suppression</b>                       | When enabled, the snooping switch only sends the first report for a group to the multicast routers. Subsequent reports for the same group are not forwarded to the multicast router.<br><br>When disabled, all reports are forwarded to multicast routers. This report suppression is applied only for IGMP v1 and v2 reports.<br><br>By default, report suppression is enabled. |
| <b>static-group max-limit</b> <i>max value</i>  | Configures the maximum number of static IGMP groups allowed on the switch. The <i>max value</i> is from 0 to 128. The default value is 0.  |
| <b>tcn</b>                                      | Enables or disable the GQ packet transmission when a Topology Change Notification (TCN) is received.   |

## Modes

Global Configuration Mode

## History

| Release | Modification   |
|---------|--|
| 10.1    | The command was introduced.  |
| 10.2    | Added <b>report-forwarding-rate</b> and <b>static-group max-limit</b> options. |

## Example

The following command globally enables IGMP Snooping:

```
Switch(config)# ip igmp snooping
```

---

## ip load-sharing

Configures the unicast Forwarding Information Base (FIB) load-sharing algorithm for data traffic.

Using the **no** form of this commands reset the load-sharing algorithm to its default configuration.

The default setting is to use both source and destination IP addresses and ports.

## Syntax

```
[no] ip load-sharing {destination-ip|destination-port|  
source-dest-ip|source-dest-port|source-ip|source-port}  
[universal-id <random seed>]
```

where:

| Parameter                                 | Function  |
|---|---|
| <b>destination-ip</b>                     | Uses destination IP address for load-sharing.   |
| <b>destination-port</b>                   | Uses destination port address for load-sharing.   |
| <b>source-dest-ip</b>                     | Uses both destination and source IP addresses for load-sharing.   |
| <b>source-dest-port</b>                   | Uses both destination and source ports for load-sharing.  |
| <b>source-ip</b>                          | Uses source IP address for load-sharing.  |
| <b>source-port</b>                        | Uses source port for load-sharing.  |
| <b>universal-id</b><br><i>random seed</i> | Uses the specified value to randomize hash functions for load-sharing. The <i>random seed</i> is from 1 to 4294967295. The default value is 1431655765. |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the load-sharing algorithm to use only the destination port and IP address and a random seed of 13445000:

```
Switch(config)# ip load-sharing destination-ip destination-port  
universal-id 13445000
```



---

## ip name-server

Configures a remote DNS server on the switch.

### Syntax

```
[no] ip name-server <IP address> [<IP address> [<IP address>]] vrf  
{default|management}
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>IP address</i>     | The IP address of the remote DNS server.   |
| <b>vrf default</b>    | Configures the DNS server through the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Configures the DNS server through the management VRF instance.                               |

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command configures two remote DNS servers:

```
Switch(config)# ip name-server 10.247.8.96 10.247.96.32 vrf default
```

### Restrictions

Only up to three DNS remote servers can be configured on the switch.

---

## ip prefix-list

Adds or removes an IPv4 prefix list used to filter routes.

### Syntax

```
[no] ip prefix-list <prefix list name> {description <description>|  
[seq <sequence number>] {deny|permit} {<prefix> [eq <prefix length>|ge  
<prefix length> [le <prefix length>]|le <prefix length> [ge <prefix length>]]|  
any}}
```

where:

| Parameter                                | Function  |
|--|---|
| <i>prefix list name</i>                  | The name of the prefix list.  |
| <b>description</b><br><i>description</i> | Provides a short description of the prefix list. The <i>description</i> can be up to 80 characters in length.   |
| <b>seq</b> <i>sequence number</i>        | Specifies the sequence number of the prefix list entry. The <i>sequence number</i> is from 1 to 4294967295.   |
| <b>deny</b>                              | Rejects the matching routes.  |
| <b>permit</b>                            | Forwards the matching routes.   |
| <i>prefix</i>                            | Filters routes that match the specified prefix. The <i>prefix</i> is written as: <ul style="list-style-type: none"><li>• IPv4 network address/network mask length</li></ul> |
| <b>eq</b>                                | Filters routes that match an exact prefix length.   |
| <b>ge</b>                                | Filters routes that have a prefix length greater than the specified value.  |
| <b>le</b>                                | Filters routes that have a prefix length smaller than the specified value.  |
| <i>prefix length</i>                     | The <i>prefix length</i> is from 1 to 32.   |
| <b>any</b>                               | Filters routes based on any prefix match.   |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command adds an IPv4 prefix list called 'pref-list-35' that forwards BGP routes that match IPv4 address 35.0.0.0 with network mask length 8:

```
Switch(config)# ip prefix-list pref-list-35 permit 35.0.0.0/8
```

---

## ip prefix-list sequence-number

Enables or disables the creation of sequence numbers for IPv4 prefix list entries.

### Syntax

```
[no] ip prefix-list sequence-number
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the creation of sequence numbers for IPv4 prefix list entries:

```
Switch(config)# ip prefix-list sequence-number
```

---

## ip route

Adds or removes static IPv4 routes.

## Syntax

```
[no] ip route <destination prefix> [<interface name>|ethernet <chassis number/port number>|mgmt <management interface>|null <null interface>|vlan <VLAN number>] <gateway address> [<distance>] [description <description>] [tag <tag number>]
```

where:

| Parameter   | Function  |
|---|---|
| <i>destination prefix</i>                         | The destination prefix of the static route. The destination prefix can be written as: <ul style="list-style-type: none"><li>• IPv4 prefix/network mask</li><li>• IPv4 address/network mask length</li></ul> |
| <i>interface name</i>                             | Creates a static route on the named interface.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Creates a static route on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.   |
| <b>mgmt</b> <i>management interface</i>           | Creates a static route on the specified management interface. The <i>management interface</i> is 0.   |
| <b>null</b> <i>null interface</i>                 | Creates a static route on the specified null interface. The <i>null interface</i> is 0.   |
| <b>vlan</b> <i>VLAN number</i>                    | Creates a static route on the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.   |
| <i>gateway address</i>                            | The IPv4 address of the next hop that can be used to reach the specified destination prefix.  |
| <i>distance</i>                                   | The administrative distance of the route. The <i>distance</i> is from 1 to 255. The default value is 1.   |
| <b>description</b> <i>description</i>             | Adds a short description of the static route.   |
| <b>tag</b> <i>tag number</i>                      | The tag value of the route that can be used to control redistribution via route maps. The <i>tag number</i> is from 0 to 4294967295.  |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command adds a static IPv4 route for prefix 10.0.0.0/8 with its next hop address 12.290.76.240:

```
Switch(config)# ip route 10.0.0.0/8 12.190.76.240
```

---

## ip route static bfd

Enables or disables Bidirectional Forwarding Detection (BFD) for static IPv4 routes.

This option is disabled by default.

### Syntax

**[no] ip route static bfd** {<interface name>|**ethernet** <chassis number/ port number>|**mgmt** <management interface>|**vlan** <VLAN number>} {<gateway address>/<IP destination prefix>}

where:

| Parameter  | Function   |
|--|--|
| <i>interface name</i>                              | Enables BFD on the named interface.  |
| <b>ethernet</b> <i>chassis number/ port number</i> | Enables BFD on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>mgmt</b> <i>management interface</i>            | Enables BFD on the specified management interface. The <i>management interface</i> is 0.   |
| <b>vlan</b> <i>VLAN number</i>                     | Enables BFD on the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <i>gateway address</i>                             | Enables BFD for routes with the specified gateway address.   |
| <i>IP destination prefix</i>                       | Enables BFD for routes with the specified destination ip prefix.   |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables BFD on ethernet interface 1/7 for routes with gateway address 10.56.178.34:

```
Switch(config)# ip route static bfd ethernet 1/7 10.56.178.34
```

---

## ip slp enable

Enables or disables Service Location Protocol (SLP).

This option is enabled by default.

### Syntax

**[no] ip slp enable**

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command enables SLP:

```
Switch(config)# ip slp enable
```



---

## ipv6 dhcp relay

Globally enables or disables IPv6 Dynamic Host Configuration Protocol (DHCPv6) service.

### Syntax

```
[no] ipv6 dhcp relay
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command globally enables DHCPv6:

```
Switch(config)# ipv6 dhcp relay
```

---

## ipv6 forwarding

Enables or disables the forwarding of IPv6 packets.

### Syntax

**[no] ipv6 forwarding**

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the forwarding of IPv6 packets:

```
Switch(config)# ipv6 forwarding
```

---

## ipv6 prefix-list

Adds or removes an IPv6 prefix list used to filter routes.

### Syntax

```
[no] ipv6 prefix-list <prefix list name> {description <description>|  
[seq <sequence number>] {deny|permit} {<prefix> [ge <prefix length> [le  
<prefix length>]]|le <prefix length> [ge <prefix length>]]|any}}
```

where:

| Parameter                         | Function  |
|-----------------------------------|---|
| <i>prefix list name</i>           | The name of the prefix list.  |
| description<br><i>description</i> | Provides a short description of the prefix list. The <i>description</i> can be up to 80 characters in length.   |
| seq <i>sequence number</i>        | Specifies the sequence number of the prefix list entry. The <i>sequence number</i> is from 1 to 4294967295.   |
| deny                              | Rejects the matching routes.  |
| permit                            | Forwards the matching routes.   |
| <i>prefix</i>                     | Filters routes that match the specified prefix. The <i>prefix</i> is written as: <ul style="list-style-type: none"><li>• IPv6 network address/network mask length</li></ul> |
| ge                                | Filters routes that have a prefix length greater than the specified value.  |
| le                                | Filters routes that have a prefix length smaller than the specified value.  |
| <i>prefix length</i>              | The <i>prefix length</i> is from 0 to 128.  |
| any                               | Filters routes based on any prefix match.   |

### Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command adds an IPv6 prefix list called 'pref-list-3ffe' that forwards BGP routes that match IPv6 address 3ffe:: with network mask length 16:

```
Switch(config)# ipv6 prefix-list pref-list-3ffe permit 3ffe::/16
```

---

## ipv6 prefix-list sequence-number

Enables or disables the creation of sequence numbers for IPv6 prefix list entries.

### Syntax

```
[no] ipv6 prefix-list sequence-number
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the creation of sequence numbers for IPv6 prefix list entries:

```
Switch(config)# ipv6 prefix-list sequence-number
```

---

## ipv6 route

Adds or removes static IPv6 routes.

### Syntax

**[no] ipv6 route** <destination prefix> <gateway address> [*<interface name>*|**ethernet** <chassis number/port number>|**mgmt** <management interface>|**vlan** <VLAN number>] [*<distance>*]

where:

| Parameter   | Function   |
|---|--|
| <i>destination prefix</i>                         | The destination prefix of the static route. The destination prefix can be written as: <ul style="list-style-type: none"><li>• IPv6 address/network mask length</li></ul> |
| <i>gateway address</i>                            | The IPv6 address of the next hop that can be used to reach the specified destination prefix.   |
| <i>interface name</i>                             | Creates a static route on the named interface.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Creates a static route on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                        |
| <b>mgmt</b> <i>management interface</i>           | Creates a static route on the specified management interface. The <i>management interface</i> is 0.  |
| <b>vlan</b> <i>VLAN number</i>                    | Creates a static route on the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.  |
| <i>distance</i>                                   | The administrative distance of the route. The <i>distance</i> is from 1 to 255. The default value is 1.  |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds a static IPv6 route for prefix 3ffe:506::/32 with its next hop address 389c:be45:78::c45:8156:

```
Switch(config)# ipv6 route 3ffe:506::/32 389c:be45:78::c45:8156
```

---

## ipv6 route static bfd

Enables or disables Bidirectional Forwarding Detection (BFD) for static IPv6 routes.

This option is disabled by default.

### Syntax

```
[no] ipv6 route static bfd {<interface name>|ethernet <chassis number / port number>|loopback <loopback interface>|mgmt <management interface>|port-aggregation <LAG number>|vlan <VLAN number>} [<gateway address>|<IP destination prefix>]
```

where:

| Parameter   | Function   |
|---|--|
| <i>interface name</i>                               | Enables BFD on the named interface.  |
| <b>ethernet</b> <i>chassis number / port number</i> | Enables BFD on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>           | Enables BFD on the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>             | Enables BFD on the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number</i>           | Enables BFD on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                      | Enables BFD on the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <i>gateway address</i>                              | Enables BFD for routes with the specified gateway address.   |
| <i>IP destination prefix</i>                        | Enables BFD for routes with the specified destination ip prefix.   |

### Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables BFD on ethernet interface 1/10 for routes with gateway address 832a:5821:b34a::187:14:

```
Switch(config)# ipv6 route static bfd ethernet 1/10  
832a:5821:b34a::187:14
```



---

## lACP system-priority

Configures the Link Aggregation Control Protocol (LACP) system priority of the switch.

By default, the LACP system priority has a value of 32768.

### Syntax

**[no] lACP system-priority** <*LACP system priority*>

where:

| Parameter                   | Function  |
|-----------------------------|---|
| <i>LACP system priority</i> | The <i>LACP system priority</i> range is from 1 to 65535. |

The following command resets the LACP system priority to its default value:

**no lACP system -priority**

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures a LACP system priority of 35000:

```
Switch(config)# lACP system-priority 35000
```

---

## line

Enter Line Configuration Mode.

## Syntax

**[no] line {console <console line>|vty <VTY number>}**

where:

| Parameter           | Function   |
|---------------------|--|
| <i>console line</i> | The console line number; default value is 0.       |
| <i>VTY number</i>   | The virtual terminal number; an integer from 0-63. |

For more information on Line Configuration Mode commands, see [Chapter 6, "Line Mode Commands."](#)

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enters Line Configuration Mode to configure virtual terminal 3:

```
Switch(config)# line vty 3
Switch(config-line)#
```

---

## lldp holdtime-multiplier

Hold time is the amount of time a receiving device holds the information before discarding it. Hold time is configured as a multiple of the message transmission interval, which is set by the **lldp timer** command.

This command configures the Link Layer Discovery Protocol (LLDP) hold time multiplier value.

### Syntax

```
[no] lldp holdtime-multiplier <multiplier value>
```

where:

| Parameter               | Function  |
|-------------------------|---|
| <i>multiplier value</i> | The multiplier value; an integer from 2-10. Default value is 4. |

Using the **no** form of this command resets the LLDP hold time multiplier to its default value (4).

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures an LLDP hold time multiplier of 3:

```
Switch(config)# lldp holdtime-multiplier 3
```

### Related Commands

| Command                    | Description                             |
|----------------------------|---|
| <a href="#">lldp timer</a> | Sets the message transmission interval. |

---

## lldp reinit

Configures the time delay before Link Layer Discovery Protocol (LLDP) re-initialization is attempted on an interface. The re-initialization delay allows the port LLDP information to stabilize before transmitting LLDP messages.

Using the **no** form of this command reset the re-initialization delay to its default value.

The default value is 2 seconds.

## Syntax

[no] **lldp reinit** <*time delay*>

where:

| Parameter         | Function   |
|-------------------|--|
| <i>time delay</i> | The time delay in seconds before LLDP re-initialization is attempted on an interface. The <i>time delay</i> is from 1 to 10. |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the LLDP re-initialization delay to 5 seconds:

```
Switch(config)# lldp reinit 5
```

---

## Ildp timer

Configures the time interval between Link Layer Discovery Protocol (LLDP) message transmissions.

Using the **no** form of this command resets the time interval between LLDP messages to its default value.

The default value is 30 seconds.

## Syntax

**[no] lldp timer** <*time interval*>

where:

| Parameter            | Function  |
|----------------------|---|
| <i>time interval</i> | The rate at which the switch sends LLDP messages. The <i>time interval</i> is in seconds from 5 to 32768. |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the switch to send LLDP messages every 20 seconds:

```
Switch(config)# lldp timer 20
```

## Restrictions

The transmission interval must be at least four times the transmission delay interval, which is set by the **lldp transmit-delay** command.

---

## lldp transmit-delay

Configures the Link Layer Discovery Protocol (LLDP) transmission delay interval, which represents the minimum time permitted between two successive LLDP transmissions on a port.

Using the **no** form of this command resets the LLDP transmission delay interval to its default value.

The default value is 2 seconds.

## Syntax

```
[no] lldp transmit-delay <time delay>
```

where:

| Parameter         | Function  |
|-------------------|---|
| <i>time delay</i> | The minimum time in seconds a switch waits between two successive LLDP transmission on a port. The <i>time delay</i> is from 1 to 8192. |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the LLDP transmission delay interval to 5 seconds:

```
Switch(config)# lldp transmit-delay 5
```

## Restrictions

The transmission delay interval must be at least four times smaller than the transmission interval, which is set by the **lldp timer** command.

---

## lldp trap-interval

Configures the Link Layer Discovery Protocol (LLDP) trap notification interval.

Using the **no** form of the command resets the LLDP trap notification to its default value.

The default value is 5 seconds.

## Syntax

**[no] lldp trap-interval** *<time interval>*

where:

| Parameter            | Function  |
|----------------------|---|
| <i>time interval</i> | The minimum number of seconds between two successive LLDP trap notifications. The <i>time interval</i> is from 5 to 3600. |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the LLDP trap notification interval to 10 seconds:

```
Switch(config)# lldp trap-interval 10
```

---

## logging console

Enables the switch to log messages to the console session.

### Syntax

**[no] logging console** [*<severity level>*]

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>severity level</i> | The severity level; an integer from 0-7 as follows: <ul style="list-style-type: none"><li>● 0 - emergencies</li><li>● 1 - alerts</li><li>● 2 - critical</li><li>● 3 - errors</li><li>● 4 - warnings</li><li>● 5 - notifications</li><li>● 6 - informational</li><li>● 7 - debugging</li></ul> Only messages up to the specified severity level are logged. The default severity level is 2 (critical). |

Using the **no** form of this command disables logging messages on the console. Logging is enabled by default.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the logging of messages to the console session with a severity level of 3:

```
Switch(config)# logging console 3
```



---

## logging level

Configures the logging level for each facility in the system. Each facility corresponds to an application, process, protocol, or module.

The default severity level varies based on facility. Each facility has its own default value independently of the other facilities. The user can determine the default severity level for a given facility using the following command: **display logging level** *<facility>*.

## Syntax

**[no] logging level** {*<facility>*|**all**} *<severity level>*

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>facility</i>       | The name of the facility that will have its severity level changed. A facility is a keyword used to identify the application, process, protocol, or module that logs a message. The list of supported facilities is shown after this table.  |
| <b>all</b>            | Configures the severity level for all facilities.  |
| <i>severity level</i> | Only messages up to the specified severity level will be logged. The <i>severity level</i> is from 0 to 7: <ul style="list-style-type: none"><li>● 0 - emergencies</li><li>● 1 - alerts</li><li>● 2 - critical</li><li>● 3 - errors</li><li>● 4 - warnings</li><li>● 5 - notifications</li><li>● 6 - informational</li><li>● 7 - debugging</li></ul> |

Using the **no** form of this command resets the severity level to the default value.

You can change the severity level of the following *facilities*:

- **aaa** - Authentication, Authorization and Accounting (AAA). The default severity level is 5.
- **bfd** - Bidirectional Forwarding Detection (BFD). The default severity level is 6.
- **bgp** - Border Gateway Protocol (BGP). The default severity level is 5.
- **chassisd** - Chassis Daemon. The default severity level is 5.
- **clid** - Command Line Interface (CLI) Daemon. The default severity level is 5.
- **dhcp-snp** - Dynamic Host Configuration Protocol (DHCP) Snooping. The default severity level is 5.
- **ecp** - Edge Control Protocol (ECP). The default severity level is 6.

- `hostmib` - Host Management Information Base (MIB). The default severity level is 6.
- `hostp` - Host Protocols. The default severity level is 5.
- `hsl` - Hardware Services Layer (HSL). The default severity level is 3.
- `imi` - Integrated Management Interface (IMI). The default severity level is 6.
- `imish` - Integrated Management Interface Shell (IMISH). The default severity level is 6.
- `khs1` - Kernel Hardware Services Layer (KHSL) module. The default severity level is 6.
- `l2mr ib` - Layer 2 Multicast Routing Information Base (MRIB). The default severity level is 5.
- `lACP` - Link Aggregation Control Protocol (LACP). The default severity level is 5.
- `lldp` - Link Layer Discovery Protocol (LLDP). The default severity level is 5.
- `memmon` - Memory Monitor. The default severity level is 6.
- `ndd` - Neighbor Discovery Daemon (NDD). The default severity level is 6.
- `nlog` - Logging Control Daemon (NLOG). The default severity level is 6.
- `nPA` - Network Policy Agent (NPA). The default severity level is 6.
- `nsm` - Network Service Module (NSM). The default severity level is 5.
- `nTP` - Network Time Protocol (NTP). The default severity level is 5.
- `onm` - Open Network Management (ONM). The default severity level is 5.
- `ospf` - Open Shortest Path First (OSPF). The default severity level is 5.
- `pam` - Linux Pluggable Authentication Modules (PAM). The default severity level is 6.
- `pkI` - Private Key Infrastructure (PKI). The default severity level is 5.
- `platform-mgr` - Platform Manager. The default severity level is 6.
- `pubsub` - Publisher/Subscriber Inter Process Communication Module. The default severity level is 6.
- `pyrun` - Python Runtime Environment. The default severity level is 6.
- `pysched` - Python Scheduler. The default severity level is 6.
- `rest` - REpresentational State Transfer (REST). The default severity level is 5.
- `rib` - Routing Information Base (RIB). The default severity level is 6.
- `service-mgr` - Service Manager. The default severity level is 5.
- `slp` - Service Location Protocol. The default severity level is 5.
- `smi-ac-l2mr ib` - Simple Management Interface (SMI) API Client (AC) Layer 2 Multicast Routing Information Base (MRIB). The default severity level is 5.
- `smi-ac-lACP` - SMI AC Link Aggregation Control Protocol (LACP). The default severity level is 5.
- `smi-ac-mstp` - SMI AC Multiple Spanning Tree Protocol (MSTP). The default severity level is 5.

- `smi-ac-ndd` - SMI AC Neighbor Discovery Daemon (NDD). The default severity level is 5.
- `smi-ac-nsm` - SMI AC Network Service Module (NSM). The default severity level is 5.
- `smi-ac-onm` - SMI AC Open Network Management (ONM). The default severity level is 5.
- `smi-ac-rib` - SMI AC Routing Information Base (RIB). The default severity level is 5.
- `smi-ac-telemetry` - SMI AC Telemetry service. The default severity level is 5.
- `smi-ac-vrrp` - SMI AC Virtual Router Redundancy Protocol (VRRP). The default severity level is 5.
- `snmp` - Simple Network Management Protocol (SNMP). The default severity level is 5.
- `ssh` - Secure Shell (SSH). The default severity level is 5.
- `stp` - Spanning Tree Protocol (STP). The default severity level is 5.
- `syslog` - System Log Host Protocol. The default severity level is 5.
- `sysmgmt` - System Management Host Protocol. The default severity level is 5.
- `sysmgr` - System Manager. The default severity level is 5.
- `tacacs` - Terminal Access Controller Access-Control System Plus (TACACS+). The default severity level is 5.
- `telemetry` - Telemetry service. The default severity level is 5.
- `telnet` - Telnet Control Host Protocol. The default severity level is 5.
- `um` - User Management. The default severity level is 5.
- `vlag` - Virtual Link Aggregation Group (VLAG). The default severity level is 6.
- `vlan` - Virtual Local Area Network (VLAN). The default severity level is 5.
- `vrrp` - Virtual Router Redundancy Protocol (VRRP). The default severity level is 6.
- `ztp` - Zero Touch Provisioning. The default severity level is 6.

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures a severity level of 3 for the VLAN facility:

```
Switch(config)# logging level vlan 3
```

---

## logging library

Configures the logging level for each system library and application process facility in the system. A system library facility is shared among multiple application process facilities in the system.

The default severity level varies based on the system library facility. Each system library facility has its own default value independently of the other libraries. The user can determine the default severity level for a given system library facility using the following command: **display logging library** *<system library>*.

## Syntax

```
[no] logging library [hsl-nos-ipcc|hsl-nos-ipcs|lli|log|  
mcast|sal-pdp|secureimg|sysinfo] facility {<facility>|all}  
<severity level>
```

where:

| Parameter           | Function  |
|---------------------|---|
| <b>hsl-nos-ipcc</b> | Configures the HSL Inter-Process-Communication Client library. The default security level is 3.   |
| <b>hsl-nos-ipcs</b> | Configures the HSL Inter-Process-Communication Server library. The default security level is 3.   |
| <b>lli</b>          | Configures the low level drivers interface library. The default security level is 5.  |
| <b>log</b>          | Configures the log logging library. The default security level is 6.  |
| <b>mcast</b>        | Configures the multicast logging library. The default security level is 5.  |
| <b>sal-pdp</b>      | Configures the SDK Abstraction Layer (SAL) logging library. The default security level is 5.  |
| <b>secureimg</b>    | Configures the secure image logging library. The default security level is 6.   |
| <b>sysinfo</b>      | Configures the system information library. The default security level is 5.   |
| <b>facility</b>     | Configures the severity level of a certain application process facility.  |
| <i>facility</i>     | The name of the application process facility that will have its severity level changed for the selected system library facility. The list of supported application process facilities is shown below. |

| Parameter             | Function  |
|-----------------------|---|
| <b>all</b>            | Configures the severity level for all application process facilities using a given system library facility.   |
| <i>severity level</i> | Only messages up to the specified severity level will be logged. The <i>severity level</i> is from 0 to 7: <ul style="list-style-type: none"> <li>● 0 - emergencies</li> <li>● 1 - alerts</li> <li>● 2 - critical</li> <li>● 3 - errors</li> <li>● 4 - warnings</li> <li>● 5 - notifications</li> <li>● 6 - informational</li> <li>● 7 - debugging</li> </ul> |

Using the **no** form of this command resets the severity level to the default value.

You can change the severity level of the following *facilities*:

- **bfd** - Bidirectional Forwarding Detection (BFD)
- **bgp** - Border Gateway Protocol (BGP)
- **chassisd** - Chassis Daemon
- **clid** - Command Line Interface (CLI) Daemon
- **dhcp-snp** - Dynamic Host Configuration Protocol (DHCP) Snooping
- **ecp** - Edge Control Protocol (ECP)
- **hostmib** - Host Management Information Base (MIB)
- **hostp** - Host Protocols
- **hsl** - Hardware Services Layer (HSL)
- **imi** - Integrated Management Interface (IMI)
- **imish** - Integrated Management Interface Shell (IMISH)
- **l2mr ib** - Layer 2 Multicast Routing Information Base (MRIB)
- **lACP** - Link Aggregation Control Protocol (LACP)
- **memmon** - Memory Monitor
- **ndd** - Neighbor Discovery Daemon (NDD)
- **nlog** - Logging Control Daemon
- **npa** - Network Policy Agent (NPA)
- **nsm** - Network Service Module (NSM)
- **onm** - Open Network Management (ONM)
- **ospf** - Open Shortest Path First (OSPF)
- **pam** - Linux Pluggable Authentication Modules (PAM)
- **platform-mgr** - Platform Manager

- `pubsub` - Publisher/Subscriber Inter Process Communication Module
- `pyrun` - Python Runtime Environment
- `pysched` - Python Scheduler
- `rest` - REpresentational State Transfer (REST)
- `rib` - Routing Information Base (RIB)
- `service-mgr` - Service Manager
- `slp` -Service Location Protocol
- `stp` - Spanning Tree Protocol (STP)
- `sysmgr` - System Manager
- `telemetry` - Telemetry service
- `vlag` - Virtual Link Aggregation Group (VLAG)
- `vrrp` - Virtual Router Redundancy Protocol (VRRP)
- `ztp` - Zero Touch Provisioning

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures a severity level of 3 for the system library `l1i` when operating as part of the application process OSPF:

```
Switch(config)# logging library l1i facility ospf 3
```

---

## logging logfile

Enables or disables the logging of messages to a log file. The log file will be created in persistent memory under the /cfg/log/customer/ directory.

Using the no form of this command will only disable the logging of messages to the log file. However, it will not delete the log file or the logged messages.

The default severity level is 6 (informational).

## Syntax

**[no] logging logfile** <log file name> <severity level> [**size** <file size>]

where:

| Parameter                    | Function   |
|------------------------------|--|
| <i>log file name</i>         | The name of the log file. The <i>log file name</i> can be up to 32 characters in length. The allowed characters are: <ul style="list-style-type: none"><li>● letters</li><li>● numbers</li><li>● -</li></ul>   |
| <i>severity level</i>        | Only messages up to the specified severity level will be logged. The <i>severity level</i> is from 0 to 7: <ul style="list-style-type: none"><li>● 0 - emergencies</li><li>● 1 - alerts</li><li>● 2 - critical</li><li>● 3 - errors</li><li>● 4 - warnings</li><li>● 5 - notifications</li><li>● 6 - informational</li><li>● 7 - debugging</li></ul> |
| <b>size</b> <i>file size</i> | The maximum size in bytes of the log file. The file size is from 4,096 bytes (4 KB) to 10,485,760 bytes (10 MB).   |

To delete the logged messages from the log file use the following command:

**remove logging logfile**

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the logging of messages to the log file named 'log\_file\_sev\_2'. In order to be saved to the file, the logged messages must have a severity level of 2 (critical) or greater. The size of log file is restricted to 3 MB:

```
Switch(config)# logging logfile log_file_sev_2 2 size 3145728
```

## Restrictions

The default log file size is 10,485,760 bytes (10 MB).



---

## logging monitor

Enables or disables the switch to log messages to the monitor sessions (Telnet and Secure Shell (SSH)).

The default settings is enabled with a severity level of 5 (notifications).

## Syntax

**[no] logging monitor** [*<severity level>*]

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>severity level</i> | Only messages up to the specified severity level will be logged. The <i>severity level</i> is from 0 to 7: <ul style="list-style-type: none"><li>● 0 - emergencies</li><li>● 1 - alerts</li><li>● 2 - critical</li><li>● 3 - errors</li><li>● 4 - warnings</li><li>● 5 - notifications</li><li>● 6 - informational</li><li>● 7 - debugging</li></ul> |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the logging of messages to the monitor sessions with a severity level of 3 (errors):

```
Switch(config)# logging monitor 3
```

---

## logging rate-limit

Configures the rate limit of logged messages (maximum number of messages that can be logged per time interval in seconds) for three supported contexts:

- for the entire system
- for each severity level
- for each facility

The three rate limit contexts listed previously are independent of each other. (e.g. if we disable rate limit for the system, the rate limit parameters related to the severity levels and facilities are still applicable).

Using the no form of this command disables rate limiting for the specified context. To reset the rate limit parameters to their default values use the default keywords associated to the number of messages or time interval parameters.

Rate limit has different default values for the distinct contexts:

- for the system: 512 messages every 5 seconds
- for severity levels: 1024 messages every 10 seconds
- for facilities: 512 messages every 10 seconds

## Syntax

```
logging rate-limit num {<number of messages>|default} interval
{<time interval>|default} {facility {<facility>|all}|level <severity
level>|system}
```

```
no logging rate-limit {facility {<facility>|all}|level <severity
level>|system}
```

where:

| Parameter                       | Function   |
|---------------------------------|--|
| <b>num</b>                      | Configures the maximum number of messages that can be logged within the configured interval.   |
| <i>number of messages</i>       | The <i>number of messages</i> is from 1 to 4096.   |
| <b>default</b>                  | This keyword will instruct the system to set parameter being configured to its default value.  |
| <b>interval</b>                 | Configures the time interval.  |
| <i>time interval</i>            | The <i>time interval</i> is in seconds from 1 to 600.  |
| <b>facility</b> <i>facility</i> | Configures the rate limit of logged messages for the specified facility. A facility is a keyword used to identify the application, process, protocol, or module that logs a message. The list of supported facilities is shown after this table. |

| Parameter                          | Function  |
|------------------------------------|---|
| <b>level</b> <i>severity level</i> | Only messages up to the specified severity level will be logged. The <i>severity level</i> is from 0 to 7: <ul style="list-style-type: none"> <li>● 0 - emergencies</li> <li>● 1 - alerts</li> <li>● 2 - critical</li> <li>● 3 - errors</li> <li>● 4 - warnings</li> <li>● 5 - notifications</li> <li>● 6 - informational</li> <li>● 7 - debugging</li> </ul> |
| <b>system</b>                      | Configures the rate limit of logged messages for the system.  |

You can change the rate limit of the following *facilities*:

- **aaa** - Authentication, Authorization and Accounting (AAA)
- **all** - All facilities
- **bfd** - Bidirectional Forwarding Detection (BFD)
- **bgp** - Border Gateway Protocol (BGP)
- **chassisd** - Chassis Daemon
- **clid** - Command Line Interface (CLI) Daemon
- **dhcp-snp** - Dynamic Host Configuration Protocol (DHCP) Snooping
- **ecp** - Edge Control Protocol (ECP)
- **hostmib** - Host Management Information Base (MIB)
- **hostp** - Host Protocols
- **hsl** - Hardware Services Layer (HSL)
- **imi** - Integrated Management Interface (IMI)
- **imish** - Integrated Management Interface Shell (IMISH)
- **khs1** - Kernel Hardware Services Layer (KHSL) module
- **l2mrib** - Layer 2 Multicast Routing Information Base (MRIB)
- **lACP** - Link Aggregation Control Protocol (LACP)
- **lldp** - Link Layer Discovery Protocol (LLDP)
- **memmon** - Memory Monitor
- **ndd** - Neighbor Discovery Daemon (NDD)
- **nlog** - Logging Control Daemon (NLOG)
- **npa** - Network Policy Agent (NPA)
- **nsm** - Network Service Module (NSM)
- **nTP** - Network Time Protocol (NTP)

- `onm` - Open Network Management (ONM)
- `ospf` - Open Shortest Path First (OSPF)
- `pam` - Linux Pluggable Authentication Modules (PAM).
- `pki` - Private Key Infrastructure (PKI).
- `platform-mgr` - Platform Manager
- `pubsub` - Publisher/Subscriber Inter Process Communication Module
- `pyrun` - Python Runtime Environment
- `pysched` - Python Scheduler
- `rest` - REpresentational State Transfer (REST)
- `rib` - Routing Information Base (RIB)
- `service-mgr` - Service Manager
- `slp` -Service Location Protocol
- `smi-ac-l2mrib` - Simple Management Interface (SMI) API Client (AC) Layer 2 Multicast Routing Information Base (MRIB)
- `smi-ac-lacp` - SMI AC Link Aggregation Control Protocol (LACP)
- `smi-ac-mstp` - SMI AC Multiple Spanning Tree Protocol (MSTP)
- `smi-ac-ndd` - SMI AC Neighbor Discovery Daemon (NDD)
- `smi-ac-nsm` - SMI AC Network Service Module (NSM)
- `smi-ac-onm` - SMI AC Open Network Management (ONM)
- `smi-ac-rib` - SMI AC Routing Information Base (RIB)
- `smi-ac-vrrp` - SMI AC Virtual Router Redundancy Protocol (VRRP)
- `snmp` - Simple Network Management Protocol (SNMP)
- `ssh` - Secure Shell (SSH)
- `stp` - Spanning Tree Protocol (STP).
- `syslog` - System Log Host Protocol
- `sysmgmt` - System Management Host Protocol
- `sysmgr` - System Manager
- `tacacs` - Terminal Access Controller Access-Control System Plus (TACACS+)
- `telemetry` - Telemetry service.
- `telnet` - Telnet Control Host Protocol
- `um` - User Management
- `vlag` - Virtual Link Aggregation Group (VLAG)
- `vlan` - Virtual Local Area Network (VLAN)
- `vrrp` - Virtual Router Redundancy Protocol (VRRP)
- `ztp` - Zero Touch Provisioning

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Examples

The following command configures the rate-limit of the system to 300 messages every 10 seconds:

```
Switch(config)# logging rate-limit num 300 interval 10 system
```

The following command configures the rate-limit of the severity level 6 (informational) to 256 messages every 16 seconds:

```
Switch(config)# logging rate-limit num 256 interval 16 level 6
```

The following command configures the rate-limit of the facility bgp to 200 messages every 5 seconds:

```
Switch(config)# logging rate-limit num 200 interval 5 facility bgp
```

The following command configures the rate-limit of the system to the default values of 512 messages every 5 seconds:

```
Switch(config)# logging rate-limit num default interval default system
```

The following command disables the rate-limit for the severity level 3 (errors). If only this command is issued, the rate-limit parameters related to the system and all facilities are still applicable:

```
Switch(config)# no logging rate-limit level 3
```

The following command disables the rate-limit for all facilities. If only this command is issued, the rate-limit parameters related to the system and all severity levels are still applicable:

```
Switch(config)# no logging rate-limit facility all
```

---

## logging server

Adds or removes a remote logging server at the specified address.

If not specified when adding a remote logging server, the default values for severity level is 7 (debugging) and outgoing facility local7.

## Syntax

```
[no] logging server {<server address>|<hostname>} [<severity level>] [vrf {data|management}] [facility <outgoing facility>]
```

where:

| Parameter                                | Function  |
|--|---|
| <i>server address</i>                    | The IPv4 or IPv6 address of the remote server.  |
| <i>hostname</i>                          | The hostname of the remote server.  |
| <i>severity level</i>                    | Only messages up to the specified severity level will be logged. The <i>severity level</i> is from 0 to 7: <ul style="list-style-type: none"><li>● 0 - emergencies</li><li>● 1 - alerts</li><li>● 2 - critical</li><li>● 3 - errors</li><li>● 4 - warnings</li><li>● 5 - notifications</li><li>● 6 - informational</li><li>● 7 - debugging</li></ul>  |
| <b>facility</b> <i>outgoing facility</i> | Logs messages only for the specified outgoing facility. A facility is a keyword used to identify the source of the log messages when forwarding them to a remote server. Use one of the following: <ul style="list-style-type: none"><li>● local0</li><li>● local1</li><li>● local2</li><li>● local3</li><li>● local4</li><li>● local5</li><li>● local6</li><li>● local7</li><li>● user</li></ul> |
| <b>vrf data</b>                          | Uses the data Virtual Routing and Forwarding (VRF) instance to communicate with the server.   |
| <b>vrf management</b>                    | Uses the management VRF instance to communicate with the server.  |

## Modes

Global Configuration Mode

## History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.2    | Added <b>vrf</b> option.      |
| 10.4    | Added <i>hostname</i> option. |

## Example

The following command configures a remote logging server at an IPv4 address:

```
Switch(config)# logging server 10.240.34.178
```

---

## logging throttle

Prevents consecutive logging of duplicate syslog messages.

By default, this feature is disabled.

### Syntax

**[no] logging throttle**

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command prevents duplicate syslog messages logging:

```
Switch(config)# logging throttle
```



---

## logging timestamp

Configures the unit used to display the time-stamp when logging messages.

Using the **no** form of the command resets the time-stamp unit to its default setting.

The default time-stamp unit is seconds.

## Syntax

**[no] logging timestamp {microseconds|milliseconds|seconds}**

where:

| Parameter           | Function  |
|---------------------|---|
| <b>microseconds</b> | Configures logging messages to use microseconds as the timestamp units (1 microsecond = $10^{-6}$ seconds). |
| <b>milliseconds</b> | Configures logging messages to use milliseconds as the timestamp units (1 millisecond = $10^{-3}$ seconds). |
| <b>seconds</b>      | Configures logging messages to use seconds as the timestamp unit.   |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures milliseconds as the time-stamp unit:

```
Switch(config)# logging timestamp milliseconds
```

---

## mac-learn disable

When a packet with an unknown MAC source address is received, the switch saves the MAC address in its the Forwarding Database (FDB). This process is called MAC address learning.

The command globally disables MAC address learning. Any new MAC addresses will not be saved in the FDB.

Use the **no** form of this command to enable MAC address learning.

**Note:** We recommend you remove all dynamic MAC addresses from the FDB after disabling/enabling MAC learning.

### Syntax

**[no] mac-learn disable**

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command disables MAC address learning:

```
Switch(config)# mac-learn disable
```

### Related Commands

| Command                                  | Description                                     |
|--|---|
| <a href="#">remove mac address-table</a> | Removes all dynamic MAC addresses from the FDB. |

---

## mac access-list

Creates a MAC access control list and enters MAC ACL Configuration Mode.

### Syntax

**[no] mac access-list** <MAC ACL>

where:

| Parameter | Definition  |
|-----------|---|
| MAC ACL   | The name of the MAC access control list; a string up to 64 characters long. |

Using **no** before the command removes the MAC ACL.

For information about MAC ACL Configuration mode commands, see [Chapter 22, "MAC ACL Mode Commands"](#).

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates MAC ACL MyACL:

```
Switch(config)# mac access-list MyACL
Switch(config-mac-acl)#
```

---

## mac address-table aging time

Enables an aging time for a MAC address table.

### Syntax

**[no] mac address-table aging-time** *<seconds>*

where:

| Parameter                                   | Definition   |
|---|--|
| <b>aging-time</b><br><i>&lt;seconds&gt;</i> | Aging time in seconds; a number from 0 to 1000000. |

Using **no** before the command removes the aging time.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures aging time for an address table:

```
Switch(config)# mac address-table aging-time 5
```

---

## mac address-table static

Adds or removes static entries for the MAC address table.

### Syntax

```
[no] mac address-table static <MAC address> vlan <VLAN ID>  
interface {ethernet <chassis number/port number>|port-aggregation  
<LAG number>}
```

where:

| Parameter   | Definition  |
|---|---|
| <i>MAC address</i>                                | MAC address in one of the following formats: <ul style="list-style-type: none"><li>• X.X.X</li><li>• XX-XX-XX-XX-XX-XX</li><li>• XX:XX:XX:XX:XX:XX</li><li>• XXXX.XXXX.XXXX</li></ul> |
| <b>vlan</b> <VLAN ID>                             | Associates the MAC entry with the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 3999.  |
| <b>interface</b>                                  | Associates the MAC entry with an ethernet interface or Link Aggregation Group (LAG).  |
| <b>ethernet</b> <i>chassis number/port number</i> | Associates the MAC entry with the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.                                      |
| <b>port-aggregation</b> <i>LAG number</i>         | Associates the MAC entry with the specified LAG. The <i>LAG number</i> is an integer from 1 to 4096.  |

Using **no** before the command removes the static entry.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures a static MAC entry for a port-aggregation:

```
Switch(config)# mac address-table static 0001.dcde.3b00 vlan 10 interface  
port-aggregation 61
```

---

## maint password

Enables or disables the use of a password to enable maintenance mode.

### Syntax

**maint password [8]** *<password>*

**no maint password**

where:

| Parameter       | Function  |
|-----------------|---|
| 8               | Indicates that an encrypted password will follow.   |
| <i>password</i> | The password required to enable maintenance mode. The <i>password</i> can be up to 8 characters long. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures `maint -cd` as the encrypted password required to enable maintenance mode:

```
Switch(config)# maint password 8 maint-cd
```

### Related Commands

| Command                           | Description              |
|-----------------------------------|--------------------------|
| <a href="#">maint mode enable</a> | Enables maintenance mode |

---

## maximum-paths

Configures the maximum number of Equal Cost Multiple Paths (ECMP) that can be installed in the Forwarding Information Base (FIB).

Using the **no** form of the command resets the maximum number of ECMP paths to its default value.

### Syntax

**[no] maximum-paths** *<number of paths>*

where:

| Parameter              | Function   |
|------------------------|--|
| <i>number of paths</i> | The maximum number of ECMP paths; an integer from 1-32. The default value is 32. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the maximum number of ECMP paths to 12:

```
Switch(config)# maximum-paths 12
```

---

## microburst-detection interval

Microbursts are short peaks in data traffic that manifest as a sudden increase in the number of data packets transmitted over a specific millisecond-level time frame, potentially overwhelming network buffers. Microburst detection allows users to analyze and mitigate microburst-related incidents, thus preventing network congestion.

Configures the time interval used by microburst detection to evaluate traffic burst.

### Syntax

**microburst-detection interval** *<time interval>*

where:

| Parameter            | Function   |
|----------------------|--|
| <i>time interval</i> | The time period in milliseconds used to evaluate traffic burst; an integer from 5 to 5000. Default value is 5. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the microburst detection interval to 20 milliseconds:

```
Switch(config)# microburst-detection interval 20
```



---

## monitor erspan origin ip-address

Configures the global origin IPv4 address of ethernet Encapsulated Remote Switched Port Analyzer (ERSPAN) sessions.

Using the **no** form of this command will remove the configured global origin IPv4 address.

### Syntax

**[no] monitor erspan origin ip-address <IPv4 address> global**

where:

| Parameter           | Function   |
|---------------------|--|
| <i>IPv4 address</i> | The origin IPv4 address of ethernet ERSPAN sessions. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command the global origin address of ethernet ERSPAN sessions as 10.206.38.96:

```
Switch(config)# monitor erspan origin ip-address 10.206.38.96 global
```

---

## monitor session

Adds a Switch Port Analyzer (SPAN) session. After the creation of a SPAN session, enters SPAN Session Configuration Mode.

### Syntax

**[no] monitor session** <*session number*>

where:

| Parameter             | Function  |
|-----------------------|---|
| <i>session number</i> | The SPAN session number. The <i>session number</i> is from 1 to 18. |

Using no before the command removes the specified SPAN session.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds SPAN session 7:

```
Switch(config)# monitor session 7
```

---

## monitor session shut

Configures the specified Switch Port Analyzer (SPAN) session as being shut down for monitoring.

Using the **no** form of the command configures the SPAN session as not being shut down for monitor.

### Syntax

**[no] monitor session** {<*session number*>|**all**} **shut**

where:

| Parameter             | Function  |
|-----------------------|---|
| <i>session number</i> | The SPAN session number. The <i>session number</i> is from 1 to 18. |
| <b>all</b>            | Configures all SPAN sessions as being shut down.                    |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures all SPAN sessions as being shut down:

```
Switch(config)# monitor session all shut
```

---

## monitor session type

Specifies the Switch Port Analyzer (SPAN) session type.

### Syntax

```
monitor session <session number> type {erspan-destination |  
erspan-source | local}
```

where:

| Parameter                      | Function   |
|--------------------------------|--|
| <i>session number</i>          | The SPAN session number. The <i>session number</i> is from 1 to 18.                                      |
| <b>type erspan-destination</b> | Specifies that the session is a Encapsulated Remote Switched Port Analyzer (ERSPAN) destination session. |
| <b>type erspan-source</b>      | Specifies that the session is a Encapsulated Remote Switched Port Analyzer (ERSPAN) source session.      |
| <b>type local</b>              | Specifies that the session is a local session.   |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command assigns SPAN session 10 as a local session:

```
Switch(config)# monitor session 10 type local
```

---

## no onie-install

Uninstalls the Open Network Install Environment (ONIE) image from the switch.

**Note:** This command is available only on the *ThinkSystem NE10032 RackSwitch*. The switch must be reloaded with Secure Boot disabled for the command to be run, otherwise an error message appears. For more details on Secure Boot, consult the *Lenovo Network Application Guide for Lenovo Cloud Network Operating System 10.4*.

### Syntax

**no onie-install**

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command uninstalls the ONIE image from the switch:

```
Switch(config)# no onie-install
```

---

## ntp authenticate

Enables the Network Time Protocol (NTP) authentication.

### Syntax

**[no] ntp authenticate**

Using **no** before the command disables the authentication.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable NTP authentication:

```
Switch(config)# ntp authenticate
```

---

## ntp authentication-key

Adds the authentication key.

### Syntax

**[no] authentication-key** *<value>* **md5** *<string>*

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>&lt;value&gt;</i>  | Authentication key number (a value from 1 to 65534). |
| <b>md5</b>            | Authentication algorithm.                            |
| <i>&lt;string&gt;</i> | MD5 string.  |

Using **no** before the command removes the authentication key.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set the authentication key:

```
Switch(config)# ntp authentication-key 5 md5 test
```

---

## ntp enable

Enables Network Time Protocol (NTP) feature. This feature allows you to synchronize the switch clock to a Network Time Protocol (NTP) server. NTP is enabled by default.

### Syntax

**[no] ntp enable**

Using **no** before the command turns off the feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable NTP:

```
Switch(config)# ntp enable
```



---

## ntp peer

Configures an NTP peer.

### Syntax

```
[no] ntp peer {<IPv4 address>|<IPv6 address>|<hostname>} [key <key ID>]  
[maxpoll <max-poll interval>] [minpoll <min-poll interval>] [prefer]
```

where:

| Parameter                               | Description  |
|---|--|
| <i>IPv4 address</i>                     | The IPv4 address of the NTP peer.  |
| <i>IPv6 address</i>                     | The IPv6 address of the NTP peer.  |
| <i>hostname</i>                         | The hostname of the NTP peer.  |
| <b>key</b> <i>key ID</i>                | Specifies the key to be used when communicating with a peer. The key ID is a number from 1 to 65534.   |
| <b>maxpoll</b> <i>max-poll interval</i> | Specifies the maximum poll interval to check the status of the configured NTP peer. The <i>max-poll interval</i> is from 4 to 16 seconds, with a default value of 6 seconds. |
| <b>minpoll</b> <i>min-poll interval</i> | Specifies the minimum poll interval to check the status of the configured NTP peer. The <i>min-poll interval</i> is from 4 to 16 seconds, with a default value of 4 seconds. |
| <b>prefer</b>                           | Specifies the given NTP peer as the preferred one.   |

Using **no** before the command removes a NTP peer.

### Modes

Global Configuration Mode

### History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

### Example

The following shows how to set a NTP peer:

```
Switch(config)# ntp peer 10.144.19.105 key 18755 prefer
```

---

## ntp server

Configures an NTP server.

### Syntax

```
[no] ntp server {<IPv4 address>|<IPv6 address>|<hostname>} [key <key ID>]  
[maxpoll <max-poll interval>] [minpoll <min-poll interval>] [prefer]
```

where:

| Parameter                               | Description  |
|---|--|
| <i>IPv4 address</i>                     | The IPv4 address of the NTP server.  |
| <i>IPv6 address</i>                     | The IPv6 address of the NTP server.  |
| <i>hostname</i>                         | The hostname of the NTP server.  |
| <b>key</b> <i>key ID</i>                | Specifies the key to be used when communicating with a server. The key ID is a number from 1 to 65534.   |
| <b>maxpoll</b> <i>max-poll interval</i> | Specifies the maximum poll interval to check the status of the configured NTP server. The <i>max-poll interval</i> is from 4 to 16 seconds, with a default value of 6 seconds. |
| <b>minpoll</b> <i>min-poll interval</i> | Specifies the minimum poll interval to check the status of the configured NTP server. The <i>min-poll interval</i> is from 4 to 16 seconds, with a default value of 4 seconds. |
| <b>prefer</b>                           | Specifies the given NTP server as the preferred one.   |

Using **no** before the command removes a NTP server.

### Modes

Global Configuration Mode

### History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

### Example

The following shows how to set NTP server:

```
Switch(config)# ntp server 19.71.241.11 key 58466 minpoll 3 maxpoll 6
```

---

## ntp trusted-key

Sets a trusted key.

### Syntax

**[no] ntp trusted-key** <number>

where:

| Parameter | Description                                   |
|-----------|---|
| <number>  | Trusted key value (a number from 1 to 65534). |

Using **no** before the command removes a trusted key.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set a trusted key:

```
Switch(config)# ntp trusted-key 20
```

---

## ntp use-vrf

Configures NTP VRF. NTP daemon (ntpd) will run in the given namespace.

### Syntax

```
ntp use-vrf {default|management}
```

where:

| Parameter         | Description   |
|-------------------|---|
| <b>default</b>    | Default VRF. For data interfaces, a default VRF with ID 0 is created and associated with default FIB. All data IP interfaces are attached to default VRF. |
| <b>management</b> | Management VRF. By default, a VRF with ID1 is created. This is the default setting.   |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure NTP VRF:

```
Switch(config)# ntp use-vrf default
```

---

## password history-checking

Enables or disables password tracking. Up to four passwords will be stored and checked for every user.

### Syntax

**[no] password history-checking**

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following shows how to track password history:

```
Switch(config)# password history-checking
```

### Related Commands

| Command                  | Description             |
|--------------------------|-------------------------|
| <a href="#">username</a> | Modifies user settings. |

---

## pki

Creates a Public Key Infrastructure (PKI) profile. After command execution, you will enter PKI Configuration command mode.

### Syntax

**pki** <PKI profile name>

where:

| Parameter               | Description  |
|-------------------------|--|
| <i>PKI profile name</i> | The name of the PKI profile. The <i>PKI profile name</i> can be up to 16 characters in length. |

The following command deletes the specified PKI profile:

**no pki** <PKI profile name>

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command creates a PKI profile called pkiProfile1:

```
Switch(config)# pki pkiProfile1
Switch(config-pki)#
```

---

## policy-map type

Creates or modifies a control-plane or qos policy-map.

### Syntax

```
[no] policy-map type {control-plane <policy-map name>|qos  
<policy-map name>|queing}
```

where:

| Parameter            | Description                                      |
|----------------------|--|
| <b>control-plane</b> | Control Plane Protection (CoPP) policy map type. |
| <b>qos</b>           | Quality of Service (QoS) policy map type.        |
| <policy-map name>    | Policy map name.                                 |
| <b>queing</b>        | Queing policy map.                               |

Using **no** before the command removes a specified policy map.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set a policy-map:

```
Switch(config)# policy-map type control-plane test
```

---

## port-aggregation load-balance ethernet

Enables or disables Link Aggregation Group (LAG) traffic balancing.

### Syntax

```
[no] port-aggregation load-balance ethernet [destination-ip|  
destination-mac|destination-port|source-dest-ip|  
source-dest-mac|source-dest-port|source-ip|source-mac|  
source-port] [source-interface]
```

where:

| Parameter               | Function  |
|-------------------------|---|
| <b>destination-ip</b>   | Enables load distribution on the destination IP address.                    |
| <b>destination-mac</b>  | Enables load distribution on the destination MAC address.                   |
| <b>destination-port</b> | Enables load distribution on the destination port number.                   |
| <b>source-dest-ip</b>   | Enables load distribution on both the destination and source IP addresses.  |
| <b>source-dest-mac</b>  | Enables load distribution on both the destination and source MAC addresses. |
| <b>source-dest-port</b> | Enables load distribution on both the destination and source port numbers.  |
| <b>source-ip</b>        | Enables load distribution on the source IP address.                         |
| <b>source-mac</b>       | Enables load distribution on the source MAC address.                        |
| <b>source-port</b>      | Enables load distribution on the source port number.                        |
| <b>source-interface</b> | Enables load distribution on the source ethernet interface.                 |

### Modes

Global Configuration Mode



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables load distribution on the destination MAC address and source ethernet interface:

```
Switch(config)# port-aggregation load-balance ethernet destination-mac  
source-interface
```

---

## qos statistics

Enables or disables Quality of Service (QoS) statistics.

### Syntax

```
[no] qos statistics
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables QoS statistics:

```
Switch(config)# qos statistics
```

---

## radius-server host

Configures a Remote Authentication Dial-In User Service (RADIUS) server.

### Syntax

```
[no] radius-server host {<IP address>|<hostname>} [key [0|7]
<authentication key>] [auth-port <port number>] [acc-port <port number>]
[timeout <timeout interval>] [retransmit <number of retries>]
```

where:

| Parameter                 | Description  |
|---------------------------|--|
| <i>IP address</i>         | The IP address of the RADIUS server.   |
| <i>hostname</i>           | The hostname of the RADIUS server.   |
| <b>key</b>                | Configures an authentication key to be used when connecting to the RADIUS server.  |
| <b>0</b>                  | Specifies that the authentication key will not be encrypted. This is the default encryption method.                                      |
| <b>7</b>                  | Specifies that the authentication key will be encrypted.   |
| <i>authentication key</i> | The authentication key (a text string up to 65 characters in length).  |
| <b>auth-port</b>          | Configures the port used by the RADIUS server for authentication   |
| <b>acc-port</b>           | Configures the port used by the RADIUS server for accounting   |
| <i>port number</i>        | The port number (an integer between 0 and 65535). The default authentication port is 1812, and the default accounting port is 1813.      |
| <b>timeout</b>            | Configures the amount of time, in seconds, before a RADIUS server connection attempt is considered to have failed.                       |
| <i>timeout interval</i>   | The time interval after which the RADIUS server will timeout (in seconds, from 1 to 60). The default value is 5 seconds.                 |
| <b>retransmit</b>         | Configures the number of retries the switch will make to establish a connection with the RADIUS server after the initial attempt failed. |
| <i>number of retries</i>  | The number of retries (an integer between 0 and 5). The default value is one retry.  |

Using **no** before the command removes the specified RADIUS server address or reset one of its parameters if specified.

## Modes

Global Configuration Mode

## History

| Release | Modification                  |
|---------|-------------------------------|
| 10.3    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

## Examples

The following command configures the IP address of a RADIUS sever:

```
Switch(config)# radius-server host 10.34.152.10
```

The following command configures the authentication and accounting ports used by the switch to connect to a RADIUS sever, and the number of retries to connect to that server to 3:

```
Switch(config)# radius-server host 10.34.152.10 auth-port 1900 acc-port  
1901 retransmit 3
```

---

## radius-server key

Configures the global authentication key to be used when connecting to any RADIUS server.

If a RADIUS server is configured with a specific authentication key, then the global key is ignored when establishing a connection to that RADIUS server.

### Syntax

```
[no] radius-server key [0|7] <authentication key>
```

where:

| Parameter                 | Description   |
|---------------------------|---|
| 0                         | Specifies that the authentication key will not be encrypted. This is the default encryption method. |
| 7                         | Specifies that the authentication key will be encrypted.  |
| <i>authentication key</i> | The authentication key (a text string up to 65 characters in length).                               |

Using **no** before the command will remove the global authentication key.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures an encrypted global authentication key to used when establishing a connection to a RADIUS server:

```
Switch(config)# radius-server key 7 myRADIUSserverKey
```

---

## radius-server retransmit

Globally configures the number of retries the switch will make to establish a connection with a RADIUS server after the initial attempt failed.

If a RADIUS server is configured with a specific number of retries, then the global setting is ignored when establishing a connection to that RADIUS server.

By default, the switch will retry one more time to connect to the RADIUS server.

### Syntax

**[no] radius-server retransmit** <*number of retries*>

where:

| Parameter                | Description   |
|--------------------------|---|
| <i>number of retries</i> | The number of retries (an integer between 0 and 5). |

Using **no** before the command will reset the number of retries to the default value.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures the number of retries to 3:

```
Switch(config)# radius-server retransmit 3
```

---

## radius-server timeout

Configures the amount of time, in seconds, before a RADIUS server connection attempt is considered to have failed.

### Syntax

**[no] radius-server timeout** <*timeout interval*>

where:

| Parameter               | Description  |
|-------------------------|--|
| <i>timeout interval</i> | The time interval after which the RADIUS server will timeout (in seconds, from 1 to 60). The default value is 5 seconds. |

Using **no** before the command will reset the timeout interval to its default value.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures the timeout interval to 12 seconds:

```
Switch(config)# radius-server timeout 12
```

---

## remove cores

Clears all the core dump information stored on the switch.

### Syntax

```
remove cores
```

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command clears all the core dump information from the switch:

```
Switch(config)# remove cores
```



---

## remove ssh hosts

Resets the list of trusted Secure Shell (SSH) hosts.

### Syntax

```
remove ssh hosts
```

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command resets the list of trusted SSH hosts:

```
Switch> remove ssh hosts
```

---

## resequence

Applies sequence numbers to the access list entries in an access list.

### Syntax

**resequence {ip|arp|mac} access-list** <access-list name> <starting sequence number> <increment value>

where:

| Parameter                                  | Description   |
|--|---|
| <b>ip</b>                                  | Configures IP features.   |
| <b>arp</b>                                 | Configures ARP features.  |
| <b>mac</b>                                 | Configures MAC features.  |
| <b>access-list</b> <i>access-list name</i> | Configures access-list name.  |
| <i>starting sequence number</i>            | First entry number (a value from 1 to 2147483645).  |
| <i>increment value</i>                     | Increment by which to separate the entry numbers of the statements. By default the entry has a sequence number of 10 more than the last entry in the access list. |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to re-sequence numbers to access list:

```
Switch(config)# resequence ip access-list test 34 20
```

---

## restApi pki

Configures a Private Key Infrastructure (PKI) profile for the Representational State Transfer (REST) server. The new PKI profile will be user only after the REST API is re-enabled.

### Syntax

```
restApi pki <PKI profile name> vrf {default|management}
```

where:

| Parameter               | Description   |
|-------------------------|---|
| <i>PKI profile name</i> | The name of the PKI profile. The <i>PKI profile name</i> can be up to 16 characters in length.                |
| <b>vrf default</b>      | Configures a PKI profile for the REST server using the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b>   | Configures a PKI profile for the REST server using the management VRF instance.                               |

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command configures a PKI profile for the REST server on the management VRF instance:

```
Switch(config)# restApi pki myPKIprofile vrf management
```

---

## script-job

Defines a script job.

### Syntax

```
[no] script-job <job name> {QUOTE_LINE|time {QUOTE_LINE|  
daily|hourly|monthly|reboot|weekly|yearly}}
```

where:

| Parameter  | Description  |
|------------|--|
| <job name> | Script file to run.  |
| QUOTE_LINE | Crontab time format. Individual arguments in the string must be separated by one or more space characters. |
| daily      | Runs once a day at midnight.   |
| hourly     | Runs once a hour at the beginning of the hour.   |
| monthly    | Runs once a month at midnight on the morning of the first day of the month.                                |
| reboot     | Runs at startup.   |
| weekly     | Runs once a week at midnight of Sunday morning of the first day of the month.                              |
| yearly     | Runs once a year at midnight of the morning of January 1st.  |

Using **no** before the command removes a running script.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to define a script job:

```
Switch(config)# script-job test.py time daily
```

---

## no script

Deletes a script file.

## Syntax

**no script** {<file name>|**all**}

where:

| Parameter   | Description                        |
|-------------|------------------------------------|
| <file name> | Name of the script file to delete. |
| <b>all</b>  | Deletes all script files.          |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to delete all script files:

```
Switch(config)# no script all
```

---

## no script-log

Deletes a script log file.

### Syntax

**no script-log** {<file name>|**all**}

where:

| Parameter   | Description                            |
|-------------|--|
| <file name> | Name of the script log file to delete. |
| <b>all</b>  | Deletes all script log files.          |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to delete all script log files:

```
Switch(config)# no script-log all
```

---

## snmp-server community

Configures the community table entry. The configured entry is stored in the community table list in the SNMP engine. This table is used to configure community strings in the Local Configuration Datastore (LCD) of SNMP engine.

### Syntax

```
[no] snmp-server community <name> [ro|rw|group <word>|view <view name> version {v1|v2c} {ro|rw}]
```

where:

| Parameter        | Description                                   |
|------------------|---|
| <name>           | SNMP community name.                          |
| view <view name> | View name.                                    |
| v1               | Sets v1 for SNMPv1.                           |
| v2c              | Sets v2c for SNMPv2c.                         |
| ro               | Read-only access with this community string.  |
| rw               | Read-write access with this community string. |
| group <word>     | Group to which the community belongs.         |

Using **no** before the command removes the community table entry.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure community table entries:

```
Switch(config)#snmp-server community test view test2 version v1 ro
```

---

## snmp-server contact

Sets the name of the system contact.

**[no] snmp-server contact** *<string>*

where:

| Parameter             | Description          |
|-----------------------|----------------------|
| <i>&lt;string&gt;</i> | Name of the contact. |

Using **no** before the command removes a SNMP contact.

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to configure the name of a contact:

```
Switch(config)# snmp-server contact test
```



---

## snmp-server enable

Enables or disables SNMP engine.

### Syntax

```
[no] snmp-server enable {snmp|traps [bfd|link [linkDown|linkUp]]}
```

where:

| Parameter       | Description   |
|-----------------|---|
| <b>snmp</b>     | Enables SNMP management.  |
| <b>bfd</b>      | Enables Bidirectional Forwarding Detection (BFD) traps.                             |
| <b>link</b>     | Enables the sending of SNMP link up and link down traps for a specific system port. |
| <b>linkDown</b> | IETF Link state down notification.  |
| <b>linkUp</b>   | IETF Link state up notification.  |

Using **no** before the command turns off the feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable SNMP engine:

```
Switch(config)# snmp-server enable snmp
```

---

## snmp-server host

Sets the recipient of a SNMP notification operation.

### Syntax

```
[no] snmp-server host <ip address> {informs|traps|version}  
version {1|2c|3} <user name> [udp-port <port number>]
```

where:

| Parameter                          | Description  |
|------------------------------------|--|
| <i>IP address</i>                  | IPv4 or IPv6 address of SNMP notification host.                          |
| <b>informs</b>                     | Sends inform messages to this host.                                      |
| <b>traps</b>                       | Sends traps messages to this host.                                       |
| <b>version</b>                     | SNMP version to use for notification messages.                           |
| <b>1</b>                           | Sets v1 for SNMPv1.  |
| <b>2c</b>                          | Sets v2c for SNMPv2c.  |
| <b>3</b>                           | Sets v3 for SNMPv3.  |
| <i>user name</i>                   | SNMP community string or SNMPv3 user name.                               |
| <b>udp-port</b> <i>port number</i> | The UDP port number of the notification host (a number from 1 to 65535). |

Using **no** before the command removes a specified host.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set a SNMP host:

```
Switch(config)# snmp-server host 255.0.0.0 traps version 1 test
```

### Restrictions

The maximum number of SNMP hosts is 16.

---

## snmp-server location

Sets the name of the system location.

### Syntax

**[no] snmp-server location** <*string*>

where:

| Parameter     | Description                  |
|---------------|------------------------------|
| <i>string</i> | Name of the system location. |

Using **no** before the command removes a specified name.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set a SNMP server location:

```
Switch(config)# snmp-server location test
```

---

## snmp-server tcp-session

Enables or disables SNMP TCP session authentication.

### Syntax

```
[no] snmp-server tcp-session
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable TCP session:

```
Switch(config)# snmp-server tcp-session
```

---

## snmp-server trap vrf

Configures the Virtual Routing and Forwarding (VRF) instances used for SNMP notifications.

By default, SNMP notifications are sent through all VRF instances.

### Syntax

**[no] snmp-server trap vrf {default|management|all}**

where:

| Parameter         | Description  |
|-------------------|--|
| <b>default</b>    | Sets the data port as trap source.                       |
| <b>management</b> | Sets the management port as trap source.                 |
| <b>all</b>        | Sets both data port and management port as trap sources. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following shows how to set the management port as trap source:

```
Switch(config)# snmp-server trap vrf management
```

---

## snmp-server user

Sets a user security model (USM) entry for an authorized user.

### Syntax

```
[no] snmp-server user <name> [auth{md5|sha} {<password> priv  
{des|aes} <private password>}]
```

```
[no] snmp-server user <name> [network-admin [auth{md5|sha}  
{<password> priv {des|aes} <private password>}]]
```

```
[no] snmp-server user <name> [network-operator [auth{md5|sha}  
{<password> priv {des|aes} <private password>}]]
```

where:

| Parameter                              | Description  |
|--|--|
| <i>name</i>                            | User name.   |
| <b>auth</b>                            | Sets the authentication protocol.  |
| <b>md5 sha</b>                         | Available authentication protocols: <ul style="list-style-type: none"><li>● md5</li><li>● sha</li></ul>  |
| <i>password</i>                        | Password.  |
| <b>priv</b>                            | Type of privacy protocol.  |
| <b>des aes</b> <i>private password</i> | Available privacy protocols: <ul style="list-style-type: none"><li>● des (CBC-DES Symmetric Encryption Protocol)</li><li>● aes (AES-128 Advanced Encryption Standard Protocol)</li></ul> |

Using **no** before the command disable a user.

### Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to set a user:

```
Switch(config)# snmp-server user tester auth md5 1qazxsw2#EDC priv aes  
pl,mko09i1JN
```

---

## snmp-server view

Sets a SNMP view.

### Syntax

```
[no] snmp-server view <name> OID-TREE {excluded|included}
```

where:

| Parameter       | Description              |
|-----------------|--------------------------|
| <name>          | Name of the view.        |
| <b>excluded</b> | Specify view to exclude. |
| <b>included</b> | Specify view to include. |

Using **no** before the command removes a specified view.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set a SNMP view:

```
Switch(config)# snmp-server view test OID-TREE excluded
```



---

## spanning-tree mode

Enables or disables Multiple Spanning Tree (MST) mode or Rapid per-VLAN Spanning Tree protocol (RPVST+) mode.

### Syntax

**spanning-tree mode {disable|mst|rapid-pvst}**

**no spanning-tree mode**

where:

| Parameter         | Description          |
|-------------------|----------------------|
| <b>disable</b>    | Disables STP mode.   |
| <b>mst</b>        | Enables MST mode.    |
| <b>rapid-pvst</b> | Enables RPVST+ mode. |

Using **no** before the command restores the default settings.

### Modes

Global Configuration Mode

### History

| Release | Modification                          |
|---------|---------------------------------------|
| 10.1    | The command was introduced.           |
| 10.2    | Added <code>rapid-pvst</code> option. |

### Example

The following shows how to enable MST mode:

```
Switch(config)# spanning-tree mode mst
```

### Restrictions

When you select the `disable` option, the switch globally turns Spanning Tree off. All ports are placed into forwarding state. Any BPDU's received are flooded.

---

## spanning-tree pathcost

Calculates default port path cost.

### Syntax

**[no] spanning-tree pathcost method {long|short}**

where:

| Parameter    | Description                                      |
|--------------|--|
| <b>long</b>  | 32 bit based values for default port path costs. |
| <b>short</b> | 16 bit based values for default port path costs. |

Using **no** before the command turns off this feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to calculate default path cost:

```
Switch(config)# spanning-tree pathcost method long
```

### Restrictions

When you are using MST spanning tree mode, the switch uses only the long method for calculating path cost.

---

## spanning-tree mst priority

Configures the bridge priority for the specified MSTP instance. The bridge priority parameter controls which bridge on the network is the MSTP root bridge. To make this switch the root bridge, configure the bridge priority lower than all other switches and bridges on your network. The lower the value, the higher the bridge priority.

### Syntax

**[no] spanning-tree mst** *<range>* **priority** *<number>*

where:

| Parameter                             | Description   |
|---------------------------------------|---|
| <i>&lt;range&gt;</i>                  | MST instance range (ranges from 0 to 64).   |
| <b>priority</b> <i>&lt;number&gt;</i> | Bridge priority number. The range is 0 to 61440, in steps of 4096 (0, 4096, 8192, 12288 ...). The default value is 32768. |

Using **no** before the command removes a previous configured instance bridge priority.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set an instance bridge priority:

```
Switch(config)# spanning-tree mst 7-9 priority 8192
```

---

## spanning-tree mst forward-time

Configures the forward delay time in seconds. The forward delay parameter specifies the amount of time that a bridge port has to wait before it changes from the discarding and learning states to the forwarding state.

### Syntax

**[no] spanning-tree mst forward-time** <value>

where:

| Parameter | Description   |
|-----------|---|
| <value>   | Number of seconds for the forward delay timer (a number from 4 to 30). The default value is 15. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure forward time:

```
Switch(config)# spanning-tree mst forward-time 30
```

---

## spanning-tree mst hello-time

Configures the port Hello time. The Hello time specifies how often the bridge transmits a configuration bridge protocol data unit (BPDU). Any bridge that is not the root bridge uses the root bridge Hello value.

### Syntax

**spanning-tree mst hello-time** *<value>*

**no spanning-tree mst hello-time**

where:

| Parameter            | Description   |
|----------------------|---|
| <i>&lt;value&gt;</i> | Number of seconds for the hello BPDU time interval (a number from 1 to 10). The default value is 2. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure hello time interval:

```
Switch(config)# spanning-tree mst hello-time 10
```

---

## spanning-tree mst max-age

Configures the maximum age interval in seconds. The maximum age parameter specifies the maximum time the bridge waits without receiving a configuration bridge protocol data unit before it reconfigures the MSTP network.

### Syntax

**spanning-tree mst max-age** *<value>*

**no spanning-tree mst max-age**

where:

| Parameter            | Description  |
|----------------------|--|
| <i>&lt;value&gt;</i> | Number of seconds for the hello BPDU time interval (a number from 6 to 40). The default value is 20. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the maximum age interval:

```
Switch(config)# spanning-tree mst max-age 30
```

---

## spanning-tree mst max-hops

Configures the maximum number of bridge hops a packet may traverse before it is dropped.

### Syntax

**[no] spanning-tree mst max-hops** *<value>*

where:

| Parameter            | Description  |
|----------------------|--|
| <i>&lt;value&gt;</i> | Maximum number of hops the BPDU is valid for all MST instance (a number from 1 to 255). The default value is 20. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the maximum number of bridge hops:

```
Switch(config)# spanning-tree mst max-hops 100
```

---

## spanning-tree vlan forward-time

Configures the forward delay time in seconds. The forward delay parameter specifies the amount of time that a bridge port has to wait before it changes from the discarding and learning states to the forwarding state.

### Syntax

**[no] spanning-tree vlan** *<VLAN number>* **forward-time** *<value>*

where:

| Parameter            | Description   |
|----------------------|---|
| <i>VLAN number</i>   | The VLAN number. Range is from 1 to 4094.   |
| <i>&lt;value&gt;</i> | Number of seconds for the forward delay timer (a number from 4 to 30). The default value is 15. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following shows how to configure forward time:

```
Switch(config)# spanning-tree vlan 2 forward-time 30
```



---

## spanning-tree vlan hello-time

Configures the port Hello time. The Hello time specifies how often the bridge transmits a configuration bridge protocol data unit (BPDU). Any bridge that is not the root bridge uses the root bridge Hello value.

### Syntax

**[no] spanning-tree vlan** <VLAN number> **hello-time** <value>

where:

| Parameter          | Description   |
|--------------------|---|
| <i>VLAN number</i> | The VLAN number. Range is from 1 to 4094.   |
| <value>            | Number of seconds for the hello BPDU time interval (a number from 1 to 10). The default value is 2. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following shows how to configure hello time interval:

```
Switch(config)# spanning-tree vlan 4 hello-time 10
```

---

## spanning-tree vlan max-age

Configures the maximum age interval in seconds. The maximum age parameter specifies the maximum time the bridge waits without receiving a configuration bridge protocol data unit before it reconfigures the RPVST+ network.

### Syntax

**[no] spanning-tree vlan** *<VLAN number>* **max-age** *<value>*

where:

| Parameter            | Description  |
|----------------------|--|
| <i>VLAN number</i>   | The VLAN number. Range is from 1 to 4094.  |
| <i>&lt;value&gt;</i> | Number of seconds for the hello BPDU time interval (a number from 6 to 40). The default value is 20. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following shows how to configure the maximum age interval:

```
Switch(config)# spanning-tree vlan 5 max-age 30
```

---

## spanning-tree vlan priority

Configures the bridge priority for the specified RPVST+ instance. The bridge priority parameter controls which bridge on the network is the RPVST+ root bridge. To make this switch the root bridge, configure the bridge priority lower than all other switches and bridges on your network. The lower the value, the higher the bridge priority.

### Syntax

**[no] spanning-tree vlan** <VLAN number> **priority** <number>

where:

| Parameter                | Description   |
|--------------------------|---|
| <i>VLAN number</i>       | The VLAN number. Range is from 1 to 4094.   |
| <b>priority</b> <number> | Bridge priority number. The range is 0 to 61440, in steps of 4096 (0, 4096, 8192, 12288 ...). The default value is 32768. |

Using **no** before the command removes a previous configured instance bridge priority.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following shows how to set an instance bridge priority:

```
Switch(config)# spanning-tree vlan 3 priority 8192
```

---

## ssh key

Configures SSH keys.

### Syntax

```
[no] ssh key {dsa|rsa [length <value>]} [force]
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <b>dsa</b>            | Generates SSH server DSA keys.                           |
| <b>rsa</b>            | Generates SSH server RSA keys.                           |
| <b>length</b> <value> | Force key generation length (a number from 768 to 2048). |
| <b>force</b>          | Forces key generation.                                   |

Using **no** before the command removes a SSH key.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure a SSH key:

```
Switch(config)#ssh key dsa force
```

---

## ssh login-attempts

Sets the number of failed login attempts before disconnecting the user.

### Syntax

**[no] ssh login-attempts** <retries>

where:

| Parameter | Description   |
|-----------|---|
| <retries> | Number of retries (a value from 1 to 10). The default value is 3. |

Using **no** before the command restores the default settings.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure a maximum number of login attempts:

```
Switch(config)# ssh login-attempts 5
```

---

## ssh server

Sets the SSH server port number.

### Syntax

**ssh server port** *<port number>*

where:

| Parameter                  | Description                                       |
|----------------------------|---|
| <i>&lt;port number&gt;</i> | SSH server port number (a value from 1 to 65535). |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following show how to configure SSH port number:

```
Switch(config)# ssh server port 10
```

---

## startup image

Configures the software image to be booted on the next switch reload.

### Syntax

```
startup image {active|onie-image {install|rescue|uninstall|update}|standby}
```

where:

| Parameter                   | Function   |
|-----------------------------|--|
| <b>active</b>               | On the next reload, the switch will boot using the active image.                         |
| <b>onie-image install</b>   | On the next reload, the switch will boot using the ONIE image in ONIE OS installer mode. |
| <b>onie-image rescue</b>    | On the next reload, the switch will boot using the ONIE image in ONIE rescue mode.       |
| <b>onie-image uninstall</b> | On the next reload, the switch will boot using the ONIE image in ONIE OS uninstall mode. |
| <b>onie-image update</b>    | On the next reload, the switch will boot using the ONIE image in ONIE self update mode.  |
| <b>standby</b>              | On the next reload, the switch will boot using the standby image.                        |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures the switch to boot using the standby image on the next reload:

```
Switch(config)# startup image standby
```

---

## startup zerotouch force

Enables Zero Touch Provisioning (ZTP) mode on the next switch reload. The switch is automatically provisioning itself using the resources available on the network, without any manual intervention.

### Syntax

**startup zerotouch force {disable|enable}**

**no startup zerotouch force**

where:

| Parameter | Function  |
|-----------|---|
| disable   | On the next reload, the switch will disable ZTP mode. |
| enable    | On the next reload, the switch will enable ZTP mode.  |

Using **no** before the command restores the default ZTP settings.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command enables ZTP mode:

```
Switch(config)# startup zerotouch force enable
```



---

## system cores

Enables users to retrieve the core dump files from the switch.

### Syntax

```
[no] system cores <tftp url> vrf [management|default]
```

where:

| Parameter  | Description                                       |
|------------|---|
| <tftp url> | URL link location (tftp://server[:port]][/path]). |

Using **no** before the command turns off this feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable retrieving the core dumb files:

```
Switch(config)# system cores tftp://10.188.71.14/ vrf management
```

---

## system service-led operational-enable

Enables (on) or disables (off) the Service Required LED to glow in steady blue to locate the device.

### Syntax

**[no] system service-led operational-enable**

Using **no** before the command turns off the feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable service led:

```
Switch(config)# system service-led operational-enable
```

---

## tacacs-server host

Specifies a TACACS+ authentication server.

### Syntax

**tacacs-server host** {<IPv4 address>|<IPv6 address>|<hostname>} [**key** [0|7] <key string>] [**port** <server port>]

**no tacacs-server host** {<IPv4 address>|<IPv6 address>|<hostname>}

where:

| Parameter                      | Description   |
|--------------------------------|---|
| <i>IPv4 address</i>            | The IPv4 address of the TACACS+ server.   |
| <i>IPv6 address</i>            | The IPv6 address of the TACACS+ server.   |
| <i>hostname</i>                | The hostname of the TACACS+ server.   |
| <b>key</b> <i>key string</i>   | The key used when communicating with the configured TACACS+ server. The <i>key string</i> can be up to 63 characters. |
| <b>0</b>                       | The key is not encrypted.   |
| <b>7</b>                       | The key is encrypted.   |
| <b>port</b> <i>server port</i> | The port used to connect to the TACACS+ server. The <i>server port</i> is from 1 to 65535.                            |

Using the **no** form of the command deletes the specified TACACS+ server.

### Modes

Global Configuration Mode

### History

| Release | Modification                  |
|---------|-------------------------------|
| 10.1    | The command was introduced.   |
| 10.4    | Added <i>hostname</i> option. |

## Example

The following shows how to set a TACACS+ host:

```
Switch(config)# tacacs-server host 255.0.0.0 key 7 test
```

## Restrictions

You can configure up to four TACACS+ servers.

---

## tacacs-server key

Configures a global TACACS+ encryption or decryption key.

### Syntax

**tacacs-server key [0|7] <word>**

**no tacacs-server key**

where:

| Parameter | Description   |
|-----------|---|
| <b>0</b>  | Default clear text password.  |
| <b>7</b>  | Default encrypted text password.  |
| <word>    | TACACS password name. The password length can be up to 63 characters, only lowercase letters and numbers and it must start with a letter. |

Using **no** before the command removes previous settings.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set default TACACS key properties:

```
Switch(config)# tacacs-server key 0 test
```

### Restrictions

This is a global configuration value for all TACACS+ servers. This value will be overwritten by **tacacs-server host key** command.

---

## telemetry controller ip

Configures the telemetry controller by specifying its IP address, TCP port, and the Virtual Routing and Forwarding (VRF) instance used to reach the controller.

### Syntax

```
telemetry controller ip <IPv4 address> port <TCP port> [vrf  
{default|management}]
```

where:

| Parameter                   | Description   |
|-----------------------------|---|
| <i>IPv4 address</i>         | The IPv4 address of the telemetry controller.   |
| <b>port</b> <i>TCP port</i> | Configures the TCP port used by the telemetry controller. The TCP port is an integer from 1 to 65535. |
| <b>vrf default</b>          | Associates the telemetry controller with the default VRF instance.                                    |
| <b>vrf management</b>       | Associates the telemetry controller with the management VRF instance.                                 |

The following command deletes the previously configured telemetry controller:

```
no telemetry controller
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command configures the telemetry controller's IP address to 10.125.89.15 and the TCP port to 2488:

```
Switch(config)# telemetry controller ip 10.125.89.15 port 2488
```

---

## telemetry controller protocol https

Enables or disables the telemetry agent to use the Hypertext Transfer Protocol Secure (HTTPS) instead of HTTP when communicating with the remote controller.

### Syntax

```
[no] telemetry controller protocol https
```

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command enables the telemetry agent to use HTTPS when communicating with the remote controller:

```
Switch(config)# telemetry controller protocol https
```

---

## telemetry controller username

Configures a user (username and password pair) to be used by the telemetry agent to authenticate with the remote controller through basic authentication mechanisms.

### Syntax

```
telemetry controller username <username> password [encrypted]  
<password>
```

where:

| Parameter        | Description   |
|------------------|---|
| <i>username</i>  | The name of the user used to authenticate with the remote telemetry controller. |
| <b>encrypted</b> | The configured password will be encrypted.                                      |
| <i>password</i>  | The password used to authenticate with the remote telemetry controller.         |

The following command deletes the previously configured user:

```
no telemetry controller user
```

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command creates a user for the telemetry agent to use to authenticate with the remote controller:

```
Switch(config)# telemetry controller username User1 password Pass1
```



---

## telemetry heartbeat

Enables or disables the sending of heartbeat messages to the configured controller and sets the time interval between these messages. The heartbeat messages allow collectors to learn about the switches present in the network.

**Note:** Even if this service is enabled on the switch, the device will not send heartbeat messages if there are no telemetry controllers configured.

## Syntax

```
telemetry heartbeat {enabled interval <heartbeat interval> | disabled}
```

where:

| Parameter                                 | Description   |
|---|---|
| <b>enabled</b>                            | Enables the sending of heartbeat messages to the configured telemetry controller.   |
| <b>interval</b> <i>heartbeat interval</i> | Configures the time interval between consecutive heartbeat messages. The <i>heartbeat interval</i> is an integer from 1 to 600 seconds. The default value is 5 seconds. |
| <b>disabled</b>                           | Disables the sending of heartbeat messages.   |

## Modes

Global Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command enables the sending of heartbeat messages with a frequency of one message every 20 seconds:

```
Switch(config)# telemetry heartbeat enabled interval 20
```

---

## telnet

Sets an optional Telnet server port number for cases where the server listens for Telnet sessions on a non-standard port.

### Syntax

**telnet server port** *<port number>*

where:

| Parameter                  | Description                                   |
|----------------------------|---|
| <i>&lt;port number&gt;</i> | Telnet port number (a value from 1 to 65535). |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to set an optional telnet connection:

```
Switch(config)# telnet server port 55
```

---

## username

Adds or modifies user with a specified role or password.

## Syntax

```
[no] username <username> [password [encrypted] <password>] [role {network-admin|network-operator}]
```

```
no username <username>
```

where:

| Parameter                       | Description   |
|---------------------------------|---|
| <i>username</i>                 | The name of the user. The <i>username</i> must be between 2 and 28 characters in length.  |
| <b>password</b> <i>password</i> | The password associated with the specified username. The <i>password</i> must be between 8 and 80 characters in length.<br><b>Note:</b> If history checking is enabled, the entered password must be different from the last four used passwords. |
| <b>encrypted</b>                | Specifies that the password is encrypted.   |
| <b>role</b>                     | Role assigned to the user. The default is <code>network-operator</code> .   |

Using **no** before the command deletes the specified user and all associated passwords.

## Modes

Global Configuration Mode

## History

| Release | Modification                           |
|---------|--|
| 10.1    | The command was introduced.            |
| 10.2    | Password checking mechanism was added. |

## Example

The following shows how to create a new user:

```
Switch(config)# username admin35 password passAdmin35 role network-admin
```

## Related Commands

| Command  | Description                            |
|--|--|
| <a href="#">password</a><br><a href="#">history-checking</a> | Enables or disables password tracking. |

---

## vlag auto-recovery

Sets the duration in seconds of the auto-recovery timer. This timer configures how long after boot-up configuration load, the switch can assume the Primary role from an unresponsive ISL peer and bring up the vLAG ports.

### Syntax

**[no] vlag auto-recovery** *<value>*

where:

| Parameter            | Description  |
|----------------------|--|
| <i>&lt;value&gt;</i> | Time interval, in seconds (an integer from 240 to 3600). The default value is 300 seconds. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the auto-recovery value:

```
Switch(config)# vlag auto-recovery 1000
```

---

## vlag config-consistency disable

Disables or enables vLAG peers inconsistency check.

By default, this setting is enabled on the switch.

### Syntax

**[no] vlag config-consistency disable**

Using **no** before the command enables the feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command enables vLAG configuration consistency check:

```
Switch(config)# no vlag config-consistency disable
```

---

## vlag config-consistency strict

Enables or disables strict configuration consistency checking.

By default, this feature is disabled.

**Note:** Using this command, low priority items act as high priority items.

### Syntax

```
[no] vlag config-consistency strict
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command enables strict mode:

```
Switch(config)# vlag config-consistency strict
```

---

## vlag enable

Enables or disables vLAG globally.

### Syntax

**[no] vlag enable**

Using **no** before the command turns off the feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following enables vLAG:

```
Switch(config)# vlag enable
```



---

## vlag h1thchk keepalive-attempts

Sets the number of vLAG keep alive attempts.

### Syntax

**[no] vlag h1thchk keepalive-attempts** <value>

where:

| Parameter    | Description  |
|--------------|--|
| <i>value</i> | Number of keepalive attempts made before declaring the peer is down (a number from 1 to 24). The default value is 3. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the number of vLAG keep alive attempts:

```
Switch(config)# vlag h1thchk keepalive-attempts 10
```

---

## vlag hltchk keepalive-interval

Sets, in seconds, the time between vLAG keep alive attempts.

### Syntax

**[no] vlag hltchk keepalive-interval** *<value>*

where:

| Parameter            | Description  |
|----------------------|--|
| <i>&lt;value&gt;</i> | Time interval, in seconds (a number from 2 to 300).<br>The default value is 5. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the keep alive interval:

```
Switch(config)# vlag hltchk keepalive-interval 100
```

---

## vlag h1thchk peer-ip

Configures the IP address of the peer switch, used for health checks. Use the management IP address of the peer switch.

### Syntax

```
[no] vlag h1thchk peer-ip {<ipv4 address> | <ipv6 address>}
```

where:

| Parameter      | Description                               |
|----------------|---|
| <ipv4 address> | IPv4 address for health check connection. |
| <ipv6 address> | IPv6 address for health check connection. |

Using **no** before the command removes previous settings.

### Modes

Global Configuration Mode

### History

| Release | Modification                           |
|---------|--|
| 10.1    | The command was introduced.            |
| 10.2    | The <ipv6 address> argument was added. |

### Example

The following sets the IPv4 address for health check connection:

```
Switch(config)# vlag h1thchk peer-ip 1.1.1.1
```

---

## vlag hltchck retry-interval

Sets, in seconds, the vLAG health check connect retry interval.

### Syntax

**[no] vlag hltchck retry-interval** *<value>*

where:

| Parameter            | Description   |
|----------------------|---|
| <i>&lt;value&gt;</i> | Time interval, in seconds (a number from 1 to 300).<br>The default value is 30. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure retry interval:

```
Switch(config)# vlag hltchck retry-interval 100
```

---

## vlag instance

Configures vLAG instance parameters.

### Syntax

```
[no] vlag instance <vLAG number> {enable|port-aggregation <LAG number>}
```

where:

| Parameter               | Description                                   |
|-------------------------|---|
| <vLAG number>           | vLAG instance number (a number from 1 to 64). |
| <b>enable</b>           | Enables vLAG instance.                        |
| <b>port-aggregation</b> | Attaches vLAG instance to a LAG.              |
| <LAG number>            | LAG identifier (a number from 1 to 4096).     |

Using **no** before the command turns off this feature or removes previous settings.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable vLAG instance:

```
Switch(config)# vlag instance 1 port-aggregation 1000
Switch(config)# vlag instance 1 enable
```

---

## vlag isl

Enables vLAG Inter-Switch Link (ISL) on the selected LAG.

### Syntax

**[no] vlag isl port-aggregation** <LAG number>

where:

| Parameter    | Description                               |
|--------------|---|
| <LAG number> | LAG identifier (a number from 1 to 4096). |

Using **no** before the command removes previous settings.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable vLAG ISL:

```
Switch(config)# vlag isl port-aggregation 100
```

---

## vlag mac-address-table refresh

Enables or disables the periodic check of the aging status of synchronized Forwarding Database (FDB) entries. When a MAC address is marked for removal from the FDB table, the entry is reinstalled instead.

By default, the feature is enabled.

### Syntax

**[no] vlag mac-address-table refresh**

Using **no** before the command turns off the feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable periodic check:

```
Switch(config)# vlag mac-address-table refresh
```

### Restrictions

This option takes effect only if the aging value for FDB entries is set to 40 seconds or more.

---

## vlag peer-gateway

Enables or disables vLAG Peer Gateway. When enabled, a vLAG switch acts as the active gateway for packets addressed to its vLAG peer.

By default, vLAG Peer Gateway is disabled.

### Syntax

**[no] vlag peer-gateway**

Using **no** before the command disables the feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following shows how to enable vLAG peer gateway:

```
Switch(config)# vlag peer-gateway
```



---

## vlag priority

Configures the vLAG priority for the switch, used for election of Primary and Secondary vLAG switches. The switch with lower priority is elected to the role of Primary vLAG switch.

### Syntax

**[no] vlag priority** <priority value>

where:

| Parameter        | Description   |
|------------------|---|
| <priority value> | vLAG priority value (a number from 0 to 65535). The default value is 0. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure vLAG priority:

```
Switch(config)# vlag priority 50
```

---

## vlag startup-delay

Sets the vLAG startup delay interval.

### Syntax

**[no] vlag startup-delay** *<delay value>*

where:

| Parameter                  | Description   |
|----------------------------|---|
| <i>&lt;delay value&gt;</i> | Delay time, in seconds (a number from 0 to 3600). The default value is 120. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets vLAG startup delay interval:

```
Switch(config)# vlag startup-delay 1000
```

---

## vlag tier-id

Sets the vLAG tier ID.

### Syntax

**[no] vlag tier-id** <value>

where:

| Parameter | Description  |
|-----------|--|
| <value>   | vLAG tier-id value (a number from 1 to 512). The default value is 0. |

Using **no** before the command restores the default setting.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure a vLAG tier-id value:

```
Switch(config)# vlag tier-id 100
```

---

## vlag vrrp active

Configures all vLAG related VRRP domains to forward L3 traffic.

By default, this feature is enabled.

### Syntax

```
[no] vlag vrrp active
```

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following shows how to enable vLAG VRRP passive mode on the switch:

```
Switch(config)# no vlag vrrp active
```

---

## vlan access-map

Configures VLAN access-maps.

### Syntax

**[no] vlan access-map** <name>

where:

| Parameter | Description             |
|-----------|-------------------------|
| <name>    | Name of the access-map. |

Using **no** before the command turns off the feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure VLAN access-map named **test**:

```
Switch(config)# vlan access-map test
```

---

## vlan dot1q tag native

Disables or enables VLAN tag persistence. When disabled, the VLAN tag is removed at egress from packets whose VLAN tag matches the port PVID/Native-vlan.

The default setting is disabled.

### Syntax

```
[no] vlan dot1q tag native [egress-only]
```

where:

| Parameter          | Description                                  |
|--------------------|--|
| <b>egress-only</b> | Enables tag native VLAN only on egress-side. |

Using **no** before the command disables this feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable VLAN tag persistence:

```
Switch(config)# vlan dot1q tag native
```

---

## vlan filter

Configures VLAN access map filtering.

### Syntax

**[no] vlan filter** *<name>* **vlan-list** *<vlan id or range>*

where:

| Parameter                       | Description                  |
|---------------------------------|------------------------------|
| <i>&lt;name&gt;</i>             | Name of the VLAN access-map. |
| <i>&lt;vlan id or range&gt;</i> | VLAN ID or range.            |

Using **no** before the command turns off this feature.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure VLAN access-map filtering:

```
Switch(config)# vlan filter testAccessMap vlan-list 2
```

---

## vrf context

Virtual routing and forwarding (VRF) allows multiple instances of a routing table to exist in a router and work simultaneously.

### Syntax

**vrf context {default|management}**

where:

| Parameter         | Description   |
|-------------------|---|
| <b>default</b>    | Default VRF. For data interfaces, a default VRF with ID 0 is created and associated with default FIB. All data IP interfaces are attached to default VRF. |
| <b>management</b> | Management VRF. By default, a VRF with ID1 is created.  |

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable management VRF:

```
Switch(config)# vrf context management
Switch(config-vrf)#
```



---

## Chapter 5. Interface Mode Commands

These commands enter you into an advanced configuration mode for the selected interface type.

---

## interface

Enter the Interface Configuration Mode.

### Syntax

```
interface {<interface name>|ethernet <chassis number/port number>|  
loopback <loopback interface>|mgmt 0|port-aggregation <LAG number>|  
vlan <VLAN ID>}
```

where:

| Parameter   | Function   |
|---|--|
| <i>interface name</i>                             | Enters Interface Configuration mode for the named ethernet interface.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Enters Interface Configuration mode for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Enters Interface Configuration mode for the specified loopback interface (an integer from 0-7).  |
| <b>mgmt 0</b>                                     | Enters Interface Configuration mode for the specified management interface (0).  |
| <b>port-aggregation</b> <i>LAG number</i>         | Enters Interface Configuration mode for the specified LAG (an integer from 1-4096).  |
| <b>vlan</b> <i>VLAN ID</i>                        | Enters Interface Configuration mode for the specified VLAN (an integer from 1-3999).   |

### Mode

Global Command Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enters interface command mode for LAG 4001:

```
Switch(config)# interface port-aggregation 4001  
Switch(config-if)#
```

## Restrictions

If you use **interface** *<interface name>*, the command will not work unless the interface with that name exists.

## Related Commands

| Command          | Description               |
|------------------|---------------------------|
| configure device | Enter Configuration Mode. |

---

## aggregation-group

Assigns the interface to a Link Aggregation Group (LAG).

### Syntax

**aggregation-group** <LAG number> **mode** {**active**|**on**|**passive**}

**no aggregation-group**

where:

| Parameter         | Description   |
|-------------------|---|
| <i>LAG number</i> | The LAG to which to assign the current interface. The <i>LAG number</i> is an integer from 1 to 4096. |
| <b>mode</b>       | Configures the aggregation mode of the interface.   |
| <b>active</b>     | Enables Link Aggregation Control Protocol (LACP) on the current LAG.                                  |
| <b>on</b>         | Disables LACP on the current LAG.   |
| <b>passive</b>    | Enables LACP on the current LAG only if an LACP device is detected at the other end of the link.      |

Using **no** before the command with no other arguments removes the interface from the LAG.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command assigns the current interface to LAG 1:

```
Switch(config-if)# aggregation-group 1 mode on
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## auto-policy enable

Enables or disables automatic policy provisioning on the current interface. The policy elements include VLAN, Access Control Lists (ACLs), and Quality of Service (QoS).

By default, the automatic policy provisioning is disabled.

### Syntax

**[no] auto-policy enable**

Using **no** before the command disables automatic policy provisioning.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command enables automatic policy provisioning on the interface:

```
Switch(config-if)# auto-policy enable
```

---

## bfd authentication keyed-md5

Configures Bidirectional Forwarding Detection (BFD) with keyed message digest authentication.

### Syntax

```
[no] bfd [ipv4|ipv6] authentication keyed-md5 {key-chain  
<key chain name>|key-id <key ID> key <authentication key string>}
```

where:

| Parameter                                   | Description   |
|---|---|
| <b>ipv4</b>                                 | Configures only IPv4 BFD sessions.  |
| <b>ipv6</b>                                 | Configures only IPv6 BFD sessions.  |
| <b>key-chain</b> <i>key chain name</i>      | Configures an authentication key-chain.   |
| <b>key-id</b> <i>key ID</i>                 | Configures the ID of the authentication key. The <i>key ID</i> is an integer from 0 to 255. |
| <b>key</b> <i>authentication key string</i> | Configures the authentication key string.   |

Using **no** before the command turns off keyed message digest authentication.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Examples

The following command configures BFD for a keyed MD5 key-chain:

```
Switch(config-if)# bfd authentication keyed-md5 key-chain myKeyChain
```

The following command configures BFD for keyed MD5 authentication key with the key ID 12:

```
Switch(config-if)# bfd authentication keyed-md5 key-id 12 key myKeyString
```

---

## bfd authentication keyed-sha1

Configures Bidirectional Forwarding Detection (BFD) with keyed Secure Hash Algorithm I authentication.

### Syntax

```
[no] bfd [ipv4|ipv6] authentication keyed-sha1 {key-chain  
<key chain name>|key-id <key ID> key <authentication key string>}
```

where:

| Parameter                                   | Description   |
|---|---|
| <b>ipv4</b>                                 | Configures only IPv4 BFD sessions.  |
| <b>ipv6</b>                                 | Configures only IPv6 BFD sessions.  |
| <b>key-chain</b> <i>key chain name</i>      | Configures an authentication key-chain.   |
| <b>key-id</b> <i>key ID</i>                 | Configures the ID of the authentication key. The <i>key ID</i> is an integer from 0 to 255. |
| <b>key</b> <i>authentication key string</i> | Configures the authentication key string.   |

Using **no** before the command turns off keyed Secure Hash Algorithm authentication.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Examples

The following configures BFD for a keyed SHA1 authentication key-chain:

```
Switch(config-if)# bfd authentication keyed-sha1 key-chain myKeyChain
```

The following command configures BFD for keyed SHA1 authentication key with the key ID 12:

```
Switch(config-if)# bfd authentication keyed-sha1 key-id 12 key KeyString
```

---

## bfd authentication meticulous-keyed-md5

Configures Bidirectional Forwarding Detection (BFD) with meticulous keyed Message Digest authentication.

### Syntax

```
[no] bfd [ipv4|ipv6] authentication meticulous-keyed-md5  
{key-chain <key chain name>|key-id <key ID> key <authentication key  
string>}
```

where:

| Parameter                                   | Description   |
|---|---|
| <b>ipv4</b>                                 | Configures only IPv4 BFD sessions.  |
| <b>ipv6</b>                                 | Configures only IPv6 BFD sessions.  |
| <b>key-chain</b> <i>key chain name</i>      | Configures an authentication key-chain.   |
| <b>key-id</b> <i>key ID</i>                 | Configures the ID of the authentication key. The <i>key ID</i> is an integer from 0 to 255. |
| <b>key</b> <i>authentication key string</i> | Configures the authentication key string.   |

Using **no** before the command turns off meticulous keyed Message Digest authentication.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |



## Examples

The following configures BFD for a meticulous keyed MD5 authentication key-chain:

```
Switch(config-if)# bfd authentication meticulous-keyed-md5 key-chain  
mykeychain
```

The following command configures BFD for meticulous keyed MD5 authentication key with the key ID 120:

```
Switch(config-if)# bfd authentication meticulous-keyed-md5 key-id 120 key  
mystring
```

---

## bfd authentication meticulous-keyed-sha1

Configures Bidirectional Forwarding Detection (BFD) with meticulous keyed Secure Hash Algorithm authentication.

### Syntax

```
[no] bfd [ipv4|ipv6] authentication meticulous-keyed-sha1  
{key-chain <key chain name>|key-id <key ID> key <authentication key  
string>}
```

where:

| Parameter                                   | Description   |
|---|---|
| <b>ipv4</b>                                 | Configures only IPv4 BFD sessions.  |
| <b>ipv6</b>                                 | Configures only IPv6 BFD sessions.  |
| <b>key-chain</b> <i>key chain name</i>      | Configures an authentication key-chain.   |
| <b>key-id</b> <i>key ID</i>                 | Configures the ID of the authentication key. The <i>key ID</i> is an integer from 0 to 255. |
| <b>key</b> <i>authentication key string</i> | Configures the authentication key string.   |

Using **no** before the command turns off meticulous keyed Secure Hash Algorithm authentication.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Examples

The following configures BFD for a meticulous keyed SHA1 authentication key-chain:

```
Switch(config-if)# bfd authentication meticulous-keyed-sha1 key-chain  
mykeychain
```

The following command configures BFD for meticulous keyed SHA1 authentication key with the key ID 120:

```
Switch(config-if)# bfd authentication meticulous-keyed-sha1 key-id 120  
key mystring
```

---

## bfd authentication simple

Configures Bidirectional Forwarding Detection (BFD) with simple password authentication.

### Syntax

```
[no] bfd [ipv4|ipv6] authentication simple {key-chain <key chain name>|key-id <key ID> key <authentication key string>}
```

where:

| Parameter                                   | Description   |
|---|---|
| <b>ipv4</b>                                 | Configures only IPv4 BFD sessions.  |
| <b>ipv6</b>                                 | Configures only IPv6 BFD sessions.  |
| <b>key-chain</b> <i>key chain name</i>      | Configures an authentication key-chain.   |
| <b>key-id</b> <i>key ID</i>                 | Configures the ID of the authentication key. The <i>key ID</i> is an integer from 0 to 255. |
| <b>key</b> <i>authentication key string</i> | Configures the authentication key string.   |

Using **no** before the command turns off simple password authentication.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Examples

The following configures BFD for a simple authentication key-chain:

```
Switch(config-if)# bfd authentication simple key-chain mykeychain
```

The following command configures BFD for a simple authentication key with the key ID 120:

```
Switch(config-if)# bfd authentication simple key-id 120 key mystring
```

---

## bfd echo

Puts the BFD session into echo mode.

### Syntax

**[no] bfd [ipv4|ipv6] echo**

where:

| Parameter   | Description                        |
|-------------|------------------------------------|
| <b>ipv4</b> | Configures only IPv4 BFD sessions. |
| <b>ipv6</b> | Configures only IPv6 BFD sessions. |

Using **no** before the command turns off echo mode.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command puts the BFD session into echo mode:

```
Switch(config-if)# bfd echo
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bfd interval

Sets the BFD transmit interval, minimum receive interval, and hello multiplier.

### Syntax

```
[no] bfd [ipv4|ipv6] interval <transmit interval> minrx <receive interval> multiplier <multiplier value>
```

where:

| Parameter                                 | Description  |
|---|--|
| <b>ipv4</b>                               | Configures only IPv4 BFD sessions.   |
| <b>ipv6</b>                               | Configures only IPv6 BFD sessions.   |
| <b>interval</b> <i>transmit interval</i>  | Configures the BFD transmit interval. The <i>transmit interval</i> is from 50 to 999 milliseconds.       |
| <b>minrx</b> <i>receive interval</i>      | Configures the BFD minimum receive interval. The <i>receive interval</i> is from 50 to 999 milliseconds. |
| <b>multiplier</b> <i>multiplier value</i> | Configures the BFD Hello multiplier. The <i>multiplier value</i> is an integer from 3 to 50.             |

Using **no** before the command restores the default settings.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the BFD transmit interval to 60 milliseconds with a minimum receive interval of 60 milliseconds and a Hello multiplier of 10:

```
Switch(config-if)# bfd interval 60 minrx 60 multiplier 10
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bfd neighbor

Configures a BFD neighbor.

### Syntax

```
[no] bfd neighbor src-ip <IP address> dest-ip <IP address>  
[multihop] [non-persistent] [admin-down]
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <b>src-ip</b>         | The source IP address of the BFD neighbor.   |
| <i>IP address</i>     | An IPv4 or IPv6 address.   |
| <b>dest-ip</b>        | The destination IP address of the BFD neighbor.  |
| <b>multi-hop</b>      | Multi-hop session.   |
| <b>non-persistent</b> | Non-persistent sessions will be removed from the running configuration after they go down. |
| <b>admin-down</b>     | Administrative shutdown of the session.  |

Using **no** before the command removes the neighbor.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the a BFD neighbor with the source IP address 10.32.4.55, the destination IP address 10.32.4.56, and designates it as a multi-hop, non-persistent session where the session admin is down:

```
Switch(config-if)# bfd neighbor src-ip 10.32.4.55 dest-ip 10.32.4.56  
multihop non-persistent admin-down
```

## Restrictions

The optional arguments `multihop`, `non-persistent`, and `admin-down` can be applied on the same line *only* if they are applied in the following order:

1. `multi-hop`
2. `non-persistent`
3. `admin-down`



---

## bridge-port access

Configures the access VLAN of the current interface.

### Syntax

**[no] bridge-port access vlan** <VLAN ID>

where:

| Parameter | Description   |
|-----------|---|
| VLAN ID   | Configures the specified VLAN as the access VLAN. The VLAN ID is an integer from 1 to 3999. |

Using **no** before the command with all but the last argument resets the VLAN ID to the default value.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures VLAN 2 as the access VLAN:

```
Switch(config-if)# bridge-port access vlan 2
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bridge-port mode

Configures the bridge-port mode for the current interface.

### Syntax

**[no] bridge-port mode {access|dot1q-tunnel|trunk}**

where:

| Parameter           | Description  |
|---------------------|--|
| <b>access</b>       | Configures bridge-port mode to port mode access for the interface.               |
| <b>dot1q-tunnel</b> | Configures bridge-port mode to port mode PVID Ingress Tagging for the interface. |
| <b>trunk</b>        | Configures bridge-port mode to port mode trunk for the interface.                |

Using **no** before the command with all but the last argument restores the trunking characteristics to default when interface is in trunk mode.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets bridge-port mode to port mode access for the interface:

```
Switch(config-if)# bridge-port mode access
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bridge-port mode dot1q-tunnel

Enables or disables PVID Ingress Tagging on a switch port.

By default, PVID Ingress Tagging is disabled.

### Syntax

```
[no] bridge-port mode dot1q-tunnel
```

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command enables PVID Ingress Tagging:

```
Switch(config-if)# bridge-port mode dot1q-tunnel
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bridge-port trunk allowed vlan

Sets the list of allowed VLANs in bridge-port trunk mode for the interface.

### Syntax

**[no] bridge-port trunk allowed vlan** <VLAN ID>

where:

| Parameter | Description  |
|-----------|--|
| VLAN ID   | The list of allowed VLANs for the interface when this port is in trunk mode. |

Using **no** before the command with all but the last argument clears all VLANs from the list of allowed VLANs when this port is in trunk mode.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the list of allowed VLANs in bridge-port trunk mode to 1-3 for the interface:

```
Switch(config-if)# bridge-port trunk allowed vlan 1-3
```

### Restrictions

The switch must be in trunk mode for this command to work.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bridge-port trunk allowed vlan add

Adds VLANs to the list of allowed VLANs in bridge-port trunk mode for the interface.

### Syntax

**bridge-port trunk allowed vlan add** <VLANs>

where:

| Parameter | Description   |
|-----------|---|
| VLANs     | The list of VLANs added to allowed VLANs for the interface when this port is in trunk mode. |

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds VLANs 4-6 to the list of allowed VLANs in bridge-port trunk mode for the interface:

```
Switch(config-if)# bridge-port trunk allowed vlan add 4-6
```

### Restrictions

The switch must be in trunk mode for this command to work.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bridge-port trunk allowed vlan all

Adds all VLANs to the list of allowed VLANs in bridge-port trunk mode for the interface.

### Syntax

```
bridge-port trunk allowed vlan all
```

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds all VLANs to the list of allowed VLANs in bridge-port trunk mode for the interface:

```
Switch(config-if)# bridge-port trunk allowed vlan all
```

### Restrictions

The switch must be in trunk mode for this command to work.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bridge-port trunk allowed vlan except

Adds all VLANs *except* for the specified VLANs to the list of allowed VLANs in bridge-port trunk mode for the interface.

### Syntax

**bridge-port trunk allowed vlan except** <VLANs>

where:

| Parameter | Description   |
|-----------|---|
| VLANs     | The list of VLANs that are not part of allowed VLANs for the interface when this port is in trunk mode. |

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds all VLANs except 4-6 to the list of allowed VLANs in bridge-port trunk mode for the interface:

```
Switch(config-if)# bridge-port trunk allowed vlan except 4-6
```

### Restrictions

The switch must be in trunk mode for this command to work.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## bridge-port trunk allowed vlan none

Allows no VLANs in bridge-port trunk mode for the interface.

### Syntax

```
bridge-port trunk allowed vlan none
```

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command allows no VLANs in bridge-port trunk mode for the interface:

```
Switch(config-if)# bridge-port trunk allowed vlan none
```

### Restrictions

The switch must be in trunk mode for this command to work.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## bridge-port trunk allowed vlan remove

Removes the specified VLANs from the list of allowed VLANs in bridge-port trunk mode for the interface.

### Syntax

**bridge-port trunk allowed vlan remove** <VLANs>

where:

| Parameter | Description   |
|-----------|---|
| VLANs     | The list of VLANs that are removed from allowed VLANs for the interface when this interface is in trunk mode. |

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command removes VLANs 4-6 from the list of allowed VLANs in bridge-port trunk mode for the interface:

```
Switch(config-if)# bridge-port trunk allowed vlan remove 4-6
```

### Restrictions

The switch must be in trunk mode for this command to work.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## cee dcbx enable

Enables or disables the Data Center Bridging eXchange (DCBX) protocol on the current switch interface.

By default, the DCBX protocol is enabled on all the interfaces of the switch.

### Syntax

**[no] cee dcbx enable**

Using **no** before the command disables the DCBX protocol on the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command enables the DCBX protocol on ethernet port 1/12:

```
Switch(config-if)# cee dcbx enable
```

### Restrictions

This command is not supported on the NE1032T and the NE1072T.

---

## cee dcbx advertise

Enables or disables the advertisement of the local application protocol, Enhanced Transmission Selection (ETS), or Priority Flow Control (PFC) configuration to the switch's Data Center Bridging eXchange (DCBX) peer.

This command is interface-based.

By default, the switch will advertise to its DCBX peer the local application protocol, ETS, and PFS configurations.

## Syntax

**[no] cee dcbx [app-proto|ets|pfc] advertise**

where:

| Parameter        | Description   |
|------------------|---|
| <b>app-proto</b> | Configures the advertisement of the local application protocol configuration to the switch's DCBX peer. |
| <b>ets</b>       | Configures the advertisement of the local ETS configuration to the switch's DCBX peer.                  |
| <b>pfc</b>       | Configures the advertisement of the local PFC configuration to the switch's DCBX peer.                  |

Using **no** before the command disables the advertisement of the local application protocol, ETS, or PFC configuration the switch's DCBX peer.

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command enables the advertisement of the local ETS configuration on interface 1/12:

```
Switch(config-if)# cee dcbx ets advertise
```

## Restrictions

This command is not supported on the NE1032T and the NE1072T.

---

## cee pfc enable

Enables or disables Priority Flow Control (PFC) on the current switch interface.

By default, PFC is enabled on all the interfaces of the switch.

**Note:** By default, PFC is globally disabled on the switch. PFC will not function on the interface until PFC is also globally enabled.

## Syntax

**[no] cee pfc enable**

Using **no** before the command disables PFC.

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command will disable PFC on the interface:

```
Switch(config-if)# no cee pfc enable
```

## Restrictions

This command is not supported on the NE1032T and the NE1072T.

## Related Commands

| Command                        | Description                     |
|--------------------------------|---------------------------------|
| <a href="#">cee pfc enable</a> | Globally enable or disable PFC. |

---

## description

Sets the interface description.

## Syntax

**[no] description** <description>

where:

| Parameter     | Description  |
|---------------|--|
| <description> | Interface description (string up to 80 characters long). |

Using **no** before the command with no other arguments removes the description.

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets the interface description to “my interface”:

```
Switch(config-if)# description my interface
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## duplex

Sets the duplex mode for the interface.

The default duplex mode is auto-negotiate.

## Syntax

**[no] duplex {auto|full|half}**

where:

| Parameter   | Description     |
|-------------|-----------------|
| <b>auto</b> | Auto-negotiate. |
| <b>full</b> | Full-duplex.    |
| <b>half</b> | Half-duplex.    |

Using **no** before the command resets the duplex mode to the default setting.

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following sets the duplex mode to auto-negotiate:

```
Switch(config-if)# duplex auto
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## fec

Configures the Forwarding Error Correction (FEC) for the current interface.

By default, FEC is automatically configured by the switch.

**Note:** This command is available only on the *ThinkSystem NE10032 RackSwitch*.

## Syntax

**fec {auto|c174|c191|off}**

where:

| Parameter   | Description   |
|-------------|---|
| <b>auto</b> | Enables and configures FEC automatically based on the port speed of the interface: <ul style="list-style-type: none"><li>• clause 74 for 25 Gb/s and 50 Gb/s port speeds</li><li>• clause 91 for 100 Gb/s port speed</li><li>• off for 40 Gb/s port speed</li></ul> |
| <b>c174</b> | Enables FEC with clause 74 for interfaces configured with 25 Gb/s, 40 Gb/s, or 50 Gb/s port speeds.   |
| <b>c191</b> | Enables FEC with clause 91 for interfaces configured with 100 Gb/s port speeds.   |
| <b>off</b>  | Disables FEC on the interface.  |

To reset FEC to its default value, use the following command:

**no fec**

## Modes

Interface Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command disables FEC on the current interface:

```
Switch(config-if)# no fec
```

---

## flowcontrol

Turns IEEE 802.3x flow control on or off.

### Syntax

**[no] flowcontrol {receive|send} {on|off}**

where:

| Parameter             | Description                  |
|-----------------------|------------------------------|
| <b>receive on off</b> | Set flow control on receive. |
| <b>send on off</b>    | Set flow control on send.    |

Using **no** before the command with no other arguments turns off flow control.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command turns on flow control on send.

```
Switch(config-if)# flowcontrol send on
```

### Restrictions

You cannot set flow control for both send and receive on the same line.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## ip access-group

Specifies access control for packets.

### Syntax

```
[no] ip access-group <group name> {in|out}
```

where:

| Parameter         | Description                   |
|-------------------|-------------------------------|
| <i>group name</i> | The name of the access group. |
| <b>in</b>         | Inbound packets.              |
| <b>out</b>        | Outbound packets.             |

Using **no** before the command with no other arguments turns off access control for the specified direction.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets access control for inbound packets for the group MyAccessGroup.

```
Switch(config-if)# ip access-group MyAccessGroup in
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip address

Sets the IP address for an interface.

### Syntax

```
[no] ip address {<IPv4 address> <IPv4 mask> | <IPv4 address> / <mask>}  
[secondary]
```

where:

| Parameter           | Description   |
|---------------------|---|
| <i>IPv4 address</i> | IPv4 address ( <i>n.n.n.n</i> ).                      |
| <i>IPv4 mask</i>    | IPv4 address/mask( <i>n.n.n.n/m</i> ).                |
| <i>mask</i>         | Mask number (maximum value of 32).                    |
| <b>secondary</b>    | Set this as a secondary IP address for the interface. |

Using **no** before the command with no other arguments removes the IP address from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets 10.2.4.3 with a bitmask of 255.255.255.0 as the primary IP address for the interface:

```
Switch(config-if)# ip address 10.2.4.3 255.255.255.0
```

The following command sets 10.2.4.33 with a mask of 22 as a secondary IP address for the interface:

```
Switch(config-if)# ip address 10.2.4.33/22 secondary
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip address dhcp

Sets the interface to use Dynamic Host Configuration Protocol (DHCP).

### Syntax

**[no] ip address dhcp**

Using **no** before the command unsets DHCP from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the interface to use DHCP:

```
Switch(config-if)# ip address dhcp
```

### Restrictions

DHCP client service can not be enabled or disabled on a bridge-port.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip dhcp client class-id

Configures Dynamic Host Configuration Protocol (DHCP) client vendor class identifier (VCI) for the current interface.

### Syntax

```
[no] ip dhcp client class-id <VCI>
```

where:

| Parameter | Description                       |
|-----------|-----------------------------------|
| VCI       | The vendor class identifier name. |

To remove the configured VCI, use the following command:

```
no ip dhcp client class-id
```

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the DHCP client class identifier to R2D2:

```
Switch(config-if)# ip dhcp client class-id R2D2
```

---

## ip dhcp client request

Configures the interface Dynamic Host Configuration Protocol (DHCP) client request settings.

### Syntax

```
[no] ip dhcp client request {bootfile-name|dns-nameserver|  
host-name|log-server|ntp-server|tftp-server-name}
```

where:

| Parameter               | Description                                |
|-------------------------|--|
| <b>bootfile-name</b>    | Requests the boot file name (option 67).   |
| <b>dns-nameserver</b>   | Requests the DNS server name (option 6).   |
| <b>host-name</b>        | Requests the host name (option 12).        |
| <b>log-server</b>       | Requests the log server name (option 7).   |
| <b>ntp-server</b>       | Requests the NTP server name (option 42).  |
| <b>tftp-server-name</b> | Requests the TFTP server name (option 66). |

**Note:** Zero Touch Provisioning (ZTP) mode needs both **tftp-server-name** and **bootfile-name** options enabled.

### Modes

Interface Configuration Mode

### History

| Release | Modification                       |
|---------|------------------------------------|
| 10.1    | The command was introduced.        |
| 10.2    | ZTP mode prerequisites were added. |

### Example

The following command configures the DHCP client to request the name of the DNS server (option 6):

```
Switch(config-if)# ip dhcp client request dns-nameserver
```

### Restrictions

DHCP client service cannot be enabled or disabled on a bridge-port.

---

## ip dhcp relay

Sets the interface Dynamic Host Configuration Protocol (DHCP) relay IP address.

### Syntax

```
[no] ip dhcp relay address <IPv4 address>
```

where:

| Parameter           | Description                      |
|---------------------|----------------------------------|
| <i>IPv4 address</i> | IPv4 address ( <i>n.n.n.n</i> ). |

Using **no** before the command removes the specified DHCP relay address from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the DHCP relay address to 10.3.23.3:

```
Switch(config-if)# ip dhcp relay address 10.3.23.3
```

### Restrictions

DHCP relay addresses cannot be enabled or disabled on a bridge-port.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip dhcp snooping trust

Enables or disables the current interface to act as a Dynamic Host Configuration Protocol (DHCP) Snooping trusted port. A trusted port is an interface connected to a legitimate DHCP server.

The switch will discard DHCP OFFER, DHCPACK, DHCPNAK, or DHCPLEASEQUERY packets received from untrusted ports, assuming that no legitimate server is found there.

By default, all switch interfaces are configured as untrusted ports.

### Syntax

```
[no] ip dhcp snooping trust
```

### Modes

Interface Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command configures the current interface as a DHCP Snooping trusted port:

```
Switch(config-if)# ip dhcp snooping trust
```

---

## ip ospf

Sets the interface Open Shortest Path First (OSPF) LSA outbound filter for the specified address.

## Syntax

**ip ospf** <IPv4 address> **database-filter all out**

**no ip ospf** <IPv4 address> **database-filter all**

where:

| Parameter              | Description   |
|------------------------|---|
| <i>IPv4 address</i>    | IPv4 address ( <i>n.n.n.n</i> ).  |
| <b>database-filter</b> | Filter OSPF link-state advertisements (LSAs) during synchronization and flooding. |
| <b>all</b>             | Filter all OSPF link-state advertisements (LSAs).                                 |
| <b>out</b>             | Filter all outbound OSPF link-state advertisements (LSAs).                        |

Using **no** before the command with all but the **out** argument removes the OSPF filter from this interface.

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets the OSPF outbound LSA filter for IP address 10.2.3.22:

```
Switch(config-if)# ip ospf 10.2.3.22 database-filter all out
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## ip ospf authentication

Sets the interface Open Shortest Path First (OSPF) authentication scheme.

### Syntax

```
[no] ip ospf authentication {message-digest|null}
```

where:

| Parameter             | Description                        |
|-----------------------|------------------------------------|
| <b>message-digest</b> | Use message-digest authentication. |
| <b>null</b>           | Use no authentication.             |

Using **no** before the command with no argument removes OSPF authentication from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets OSPF message-digest authentication:

```
Switch(config-if)# ip ospf authentication message-digest
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf authentication-key

Sets the interface Open Shortest Path First (OSPF) authentication key.

### Syntax

```
[no] ip ospf authentication-key [0] <OSPF password>
```

where:

| Parameter            | Description                            |
|----------------------|--|
| 0                    | Do not encrypt the authentication key. |
| <i>OSPF password</i> | The authentication key; a text string. |

Using **no** before the command with no argument removes the OSPF authentication key from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF authentication key to Authkey and stores it in encrypted format:

```
Switch(config-if)# ip ospf authentication-key Authkey
```

### Restrictions

The **no** form of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf bfd

Enables or disables Open Shortest Path First (OSPF) Bidirectional Forwarding Detection (BFD) for this interface.

### Syntax

**[no] ip ospf bfd [disable]**

where:

| Parameter      | Description   |
|----------------|---|
| <b>disable</b> | Disables Bidirectional Forwarding Detection for this interface. |

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables OSPF Bidirectional Forwarding Detection:

```
Switch(config-if)# ip ospf bfd
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf cost

Sets the Open Shortest Path First (OSPF) cost for this interface.

### Syntax

**[no] ip ospf cost** *<cost>*

where:

| Parameter   | Description                             |
|-------------|---|
| <i>cost</i> | The OSPF cost; an integer from 1-65535. |

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF cost to 333:

```
Switch(config-if)# ip ospf cost 333
```

### Restrictions

The **no** form of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf database-filter

Configures the local router to suppress all LSAs going out this interface during synchronization and flooding.

### Syntax

**ip ospf database-filter all out**

**no ip ospf database-filter all**

where:

| Parameter              | Description   |
|------------------------|---|
| <b>database-filter</b> | Filter OSPF link-state advertisements (LSAs) during synchronization and flooding. |
| <b>all</b>             | Filter all OSPF link-state advertisements (LSAs).                                 |
| <b>out</b>             | Filter all outbound OSPF link-state advertisements (LSAs).                        |

Using **no** before the command with all but the **out** argument removes the OSPF filter from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the OSPF outbound LSA filter:

```
Switch(config-if)# ip ospf database-filter all out
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf dead-interval

Sets the interface Open Shortest Path First (OSPF) interval in seconds after which a neighbor is declared “dead.”

### Syntax

**[no] ip ospf dead interval** <*seconds*>

where:

| Parameter      | Description  |
|----------------|--|
| <i>seconds</i> | Timeout value in seconds; an integer from 1-65535. |

Using **no** before the command with all but the last argument removes the OSPF dead-interval timeout from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF dead-interval timeout to 600 seconds (10 minutes):

```
Switch(config-if)# ip ospf dead-interval 600
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf hello-interval

Sets the time between transmission of “hello” packets in seconds for Open Shortest Path First (OSPF) for the interface.

### Syntax

```
[no] ip ospf hello interval <seconds>
```

where:

| Parameter      | Description  |
|----------------|--|
| <i>seconds</i> | Timeout value in seconds; an integer from 1-65535. |

Using **no** before the command with all but the last argument removes the OSPF hello transmission interval time from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF hello-interval transmission interval to 600 seconds (10 minutes):

```
Switch(config-if)# ip ospf hello-interval 600
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf message-digest-key

Sets the interface Open Shortest Path First (OSPF) message digest authentication key.

### Syntax

```
[no] ip ospf message-digest-key <key ID> [0] <OSPF password>
```

where:

| Parameter            | Description                                       |
|----------------------|---|
| <i>key ID</i>        | The message digest key ID; an integer from 1-255. |
| <b>0</b>             | Do not encrypt the authentication key.            |
| <i>OSPF password</i> | The authentication key; a text string.            |

Using **no** before the command with no argument removes the OSPF message digest key from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF message digest key ID to 33, sets the key to Authkey, and stores it in encrypted format:

```
Switch(config-if)# ip ospf message-digest-key 33 Authkey
```

### Restrictions

The **no** form of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## ip ospf mtu

Sets the interface Open Shortest Path First (OSPF) Maximum Transmission Unit (MTU) size in bytes.

### Syntax

```
[no] ip ospf mtu <size>
```

where:

| Parameter   | Description  |
|-------------|--|
| <i>size</i> | The MTU size, in bytes; an integer from 576-65535. |

Using **no** before the command with no argument removes the OSPF MTU from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF MTU to 50000 bytes:

```
Switch(config-if)# ip ospf mtu 50000
```

### Restrictions

The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf mtu-ignore

Sets the interface to ignore the Open Shortest Path First (OSPF) Maximum Transmission Unit (MTU) size when dealing with database descriptor (DBD) packets.

### Syntax

**[no] ip ospf mtu-ignore**

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command tells the interface to ignore the OSPF MTU in DBD packets:

```
Switch(config-if)# ip ospf mtu-ignore
```

### Restrictions

The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf network

Sets the Open Shortest Path First (OSPF) network type.

### Syntax

```
[no] ip ospf network {broadcast|point-to-point}
```

where:

| Parameter             | Description                          |
|-----------------------|--------------------------------------|
| <b>broadcast</b>      | OSPF broadcast multi-access network. |
| <b>point-to-point</b> | OSPF point-to-point network.         |

Using **no** before the command removes the OSPF network type.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF network type to broadcast:

```
Switch(config-if)# ip ospf network broadcast
```

### Restrictions

The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf passive-interface

Suppress routing updates on this interface.

### Syntax

**[no] ip ospf passive-interface**

Using **no** before the command enables routing updates on this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command suppresses routing updates on this interface:

```
Switch(config-if)# ip ospf passive-interface
```

### Restrictions

The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf priority

Sets the Open Shortest Path First (OSPF) router priority used in DR/BDR election process.

### Syntax

**[no] ip ospf priority** <priority>

where:

| Parameter       | Description                                  |
|-----------------|--|
| <i>priority</i> | OSPF router priority; an integer from 0-255. |

Using **no** before the command removes the OSPF priority.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF router priority to 10:

```
Switch(config-if)# ip ospf priority 10
```

### Restrictions

The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf retransmit-interval

Sets the Open Shortest Path First (OSPF) time, in seconds, between retransmission of lost link state advertisements.

### Syntax

**[no] ip ospf retransmit-interval** *<retransmit interval>*

where:

| Parameter                  | Description  |
|----------------------------|--|
| <i>retransmit interval</i> | Time, in seconds, between retransmission of lost link state advertisements; an integer from 1-65535. The default value is 5. |

Using **no** before the command removes the retransmission interval.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF retransmission interval to 10:

```
Switch(config-if)# ip ospf retransmit-interval 10
```

### Restrictions

The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf shutdown

Shut down OSPF on this interface.

### Syntax

**[no] ip ospf shutdown**

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command shuts down OSPF on this interface:

```
Switch(config-if)# ip ospf shutdown
```

### Restrictions

The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip ospf transmit-delay

Sets the Open Shortest Path First (OSPF) link state transmit delay in seconds.

### Syntax

**[no] ip ospf transmit-delay** <*transmit delay*>

where:

| Parameter             | Description   |
|-----------------------|---|
| <i>transmit delay</i> | Time, in seconds, between when the link state changes and the information is transmitted; an integer from 1-3600 (one hour). The default value is 1 |

Using **no** before the command removes the link state transmit delay.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the OSPF link state transmit delay to 10:

```
Switch(config-if)# ip ospf transmit-delay 10
```

### Restrictions

The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## ip port

Configures port policies.

## Syntax

**[no] ip port access-group** <*list name*> **in**

where:

| Parameter           | Description                           |
|---------------------|---------------------------------------|
| <b>access-group</b> | Specifies access control for packets. |
| <i>list name</i>    | List of packets.                      |
| <b>in</b>           | Inbound packets.                      |

Using **no** before the command turns off the feature.

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures port policies:

```
Switch(config-if)# ip port access-group aaaa in
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip port-unreachable

Enables sending ICMP port-unreachable.

### Syntax

**[no] ip port-unreachable**

Using **no** before the command turns off the feature.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables sending ICMP port-unreachables:

```
Switch(config-if)# ip port-unreachable
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip redirects

Enables sending ICMP redirect messages.

### Syntax

**[no] ip redirects**

Using **no** before the command turns off the feature.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables sending ICMP redirect messages:

```
Switch(config-if)# ip redirects
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip router ospf

Enables a routing process.

### Syntax

```
[no] ip router ospf 0 {area|multi-area} {<decimal value>|<IP address>}
```

where:

| Parameter            | Description   |
|----------------------|---|
| <b>area</b>          | Sets an OSPF area ID.                                       |
| <b>multi-area</b>    | Sets an OSPF multi-area-adjacency.                          |
| <i>decimal value</i> | Area ID as a decimal value (a number from 0 to 4294967295). |
| <i>IP address</i>    | Area ID as an IP address.                                   |

Using **no** before the command turns off the feature.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets an OSPF routing process:

```
Switch(config-if)# ip router ospf 0 area 500
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ip unreachable

Enables sending ICMP unreachables (others than port-unreachable).

### Syntax

**[no] ip unreachable**

Using **no** before the command turns off the feature.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables sending ICMP unreachables:

```
Switch(config-if)# ip unreachable
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 address

Sets the IPv6 address for an interface.

### Syntax

**[no] ipv6 address** {<IPv6 address>/<mask>} [**anycast**] [**secondary**]

where:

| Parameter           | Description   |
|---------------------|---|
| <i>IPv6 address</i> | IPv6 address ( <i>aaaa:bbbb::cccc:dddd</i> ).         |
| <i>mask</i>         | Network mask.   |
| <b>anycast</b>      | Set this as an anycast IP address for the interface.  |
| <b>secondary</b>    | Set this as a secondary IP address for the interface. |

Using **no** before the command with no other arguments removes the IPv6 address from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Examples

The following command sets 2001:0db8:85a3:0000:0000:8a2e:0370:7334 with a mask of 22 as the primary IPv6 address for the interface:

```
Switch(config-if)# ipv6 address  
2001:0db8:85a3:0000:0000:8a2e:0370:7334/22
```

The following command sets 2001:0db8:85a3:0000:0000:8a2e:0370:7334 with a mask of 22 as a secondary IP address for the interface:

```
Switch(config-if)# ipv6 address  
2001:0db8:85a3:0000:0000:8a2e:0370:7334/22 secondary
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

---

## ipv6 address dhcp

Sets the IPv6 address to use Dynamic Host Configuration Protocol (DHCP).

### Syntax

**[no] ipv6 address dhcp**

Using **no** before the command with no other arguments removes DHCP from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the interface to use DHCP:

```
Switch(config-if)# ipv6 address dhcp
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 dhcp relay

Sets the interface Dynamic Host Configuration Protocol (DHCP) relay IPv6 address.

### Syntax

**[no] ipv6 dhcp relay address** <IPv6 address> [**interface** {**ethernet** <chassis number>|**vlan** <vlan interface>}]

where:

| Parameter                        | Description                                      |
|----------------------------------|--|
| <i>IPv6 address</i>              | IPv6 address ( <i>n:n:n:n</i> ).                 |
| <b>interface</b>                 | Sets outgoing interface parameters.              |
| <b>ethernet</b> <chassis number> | Ethernet interface number.                       |
| <b>vlan</b> <vlan interface>     | VLAN interface number (a number from 1 to 4094). |

Using **no** before the command removes the specified DHCP relay address from this interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the DHCP relay address to 2001:0db8:85a3:0000:0000:8a2e:0370:7334:

```
Switch(config-if)# ipv6 dhcp relay address  
2001:0db8:85a3:0000:0000:8a2e:0370:7334
```

### Restrictions

- DHCP relay addresses cannot be enabled or disabled on a bridge-port.
- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.



---

## ipv6 link-local

Sets the IPv6 link local address.

### Syntax

**[no] ipv6 address link-local** <IPv6 address>

where:

| Parameter    | Description                       |
|--------------|-----------------------------------|
| IPv6 address | IPv6 address ( <i>n:n::n:n</i> ). |

Using **no** before the command with no other arguments removes the link-local address from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the link-local address to `aaaa:bbbb::dddd:ffff`:

```
Switch(config-if)# ipv6 address link-local aaaa:bbbb::dddd:ffff
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd dad attempts

Sets the IPv6 neighbor discovery Duplicate Address Detection (DAD) attempts.

### Syntax

**[no] ipv6 nd dad attempts** <*DAD attempts*>

where:

| Parameter           | Description  |
|---------------------|--|
| <i>DAD attempts</i> | Number of DAD attempts available; an integer from 0-600. Default value is 1. |

Using **no** before the command restores the default value.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the number of DAD attempts to 3:

```
Switch(config-if)# ipv6 nd attempts 3
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd hop-limit

Sets the IPv6 neighbor discovery hop limit to use in router advertisement (RA) messages when originating IPv6 packets.

### Syntax

**[no] ipv6 nd hop-limit** <number of hops>

where:

| Parameter             | Description   |
|-----------------------|---|
| <i>number of hops</i> | Maximum number of hops to use in an RA message; an integer from 0-255. Default value is 64. |

Using **no** before the command with no other arguments removes the hop limit from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the hop limit to 30:

```
Switch(config-if)# ipv6 nd hop-limit 30
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd managed-config-flag

In IPv6 neighbor discovery router advertisement (RA) messages, tells the host to use DHCP for address configuration.

### Syntax

**[no] ipv6 nd managed-config-flag**

Using **no** before the command with no other arguments negates the command.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command tells the host to use DHCP for address configuration:

```
Switch(config-if)# ipv6 nd managed-config-flag
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd mtu

Sets the IPv6 neighbor discovery advertised Maximum Transmission Unit (MTU) option.

### Syntax

[no] **ipv6 nd mtu** <link MTU value>

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>link MTU value</i> | Maximum transmission unit size, in bytes; an integer from 1280-65535. Default value is 1500. |

Using **no** before the command with no other arguments removes the MTU option from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the MTU size to 30000:

```
Switch(config-if)# ipv6 nd mtu 30000
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd other-config-flag

Sets IPv6 neighbor discovery to use DHCP for non-address configuration.

### Syntax

**[no] ipv6 nd other-config-flag**

Using **no** before the command with no other arguments sets the IPv6 neighbor discovery to not use DHCP for non-address configuration on the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets IPv6 neighbor discovery to use DHCP for non-address configuration:

```
Switch(config-if)# ipv6 nd other-config-flag
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd prefix

Sets the interface IPv6 neighbor discovery prefix parameters.

### Syntax

```
[no] ipv6 nd prefix [{<valid-lifetime> | infinite} {<preferred-lifetime> | infinite}] [no-advertise] [no-autoconfig] [no-onlink] [off-link]
```

where:

| Parameter                 | Description  |
|---------------------------|--|
| <i>IPv6 address</i>       | IPv6 address ( <i>n:n::n:n</i> ).                        |
| <i>mask</i>               | Mask.  |
| <b>default</b>            | Set the default prefix parameters.                       |
| <i>valid-lifetime</i>     | Valid lifetime, in seconds. Default value is 2592000.    |
| <i>preferred-lifetime</i> | Preferred lifetime, in seconds. Default value is 604800. |
| <b>infinite</b>           | Set an indefinite valid or preferred lifetime.           |
| <b>no-advertise</b>       | Do not advertise the prefix.                             |
| <b>no-autoconfig</b>      | Do not use this prefix for autoconfiguration.            |
| <b>no-onlink</b>          | Use this prefix for offlink determination.               |
| <b>off-link</b>           | Do not use this prefix for onlink determination.         |

Using **no** before the command with no other arguments removes prefix from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets the ND prefix to 2001:0db8:85a3:0000:0000:8a2e:0370:7334/38 with a lifetime of 60000 seconds, with no advertising, no autoconfiguration, offlink determination, and no onlink determination:

```
Switch(config-if)# ipv6 nd prefix  
2001:0db8:85a3:0000:0000:8a2e:0370:7334/38 60000 no-onlink off-link  
no-autoconfig
```

## Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## ipv6 nd ra-interval

Sets the interface IPv6 neighbor discovery Route Advertisement interval.

### Syntax

**[no] ipv6 nd ra-interval** <interval>

where:

| Parameter       | Description  |
|-----------------|--|
| <i>interval</i> | The interval, in seconds, between sending RA messages; an integer from 4-1800. Default value is 600. |

Using **no** before the command with no other arguments removes the RA interval from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the ND RA interval to 1200 seconds:

```
Switch(config-if)# ipv6 nd ra-interval 1200
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd ra-lifetime

Sets the interface IPv6 neighbor discovery Route Advertisement lifetime of a default router.

### Syntax

**[no] ipv6 nd ra-lifetime** <lifetime>

where:

| Parameter       | Description  |
|-----------------|--|
| <i>lifetime</i> | The lifetime, in seconds, of a default router; an integer from 0-9000. Default value is 1800; a value of 0 means this is not the default router. |

Using **no** before the command with no other arguments removes the RA lifetime from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the ND RA lifetime to 3600 seconds:

```
Switch(config-if)# ipv6 nd ra-lifetime 3600
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd reachable-time

Sets the interface IPv6 neighbor discovery advertised time when a node considers a neighbor to be up.

### Syntax

**[no] ipv6 nd reachable-time** <time>

where:

| Parameter   | Description   |
|-------------|---|
| <i>time</i> | The time, in milliseconds, sent via an RA message that determines when a node considers a neighbor to be up; an integer from 0-3600000. Default value is 0. |

Using **no** before the command with no other arguments removes the reachable time from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the ND reachable time to 3600 milliseconds:

```
Switch(config-if)# ipv6 nd reachable-time 3600
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd retrans-timer

Sets the interface IPv6 neighbor discovery advertised retransmission timer.

### Syntax

```
[no] ipv6 nd retrans-timer <time>
```

where:

| Parameter   | Description  |
|-------------|--|
| <i>time</i> | The time, in milliseconds, between advertised retransmissions; an integer from 0-4294967295. Default value is 0. |

Using **no** before the command with no other arguments removes the advertised retransmission timer from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the ND advertised retransmission timer to 6000 milliseconds:

```
Switch(config-if)# ipv6 nd retrans-timer 6000
```

### Restrictions

- IPv6 commands do not work on LAG or ethernet interfaces.
- The “no” version of this command does not work in a nested configuration mode.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 nd suppress-ra

Sets the interface IPv6 neighbor discovery to suppress Router Advertisement messages.

### Syntax

[no] **ipv6 nd suppress-ra** [mtu]

where:

| Parameter  | Description  |
|------------|--|
| <b>mtu</b> | Disables sending the MTU in Router Advertisement messages. |

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command disables sending MTU in ND router advertisement messages:

```
Switch(config-if)# ipv6 nd suppress-ra mtu
```

### Restrictions

IPv6 commands do not work on LAG or ethernet interfaces.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## ipv6 neighbor

Sets the interface IPv6 neighbor.

### Syntax

**[no] ipv6 neighbor** <IPv6 address> <MAC address>

where:

| Parameter           | Description                           |
|---------------------|---------------------------------------|
| <i>IPv6 address</i> | IPv6 address ( <i>n:n:n:n</i> ).      |
| <i>MAC address</i>  | MAC address ( <i>NNNN.NNNN.NNNN</i> ) |

Using **no** before the command removes the neighbor.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the IPv6 neighbor to 2001:0db8:85a3:0000:0000:8a2e:0370:7334 with a MAC of AAAA.BBBB.CCCC:

```
Switch(config-if)# ipv6 neighbor 2001:0db8:85a3:0000:0000:8a2e:0370:7334  
AAAA.BBBB.CCCC
```

### Restrictions

- The neighbor must be on the local interface subnet.
- IPv6 commands do not work on LAG or ethernet interfaces.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## lACP min-links

Configures the minimum number of Link Aggregation Control Protocol (LACP) links. The minimum number of LACP links is the minimum number of Link Aggregation Group (LAG) member ports that must be in the link-up state and aggregated into the LAG for the interface to forward traffic. If the number of LAG member ports that are in the link-up state and aggregated into the LAG is smaller than the configured minimum number of LACP links, then the LAG member ports will transition into the standby state. Interfaces in the standby state will continue running LACP, but will not forward traffic.

**Note:** The interfaces that are members of the same LACP LAG must be configured with the same minimum number of LACP links.

By default, the minimum number of LACP links is one.

## Syntax

**lACP min-links** <number of minimum LACP links>

where:

| Parameter                           | Description  |
|-------------------------------------|--|
| <i>number of minimum LACP links</i> | The <i>number of minimum LACP links</i> is from 1 to 32. |

The following command resets the minimum number of LACP links to its default value:

**no lACP min-links**

## Modes

Interface Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command configures the minimum number of LACP links to 6:

```
Switch(config-if)# lACP min-links 6
```

---

## lACP port-priority

Configures the Link Aggregation Control Protocol (LACP) priority for the current interface.

By default, the LACP priority of an interface has a value of 32768.

### Syntax

**lACP port-priority** <LACP priority>

where:

| Parameter            | Description   |
|----------------------|---|
| <i>LACP priority</i> | The LACP priority for the current interface. The <i>LACP priority</i> is from 1 to 65535. |

The following command resets the LACP priority of the current interface to its default value:

**no lACP port-priority**

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the LACP port priority to 28000:

```
Switch(config-if)# lACP port-priority 28000
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## lACP suspend-individual

Sets the interface Link Aggregation Control Protocol (LACP) port into a suspended state instead of an individual state if it does not get the LACP BPDU from the peer ports in the LAG.

### Syntax

**[no] lACP suspend-individual**

Using **no** before the command removes the LACP port suspend-individual flag.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the LACP port suspend-individual flag:

```
Switch(config-if)# lACP suspend-individual
```

### Restrictions

- This command will work only for LAGs.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## lACP timeout

Configures the interface Link Aggregation Control Protocol (LACP) timeout. If the configured timeout interval expires and the switch did not receive any LACP Data Units (LACPDU), the LACP interface times out. The peer LACP interface then sends LACPDUs at a third of the value of the configured LACP timeout interval.

By default, the timeout interval is `long` (90 seconds).

## Syntax

```
[no] lACP timeout {long|short}
```

where:

| Parameter          | Description  |
|--------------------|--|
| <code>long</code>  | Configures the LACP timeout interval to 90 seconds. After the interface times out, the peer LACP interface will send LACPDUs every 30 seconds. |
| <code>short</code> | Configures the LACP timeout interval to 3 seconds. After the interface times out, the peer LACP interface will send LACPDUs every second.      |

The following command resets the LACP timeout interval to its default value:

```
no lACP timeout
```

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets the LACP timeout to `short` (3 seconds):

```
Switch(config-if)# lACP timeout short
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## lldp receive

Enables Link Layer Discovery Protocol (LLDP) reception on the interface

### Syntax

**[no] lldp receive**

Using **no** before the command disables LLDP reception on interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables LLDP reception on the interface:

```
Switch(config-if)# lldp receive
```

### Restrictions

LLDP must be supported on the interface.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## Ildp tlv-select

Sets the optional Link Layer Discovery Protocol (LLDP) TLV (type-length-value) to be included in outgoing LLDP messages, along with the mandatory attributes.

### Syntax

**[no] lldp tlv-select** <TLV type>

where *TLV type* is one of the following:

| Parameter                  | Description                               |
|----------------------------|---|
| <b>link-aggregation</b>    | Link Aggregation TLV                      |
| <b>mac-phy-status</b>      | MAC/PHY Configuration/Status TLV          |
| <b>management-address</b>  | Management Address TLV (set by default).  |
| <b>max-frame-size</b>      | Maximum Frame Size TLV                    |
| <b>port-description</b>    | Port Description TLV (set by default).    |
| <b>port-protocol-vlan</b>  | Port and Protocol VLAN ID TLV             |
| <b>port-vlan</b>           | Port VLAN ID TLV (set by default).        |
| <b>power-mdi</b>           | Power Via MDI TLV                         |
| <b>protocol-identity</b>   | Protocol Identity TLV                     |
| <b>system-capabilities</b> | System Capabilities TLV (set by default). |
| <b>system-description</b>  | System Description TLV (set by default).  |
| <b>system-name</b>         | System Name TLV (set by default).         |
| <b>vid-management</b>      | Vid Management TLV                        |
| <b>vlan-name</b>           | VLAN Name TLV                             |

Using **no** before the command removes the optional LLDP TLV from the outgoing LLDP messages.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets the LLDP TLV type to be a port description:

```
Switch(config-if)# lldp tlv-select port-description
```

## Restrictions

LLDP must be supported on the interface.

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## lldp transmit

Enables Link Layer Discovery Protocol (LLDP) transmission on the interface

### Syntax

**[no] lldp transmit**

Using **no** before the command disables the Link Layer Discovery Protocol (LLDP) transmission on the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables LLDP transmission on the interface:

```
Switch(config-if)# lldp transmit
```

### Restrictions

LLDP must be supported on the interface.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## Ildp trap-notification

Enables Link Layer Discovery Protocol (LLDP) trap-notification on the interface

### Syntax

**[no] lldp trap-notification**

Using **no** before the command disables trap notification on the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables LLDP trap-notification on the interface:

```
Switch(config-if)# lldp trap-notification
```

### Restrictions

LLDP must be supported on the interface.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## load-interval

Sets the interface load-interval delay.

### Syntax

```
[no] load-interval [counter <counter>] <delay>
```

where:

| Parameter      | Description   |
|----------------|---|
| <b>counter</b> | Specify a counter for this load interval (optional).  |
| <i>counter</i> | The counter for the load interval; an integer from 1-3.   |
| <i>delay</i>   | The load interval delay, in seconds; an integer from 30-300. The default values for each counter are the following: <ul style="list-style-type: none"><li>● 1: 30 seconds;</li><li>● 2: 300 seconds;</li><li>● 3: not configured.</li></ul> |

Using **no** before the command with no *delay* argument removes the load-interval delay.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the load-interval delay for counter 2 to 90 seconds:

```
Switch(config-if)# load-interval counter 2 90
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## mac port access-group

Sets the MAC port Access Group (AG) name.

### Syntax

```
[no] mac port access-group <name>
```

where:

| Parameter   | Description                       |
|-------------|-----------------------------------|
| <i>name</i> | The name of the MAC access group. |

Using **no** before the command removes the MAC port AG name.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the the MAC port AG name to MyAG:

```
Switch(config-if)# mac port access-group MyAG
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## mac-learn disable

Disables MAC learning to use the switch as a HUB.

### Syntax

**[no] mac-learn disable**

Using **no** before the command enables MAC learning.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command disables MAC learning:

```
Switch(config-if)# mac-learn disable
```

### Restrictions

This command does not work on a VLAN interface.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## microburst-detection enable

Enables microburst detection on the interface.

### Syntax

**microburst-detection enable threshold** <*threshold*>

**no microburst-detection enable**

where:

| Parameter        | Description                                       |
|------------------|---|
| <i>threshold</i> | The threshold in unit of buffer cell (208 bytes). |

Using **no** before the command without a threshold disables microburst-detection.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables microburst detection with a threshold of 200:

```
Switch(config-if)# microburst-detection enable threshold 200
```

### Restrictions

The interface must support microburst detection.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## mtu

Sets the Maximum Transmission Unit (MTU) on the interface.

### Syntax

**[no] mtu** <MTU>

where:

| Parameter  | Description  |
|------------|--|
| <i>MTU</i> | In bytes, the MTU: <ul style="list-style-type: none"><li>• L2 packet: An integer from 64-9216</li><li>• L3 IPv4 packet: An integer from 576-9216</li><li>• L3 IPv6 packet: An integer from 1280-9216</li></ul> |

Using **no** before the command without an argument removes the MTU.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the MTU to 1000:

```
Switch(config-if)# mtu 1000
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## service

Enter Ethernet Virtual Connection (EVC) service configuration mode on the interface. For full information on the subcommands, see [Chapter 29, “EVC Service Mode Commands.”](#)

## Syntax

**service instance** <Instance ID> **evc-id** <EVC ID>

where:

| Parameter          | Description                       |
|--------------------|-----------------------------------|
| <i>Instance ID</i> | The instance ID to map to the EVC |
| <i>EVC ID</i>      | The EVC ID of the SVLAN.          |

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enters EVC service configuration mode with instance ID 1 and EVC ID 1:

```
Switch(config-if)# service instance 1 evc-id 1
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## service-policy copp-system-policy

Attaches the specified Control Plane Policing (CoPP) service policy to the interface.

### Syntax

**[no] service-policy copp-system-policy class** {<COPP class>|**all**}

where:

| Parameter         | Description                   |
|-------------------|-------------------------------|
| <i>COPP class</i> | The COPP class name to attach |
| <b>all</b>        | Attach all COPP classes..     |

Using **no** before the command detaches the COPP class.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command attaches COPP class MyClass to the interface:

```
Switch(config-if)# service-policy copp-system-policy class MyClass
```

The following command attaches all COPP classes to the interface:

```
Switch(config-if)# service-policy copp-system-policy class all
```

### Restrictions

This command only works on Ethernet interfaces and not on virtual interfaces.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## service-policy input

Attaches the specified ingress service policy to the interface.

### Syntax

**[no] service-policy input** *<policy name>*

where:

| Parameter          | Description                      |
|--------------------|----------------------------------|
| <i>policy name</i> | The name of the policy to attach |

Using **no** before the command detaches the policy.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command attaches service policy MyPolicy to incoming traffic on the interface:

```
Switch(config-if)# service-policy input MyPolicy
```

### Restrictions

- This command only works on Ethernet interfaces and not on virtual interfaces.
- The policy map must exist before you can attach it to the interface.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## service-policy output

Attaches the specified egress service policy to the interface.

### Syntax

**[no] service-policy output** <*policy name*>

where:

| Parameter          | Description                      |
|--------------------|----------------------------------|
| <i>policy name</i> | The name of the policy to attach |

Using **no** before the command detaches the policy.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command attaches service policy MyPolicy to outgoing traffic on the interface:

```
Switch(config-if)# service-policy output MyPolicy
```

### Restrictions

- This command only works on Ethernet interfaces and not on virtual interfaces.
- The policy map must exist before you can attach it to the interface.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## service-policy type qos

Attaches the specified Quality of Service (QoS) service policy to the interface in the specified direction.

### Syntax

```
[no] service-policy type qos {input|output} <policy name>
```

where:

| Parameter          | Description                          |
|--------------------|--------------------------------------|
| <b>input</b>       | Attach an input QoS policy.          |
| <b>output</b>      | Attach an output QoS policy.         |
| <i>policy name</i> | The name of the QoS policy to attach |

Using **no** before the command detaches the policy.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command attaches QoS service policy MyPolicy to incoming traffic on the interface:

```
Switch(config-if)# service-policy type qos input MyPolicy
```

### Restrictions

- This command only works on Ethernet interfaces and not on virtual interfaces.
- The QoS policy for the specified direction must exist before you can attach it to the interface.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## service-policy type queuing

Attaches the specified queuing service policy to the interface in the specified direction.

### Syntax

**[no] service-policy type queuing {input|output} <policy name>**

where:

| Parameter          | Description                              |
|--------------------|--|
| <b>input</b>       | Attach an input queuing policy.          |
| <b>output</b>      | Attach an output queuing policy.         |
| <i>policy name</i> | The name of the queuing policy to attach |

Using **no** before the command detaches the policy.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command attaches queuing service policy MyPolicy to outgoing traffic on the interface:

```
Switch(config-if)# service-policy type queuing output MyPolicy
```

### Restrictions

- This command only works on Ethernet interfaces and not on virtual interfaces.
- The queue policy for the specified direction must exist before you can attach it to the interface.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## shutdown

Shuts down the interface.

### Syntax

**[no] shutdown**

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command shuts down the interface:

```
Switch(config-if)# shutdown
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## snmp trap link-status

Displays status for SNMP linkup and linkdown traps on the interface.

### Syntax

```
snmp trap link-status
```

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays status for SNMP linkup and linkdown traps on the interface:

```
Switch(config-if)# snmp trap link-status
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree bpdudfilter

Enables or disables the spanning-tree Bridge Protocol Data Unit (BPDU) filter on the interface.

### Syntax

**[no] spanning-tree bpdudfilter {enable|disable}**

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the spanning-tree BPDU filter on the interface:

```
Switch(config-if)# spanning-tree bpdudfilter enable
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree bpduguard

Enables or disables the blockage of spanning-tree Bridge Protocol Data Units (BPDUs) on the interface.

### Syntax

**[no] spanning-tree bpduguard {enable|disable}**

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the spanning-tree BPDU guard on the interface:

```
Switch(config-if)# spanning-tree bpduguard enable
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree cost

Sets the spanning-tree port path cost on the interface.

### Syntax

**[no] spanning-tree cost** {<port path cost>|**auto**}

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>port path cost</i> | The port path cost; an integer from 1-200000000.                                       |
| <b>auto</b>           | Automatically determine the port path cost based on the media speed of this interface. |

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the spanning-tree port path cost to 100 for the interface:

```
Switch(config-if)# spanning-tree cost 100
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree disable

Disables spanning-tree protocol on the interface.

### Syntax

```
spanning-tree disable
```

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command disables spanning-tree protocol on the interface:

```
Switch(config-if)# spanning-tree disable
```

### Related Commands

| Command                              | Description                                     |
|--------------------------------------|---|
| <a href="#">interface</a>            | Enter Interface Configuration Mode.             |
| <a href="#">spanning-tree enable</a> | Enables spanning-tree protocol on the interface |



---

## spanning-tree enable

Enables spanning-tree protocol on the interface.

### Syntax

```
spanning-tree enable
```

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables spanning-tree protocol on the interface:

```
Switch(config-if)# spanning-tree enable
```

### Related Commands

| Command                               | Description                                      |
|---------------------------------------|--|
| <a href="#">interface</a>             | Enter Interface Configuration Mode.              |
| <a href="#">spanning-tree disable</a> | Disables spanning-tree protocol on the interface |

---

## spanning-tree guard loop

Enables or disables loop guard on a port.

**Note:** If root guard is configured, loop guard is automatically disabled.

### Syntax

**spanning-tree guard loop**

**no spanning-tree guard**

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command enables loop guard on a port:

```
Switch(config-if)# spanning-tree guard loop
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree guard root

Sets the spanning-tree guard mode on the interface.

**Note:** Enabling root guard automatically disables loop guard.

### Syntax

**spanning-tree guard root**

**no spanning-tree guard**

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the spanning-tree guard mode to root guard on the interface:

```
Switch(config-if)# spanning-tree guard root
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree link-type

Sets the spanning-tree link type on the interface.

### Syntax

**[no] spanning-tree link-type {auto|point-to-point|shared}**

where:

| Parameter             | Description  |
|-----------------------|--|
| <b>auto</b>           | Sets the spanning-tree link type based on the media duplex of the interface. |
| <b>point-to-point</b> | Sets the spanning-tree link type to point-to-point on the interface.         |
| <b>shared</b>         | Sets the spanning-tree link type to shared on the interface.                 |

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the spanning-tree guard mode to root guard on the interface:

```
Switch(config-if)# spanning-tree link-type point-to-point
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree mst

Sets parameters for a multiple spanning-tree configuration on the interface.

### Syntax

```
[no] spanning-tree mst <MST instance> {cost {<port path cost>|auto}|  
port-priority <port priority>}
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>MST instance</i>   | An instance or a range of instances.   |
| <i>port path cost</i> | The port path cost; an integer from 1-200000000.                                       |
| <b>auto</b>           | Automatically determine the port path cost based on the media speed of this interface. |
| <i>port priority</i>  | The port priority for interface; a multiple of 32 from 0-224.                          |

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the spanning-tree port path cost to 300 for instances 0-3 on the interface:

```
Switch(config-if)# spanning-tree mst 0-3 cost 300
```

The following command sets the spanning-tree port priority to 128 for instances 7-9 on the interface:

```
Switch(config-if)# spanning-tree mst 7-9 port-priority 128
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree port

Sets the spanning-tree port type on the interface.

### Syntax

**[no] spanning-tree port type edge**

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the spanning-tree port type to edge port on the interface:

```
Switch(config-if)# spanning-tree port type edge
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree port-priority

Sets the spanning-tree port priority for the interface.

### Syntax

**[no] spanning-tree port-priority** *<port priority>*

where:

| Parameter            | Description   |
|----------------------|---|
| <i>port priority</i> | The port priority for interface; a multiple of 32 from 0-224. |

Using **no** before the command with no argument removes the port priority from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the spanning-tree port priority to 128 on the interface:

```
Switch(config-if)# spanning-tree port-priority 128
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## spanning-tree vlan <vlan number> cost

Sets the RPVST+ port path cost on the interface.

### Syntax

**[no] spanning-tree vlan** <VLAN number> **cost** <port path cost>|**auto**

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>VLAN number</i>    | The VLAN number. Range is from 1 to 4094.  |
| <i>port path cost</i> | The port path cost; an integer from 1-200000000.                                       |
| <b>auto</b>           | Automatically determine the port path cost based on the media speed of this interface. |

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command enables the RPVST+ port path cost to 100 for the interface:

```
Switch(config-if)# spanning-tree vlan 3 cost 100
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |



---

## spanning-tree vlan <vlan number> port-priority

Sets the RPVST+ port priority for the interface.

### Syntax

**[no] spanning-tree vlan** <VLAN number> **port-priority** <port priority>

where:

| Parameter            | Description   |
|----------------------|---|
| <i>VLAN number</i>   | The VLAN number. Range is from 1 to 4094.                     |
| <i>port priority</i> | The port priority for interface; a multiple of 32 from 0-224. |

Using **no** before the command with no argument removes the port priority from the interface.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command sets the RPVST+ port priority to 128 on the interface:

```
Switch(config-if)# spanning-tree vlan 3 port-priority 128
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## speed

Configures the port speed for the interface.

By default, the switch automatically negotiates the port speed.

## Syntax

- NE1032, NE1032T:

**speed {1000|10000|auto}**

where:

| Parameter    | Description                          |
|--------------|--------------------------------------|
| <b>1000</b>  | Sets the port speed to 1 Gb/second.  |
| <b>10000</b> | Sets the port speed to 10 Gb/second. |
| <b>auto</b>  | Auto-negotiates the port speed.      |

- G8272, G8296, G8332, NE1072T:

**speed {1000|10000|40000|auto}**

where:

| Parameter    | Description                          |
|--------------|--------------------------------------|
| <b>1000</b>  | Sets the port speed to 1 Gb/second.  |
| <b>10000</b> | Sets the port speed to 10 Gb/second. |
| <b>40000</b> | Sets the port speed to 40 Gb/second. |
| <b>auto</b>  | Auto-negotiates the port speed.      |

- NE10032:

**speed {10000|25000|40000|50000|100000|auto}**

where:

| Parameter     | Description                           |
|---------------|---------------------------------------|
| <b>10000</b>  | Sets the port speed to 10 Gb/second.  |
| <b>25000</b>  | Sets the port speed to 25 Gb/second.  |
| <b>40000</b>  | Sets the port speed to 40 Gb/second.  |
| <b>50000</b>  | Sets the port speed to 50 Gb/second.  |
| <b>100000</b> | Sets the port speed to 100 Gb/second. |
| <b>auto</b>   | Auto-negotiates the port speed.       |

To reset the port speed to its default value, use the following command:

**no speed**

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets the port speed to 10 Gb/second on the interface:

```
Switch(config-if)# speed 10000
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## storm-control

Sets storm-control for the interface.

### Syntax

```
[no] storm-control {broadcast|multicast|unicast} level <level>
```

where:

| Parameter        | Description                                |
|------------------|--|
| <b>broadcast</b> | Sets broadcast address storm control.      |
| <b>multicast</b> | Sets multicast address storm control.      |
| <b>unicast</b>   | Sets unicast address storm control.        |
| <i>level</i>     | Level; a whole number or a decimal number. |

Using **no** before the command with all but the last argument negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the broadcast storm control to 4.5 on the interface:

```
Switch(config-if)# storm-control broadcast level 4.5
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## vlan dot1q tag native

Removes the specified VLANs from the list of allowed VLANs in bridge-port trunk mode for the interface.

### Syntax

```
[no] vlan dot1q tag native {enable|egress-only enable|disable}
```

where:

| Parameter                 | Description   |
|---------------------------|---|
| <b>enable</b>             | Enables IEEE 802.1Q native VLAN tagging on the interface.                         |
| <b>egress-only enable</b> | Enables IEEE 802.1Q native VLAN tagging on the interface for egress traffic only. |
| <b>disable</b>            | Disables IEEE 802.1Q native VLAN tagging on the interface.                        |

Using **no** before the command with all but the last argument negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables IEEE 802.1Q native VLAN tagging on the interface for egress traffic only:

```
Switch(config-if)# vlan dot1q tag native egress-only enable
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## vrrp

Enters Virtual Router Redundancy Protocol (VRRP) configuration mode for the interface.

### Syntax

**vrrp** <virtual router identifier> [**ipv6**]

where:

| Parameter                        | Description   |
|----------------------------------|---|
| <i>virtual router identifier</i> | The virtual router identifier; an integer from 1-255. |
| <b>ipv6</b>                      | Optional; assume IPv6 address family.                 |

Using **no** before the command negates it.

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enters VRRP mode, configuring virtual router 2:

```
Switch(config-if)# vrrp 2
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## Chapter 6. Line Mode Commands

This chapter describes how to enter Line Configuration Mode and the commands available in this mode.

---

## line

Enter Line Configuration Mode.

## Syntax

**[no] line {console <console line>|vty <VTY number>}**

where:

| Parameter           | Function   |
|---------------------|--|
| <i>console line</i> | The console line number; default value is 0.       |
| <i>VTY number</i>   | The virtual terminal number; an integer from 0-63. |

## Modes

Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enters Line Configuration Mode to configure virtual terminal 3:

```
Switch(config)# line vty 3
Switch(config-line)#
```



---

## exec-timeout

Sets the length of idle time before the terminal is automatically logged out.

### Syntax

[no] **exec-timeout** <timeout>

where:

| Parameter      | Function   |
|----------------|--|
| <i>timeout</i> | The number of minutes of idle time before the terminal is logged out; an integer from 0-35791. Default value is 10. A value of 0 indicates infinite idle time (no automatic logout). |

Using **no** before the command negates it.

### Modes

Line Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the idle timeout to 60:

```
Switch(config-line)# exec-timeout 60
```

### Related Commands

| Command              | Description  |
|----------------------|--|
| <a href="#">line</a> | Enters Line Configuration Mode for the specified terminal. |

---

## history

Sets the maximum number of commands stored in history.

## Syntax

**[no] history max** <commands>

where:

| Parameter       | Function  |
|-----------------|---|
| <i>commands</i> | The maximum number of commands to be kept in the CLI history; an integer from 0-2147483647. |

Using **no** before the command without the last argument negates it.

## Modes

Line Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets the maximum number of commands to be retained in history to 60:

```
Switch(config-line)# history max 60
```

## Related Commands

| Command              | Description  |
|----------------------|--|
| <a href="#">line</a> | Enters Line Configuration Mode for the specified terminal. |

---

## privilege

Sets the default privilege level for the line.

### Syntax

**[no] privilege level** <*privilege level*>

where:

| Parameter              | Function   |
|------------------------|--|
| <i>privilege level</i> | The privilege level for the line; an integer from 1-15, or 16 for the maximum privilege level. |

Using **no** before the command negates it.

### Modes

Line Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the privilege level for the line to 1:

```
Switch(config-line)# privilege level 1
```

### Related Commands

| Command              | Description  |
|----------------------|--|
| <a href="#">line</a> | Enters Line Configuration Mode for the specified terminal. |



---

## Chapter 7. Class Map Mode Commands

This chapter describes the commands for entering and using Class Map Configuration Mode, Quality of Service (QoS) Class Map Configuration Mode, and Queueing Class Map Configuration Mode.

---

## class-map type qos

Adds or removes a Quality of Service (QoS) class map that is used to match packets to a specified class. After creating a class map, the user enters QoS Class Map Configuration mode.

### Syntax

```
[no] class-map [type qos] [{match-all|match-any}] <class map name>
```

where:

| Parameter             | Function   |
|-----------------------|--|
| match-all             | Configures the class map to use the logical AND function for packet evaluation when dealing with multiple match rules. |
| match-any             | Configures the class map to use the logical OR function for packet evaluation when dealing with multiple match rules.  |
| <i>class map name</i> | The name of the class map.   |

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds QoS class map 'cmap-qos-01' that uses the logical AND function when evaluating packets:

```
Switch(config)# class-map type qos match-all cmap-qos-01
```

### Restrictions

For this release, the switch supports **match-any** only; **match-all** command will have the same effect as **match-only**.

---

## class-map type control-plane

Adds or removes a control-plane class map that is used to match packets to a specified class.

### Syntax

**[no] class-map type control-plane match-any** <class map name>

where:

| Parameter             | Function  |
|-----------------------|---|
| match-any             | Configures the class map to use the logical OR function for packet evaluation when dealing with multiple match rules. |
| <i>class map name</i> | The name of the class map.  |

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds control-plane class map 'cmap-01' that uses the logical AND function when evaluating packets:

```
Switch(config)# class-map type control-plane match-any cmap-01
```

---

## match

Defines the classification criteria when evaluating packets used for the current Quality of Service (QoS) class map.

## Syntax

```
[no] match [not] {access-group name <ACL name>|cos <CoS value>|  
dscp <DSCP value>|ip rtp <TCP port>|precedence <precedence value>|  
protocol <protocol name>}
```

where:

| Parameter                            | Function   |
|--------------------------------------|--|
| not                                  | Match all criteria except the specified one.   |
| access-group name<br><i>ACL name</i> | Defines the specified Access Control List (ACL) as the classification criterion.   |
| cos <i>CoS value</i>                 | Defines the specified Class of Service (CoS) as the classification criterion. The <i>CoS value</i> is from 0 to 7 and it can be specified as a range.  |
| dscp <i>DSCP value</i>               | Defines the specified DiffServ Code Point (DSCP) as the classification criterion. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"><li>● af11 - AF11 DSCP (001010)</li><li>● af12 - AF12 DSCP (001100)</li><li>● af13 - AF13 DSCP (001110)</li><li>● af21 - AF21 DSCP (010010)</li><li>● af22 - AF22 DSCP (010100)</li><li>● af23 - AF23 DSCP (010110)</li><li>● af31 - AF31 DSCP (011010)</li><li>● af32 - AF32 DSCP (011100)</li><li>● af33 - AF33 DSCP (011110)</li><li>● af41 - AF41 DSCP (100010)</li><li>● af42 - AF42 DSCP (100100)</li><li>● af43 - AF43 DSCP (100110)</li><li>● cs1 - CS1(precedence 1) DSCP (001000)</li><li>● cs2 - CS2(precedence 2) DSCP (010000)</li><li>● cs3 - CS3(precedence 3) DSCP (011000)</li><li>● cs4 - CS4(precedence 4) DSCP (100000)</li><li>● cs5 - CS5(precedence 5) DSCP (101000)</li><li>● cs6 - CS6(precedence 6) DSCP (110000)</li><li>● cs7 - CS7(precedence 7) DSCP (111000)</li><li>● default - Default DSCP (000000)</li><li>● ef - EF DSCP (101110)</li></ul> |



| Parameter                                | Function   |
|--|--|
| <code>ip rtp TCP port</code>             | Defines the Transmission Control Protocol (TCP) port used by Real-time Transport Protocol (RTP) processes as the classification criterion. The <i>TCP port</i> can be from 2000 to 65535.  |
| <code>precedence precedence value</code> | Defines the precedence as the classification criterion. The precedence value is from 0 to 7 or it can be one of the following: <ul style="list-style-type: none"> <li>● <code>routine</code> - Routine precedence (0)</li> <li>● <code>priority</code> - Priority precedence (1)</li> <li>● <code>immediate</code> - Immediate precedence (2)</li> <li>● <code>flash</code> - Flash precedence (3)</li> <li>● <code>flash-override</code> - Flash override precedence (4)</li> <li>● <code>critical</code> - Critical precedence (5)</li> <li>● <code>internet</code> - Internetwork control precedence (6)</li> <li>● <code>network</code> - Network control precedence (7)</li> </ul>  |
| <code>protocol protocol name</code>      | Defines a protocol as the classification criterion. The <i>protocol name</i> can be one of the following: <ul style="list-style-type: none"> <li>● <code>arp</code> - Address Resolution Protocol</li> <li>● <code>bridging</code> - Bridging</li> <li>● <code>cdp</code> - CISCO Discovery Protocol</li> <li>● <code>clns</code> - Connectionless Network Service</li> <li>● <code>clns-es</code> - CLNS End Systems</li> <li>● <code>clns-is</code> - CLNS Intermediate Systems</li> <li>● <code>dhcp</code> - Dynamic Host Configuration</li> <li>● <code>isis</code> - Intermediate System to Intermediate System</li> <li>● <code>ldp</code> - Label Distribution Protocol</li> <li>● <code>netbios</code> - NetBIOS extended user interface</li> </ul> |

## Modes

QoS Class Map Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command defines the classification criterion as protocol ARP:

```
Switch(config-cmap-qos)# match protocol arp
```

---

## class-map type queuing

Adds or removes a queuing class map that is used to match packets to a specified class. After creating a class map, enters Queuing Class Map Configuration mode.

### Syntax

**[no] class-map type queuing match-any** *<queue name>*

where:

| Parameter         | Function  |
|-------------------|---|
| match-any         | Configures the class map to use the logical OR function for packet evaluation when dealing with multiple match rules.   |
| <i>queue name</i> | The name of the queue. The possible options are: <ul style="list-style-type: none"><li>o 1p7q1t-out-q-default (queue 0 or default queue)</li><li>o 1p7q1t-out-pq1 (queue 1 or priority queue)</li><li>o 1p7q1t-out-q2 (queue 2)</li><li>o 1p7q1t-out-q3 (queue 3)</li><li>o 1p7q1t-out-q4 (queue 4)</li><li>o 1p7q1t-out-q5 (queue 5)</li><li>o 1p7q1t-out-q6 (queue 6)</li><li>o 1p7q1t-out-q7 (queue 7)</li></ul> |

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates queuing class map 1p7q1t-out-q3 that uses the logical OR function when evaluating packets:

```
Switch(config)# class-map type queuing match-any 1p7q1t-out-q3
```

---

## match

Defines the classification criteria when evaluating packets used for the current queuing class map.

## Syntax

**[no] match {cos <CoS value>|qos-group <QoS group value>}**

where:

| Parameter                        | Function  |
|----------------------------------|---|
| cos <i>CoS value</i>             | Defines the specified Class of Service (CoS) as the classification criterion. The <i>CoS value</i> is from 0 to 7 and it can be specified as a range.               |
| qos-group <i>QoS group value</i> | Defines the specified Quality of Service (QoS) group as the classification criterion. The <i>QoS group value</i> is from 0 to 7 and it can be specified as a range. |

## Modes

Queuing Class Map Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command defines the classification criterion as CoS value 3:

```
Switch(config-cmap-que)# match cos 3
```



---

## Chapter 8. Route Map Mode Commands

These commands enter you into an advanced configuration mode for the selected routing map.

---

## route-map

Enters the Route Map Configuration Mode or creates a route map.

### Syntax

```
[no] route-map <route-map name> [{deny|permit} <sequence number>]
```

where:

| Parameter         | Function   |
|-------------------|--|
| <route-map name>  | Enters route map configuration mode for the named routing map.                               |
| <b>deny</b>       | Denies to distribute route if the match criteria are met.                                    |
| <b>permit</b>     | Accepts to distribute route if the match criteria are met.                                   |
| <sequence number> | Indicates the position of a new clause in the specified route map (an integer from 1-65535). |

Using **no** before the command turns off route map or deletes an entry.

### Mode

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enters route map configuration for route map 'rmap-10' and clause '2330':

```
Switch(config)# route-map rmap-10 permit 2330
```

### Restrictions

Specifying multiple match condition in a single match command is not supported.

### Related Commands

| Command          | Description               |
|------------------|---------------------------|
| configure device | Enter Configuration Mode. |

---

## match as-path

Matches a BGP autonomous system path access list.

### Syntax

```
[no] match as-path <name>
```

where:

| Parameter | Description                      |
|-----------|----------------------------------|
| <name>    | The name of AS path access list. |

Using **no** before the command turns off the as-path matching.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures a matching BGP as-path access-list named *test*:

```
Switch(config-route-map)# match as-path test
```

### Related Commands

| Command                                | Description                              |
|--|--|
| <a href="#">ip as-path access-list</a> | Creates or deletes a BGP AS access list. |

---

## match community

Matches a BGP community list in a route map.

### Syntax

**[no] match community** <name> [**exact match**]

where:

| Parameter          | Description  |
|--------------------|--|
| <name>             | The name of the BGP community list.  |
| <b>exact match</b> | Indicates that an exact match is required. All of the communities and only those communities specified in the selected community list must be present. |

Using **no** before the command removes BGP community list entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures a BGP community:

```
Switch(config-route-map)# match community test exact-match
```

### Related Commands

| Command                                    | Description  |
|--|--|
| <a href="#">ip community-list expanded</a> | Adds or removes an expanded entry to or from the specified BGP community list. |
| <a href="#">ip community-list standard</a> | Adds or removes a standard entry to or from the specified BGP community list.  |



---

## match extcommunity

Matches a BGP extended community list in a route map.

### Syntax

```
[no] match extcommunity <name> [exact match]
```

where:

| Parameter          | Description  |
|--------------------|--|
| <name>             | The name of the BGP extended community.  |
| <b>exact match</b> | Indicates that an exact match is required. All of the extended communities and only those communities specified in the selected extended community list must be present. |

Using **no** before the command removes BGP extended community list entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures a BGP extended community:

```
Switch(config-route-map)# match extcommunity test exact-match
```

### Related Commands

| Command                                       | Description   |
|---|---|
| <a href="#">ip extcommunity-list expanded</a> | Adds or removes an expanded entry to or from the specified BGP extended community list. |
| <a href="#">ip extcommunity-list standard</a> | Adds or removes a standard entry to or from the specified BGP extended community list.  |

---

## match interface

Specifies the next-hop interface name of a route to be matched.

### Syntax

```
[no] match interface {<interface name>|ethernet <chassis number>|loopback <loopback interface number>|mgmt 0|port-aggregation <LAG number>|vlan <VLAN number>}
```

where:

| Parameter                            | Description                                      |
|--------------------------------------|--|
| <interface name>                     | IP interface name.                               |
| ethernet <chassis number>            | Ethernet chassis number.                         |
| loopback <loopback interface number> | Loopback interface value (a number from 0 to 7). |
| mgmt 0                               | Management interface.                            |
| port-aggregation <LAG number>        | LAG value (a number from 1 to 4096).             |
| vlan <VLAN number>                   | VLAN interface number (a number from 1 to 4094). |

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures a match on interface ethernet 1/12:

```
Switch(config-route-map)# match interface ethernet 1/12
```

---

## match ip

Matches the IPv4 prefix lists in a route map.

## Syntax

```
[no] match ip {address|next-hop} prefix-list <name>
```

where:

| Parameter          | Description                                  |
|--------------------|--|
| <b>address</b>     | Destination IP address.                      |
| <b>next - hop</b>  | Next-hop address of route.                   |
| <b>prefix-list</b> | Predefined list to match distributed routes. |
| <name>             | Name of the prefix list.                     |

Using **no** before the command removes the address or next-hop entry.

## Modes

Route Map Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following distributes routes that have a next-hop router address passed by the prefix list named test:

```
Switch(config-route-map)# match ip next-hop prefix-list test
```

The following distributes routes that have a destination network number address passed by the prefix list named test:

```
Switch(config-route-map)# match ip address prefix-list test
```

## Related Commands

| Release                        | Modification   |
|--------------------------------|--|
| <a href="#">ip prefix-list</a> | Adds or removes an IPv4 prefix list used to filter BGP routes. |

---

## match ipv6

Matches the IPv6 prefix lists in a route map.

### Syntax

```
[no] match ipv6 {address|next-hop} prefix-list <name>
```

where:

| Parameter            | Description                                  |
|----------------------|--|
| <b>address</b>       | Destination IP address.                      |
| <b>next - hop</b>    | Next-hop address of route.                   |
| <b>prefix - list</b> | Predefined list to match distributed routes. |
| <name>               | Name of the prefix list.                     |

Using **no** before the command removes the address or next-hop entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following distributes routes that have a next-hop router address passed by the prefix list named test:

```
Switch(config-route-map)# match ipv6 next-hop prefix-list test
```

The following distributes routes that have a destination network number address passed by the prefix list named test:

```
Switch(config-route-map)# match ipv6 address prefix-list test
```

---

## match metric

Matches the metric values configured in a route map.

### Syntax

```
[no] match metric <metric-value>
```

where:

| Parameter      | Description                                   |
|----------------|---|
| <metric-value> | Route metric (a number from 0 to 4294967295). |

Using **no** before the command removes the metric match.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following redistributes routes that match routing metric value 5:

```
Switch(config-route-map)# match metric 10
```

---

## match origin

Redistributes routes that match the BGP origin code.

### Syntax

```
[no] match origin {egp|igp|incomplete}
```

where:

| Parameter         | Description                                    |
|-------------------|--|
| <b>egp</b>        | Remote exterior gateway protocol (EGP) system. |
| <b>igp</b>        | Local interior gateway protocol (IGP) system.  |
| <b>incomplete</b> | Unknown origin.                                |

Using **no** before the command removes the origin match.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following redistributes routes that match an unknown origin:

```
Switch(config-route-map)# match origin incomplete
```

---

## match route-type

Redistributes routes that match the specified route type.

### Syntax

```
[no] match route-type external [type-1|type-2] [internal  
[inter|intra]] [nssa-external [type-1|type-2]]
```

```
[no] match route-type internal [inter|intra] [external  
[type-1|type-2]] [nssa-external [type-1|type-2]]
```

```
[no] match route-type nssa-external [type-1|type-2] [external  
[type-1|type-2]] [internal [inter|intra]]
```

where:

| Parameter            | Description  |
|----------------------|--|
| <b>external</b>      | Redistributes external OSPF routes.                      |
| <b>nssa-external</b> | Redistributes Not-so-stubby Area (NSSA) external routes. |
| <b>type-1</b>        | Redistributes OSPF type 1 routes.                        |
| <b>type-2</b>        | Redistributes OSPF type 2 routes.                        |
| <b>internal</b>      | Redistributes internal OSPF routes.                      |
| <b>intra</b>         | Redistributes OSPF intra-area internal routes.           |
| <b>inter</b>         | Redistributes OSPF inter-area internal routes.           |

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command redistributes NSSA OSPF type 1 external routes, OSPF type 1 external routes, and all internal routes:

```
Switch(config-route-map)# match route-type nssa-external type-1 external  
type-1 internal
```

---

## match tag

Redistributes routes that match the specified tags.

### Syntax

**[no] match tag** <route tag value>

where:

| Parameter         | Description   |
|-------------------|---|
| <route tag value> | List of route tag values (a number from 0 to 4294967295). |

Using **no** before the command removes the tag match.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following redistributes routes that match the tag value 4:

```
Switch(config-route-map)# match tag 4
```



---

## apply aggregator

Sets the BGP aggregator attribute.

### Syntax

**[no] apply aggregator as** <AS number> <IP address>

where:

| Parameter    | Description   |
|--------------|---|
| <AS number>  | The aggregator's autonomous system path number.           |
| <IP address> | The aggregator's BGP identifier of the originator router. |

Using **no** before the command disables the function.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the BGP aggregator attribute:

```
Switch(config-route-map)# apply aggregator as 1 9.1.0.0
```

---

## apply as-path

Modifies an autonomous system path (as-path) for BGP routes.

### Syntax

**[no] apply as-path {tag|prepend {<AS number>|last-as <prepend number>}}**

where:

| Parameter        | Description  |
|------------------|--|
| <b>tag</b>       | Tag of a route.  |
| <b>prepend</b>   | Adds an as-path number to the AS path of the route.          |
| <AS number>      | Autonomous system path number.                               |
| <b>last-as</b>   | Prepends the last AS to the AS path.                         |
| <prepend number> | The number of times the last AS is prepended to the AS path. |

Using **no** before the command disables the function.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following prepends 50 to all routes:

```
Switch(config-route-map)# apply as-path prepend 50
```

---

## apply atomic-aggregate

Sets the BGP atomic aggregate attribute.

### Syntax

**[no] apply atomic-aggregate**

Using **no** before the command disables the function.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the BGP atomic aggregate attribute:

```
Switch(config-route-map)# apply atomic-aggregate
```

### Restrictions

This parameter is set automatically when an aggregate route is created with the **aggregate-address** command.

---

## apply comm-list

Removes the BGP community attribute from the route map configuration.

### Syntax

**[no] apply comm-list** *<community list name>* **delete**

where:

| Parameter                          | Description  |
|------------------------------------|--|
| <i>&lt;community list name&gt;</i> | The community list name. Communities from this list will be removed. |

Using **no** before the command removes a previous **apply** command.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following delete the community named test:

```
Switch(config-route-map)# apply comm-list test delete
```

---

## apply community

Sets the BGP community attribute.

### Syntax

```
[no] apply community {none|<community number>[<community number list>]|additive|internet|local-AS|no-advertise|no-export}}
```

where:

| Parameter           | Description  |
|---------------------|--|
| <b>none</b>         | Removes the community attribute from prefix that passed the route-map.   |
| <community number>  | Sets the BGP community attribute (a number from 1 to 65535). Enter up to 32 communities strings using the format, aa:nn. |
| <b>additive</b>     | Adds to existing community.  |
| <b>internet</b>     | Specifies the internet community.  |
| <b>local-AS</b>     | Specifies the local-AS community. Outside local AS are not sent.   |
| <b>no-advertise</b> | Specifies the no-advertise community. Routes are not advertised to any peers.  |
| <b>no-export</b>    | Specifies the no-export community. Routes are not exported to the next AS.   |

Using **no** before the command removes the entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the BGP community attribute:

```
Switch(config-route-map)# apply community 3:1
```

---

## apply dampening

Sets the BGP route dampening factors.

### Syntax

```
[no] apply dampening [<half-life> [<reuse> [<suppress> [<max-duration> [<unreach half-life>]]]]]
```

where:

| Parameter           | Description   |
|---------------------|---|
| <half-life>         | Time after which a penalty is decreased by half (a number from 1 to 45). The default is 15 minutes.                                 |
| <reuse>             | Value to start reusing a route (a number from 1 to 20000). The default is 750.  |
| <suppress>          | Value to start suppressing a route (a number from 1 to 20000). The default is 2000.   |
| <max-duration>      | Maximum duration to suppress a stable route (a number from 1 to 255). The default value is 4 times the half-life time (60 minutes). |
| <unreach half-life> | Time after which an unreachable route's penalty is decreased by half (a number from 1 to 45). The default is 15 minutes.            |

Using **no** before the command disables the feature.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the BGP route dampening factors:

```
Switch(config-route-map)# apply dampening 10 750 1500 20 15
```

---

## apply extcommunity

Sets an extended community attribute.

### Syntax

```
[no] apply extcommunity {rt|soo} <AA:NN> [<AA:NN list>]
```

where:

| Parameter    | Description   |
|--------------|---|
| <b>rt</b>    | Specifies the route target extended community.      |
| <b>soo</b>   | Specifies the site-of-origin extended community.    |
| <i>AA:NN</i> | Extended community number (AS and network numbers). |

Using **no** before the command removes the entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures an extended community attribute:

```
Switch(config-route-map)# apply extcommunity rt 3:1
```

---

## apply ip next-hop

Sets the specified next-hop value.

### Syntax

**[no] apply ip next-hop** {<IP address>|**peer-address**}

where:

| Parameter           | Description  |
|---------------------|--|
| <IP address>        | Sets the IP addresses for the next-hop for the matched routes. When multiple addresses are specified they are prioritized in the order in which they are entered. Each next-hop must be an adjacent router.  |
| <b>peer-address</b> | Applied on output, sets the next-hop of the advertised matching routes to the current local address of the local router. Applied on input, sets the next-hop of the received matching routes to the neighbor address, overriding other existing next-hops. |

Using **no** before the command removes the next-hop configuration.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the next-hop IP address:

```
Switch(config-route-map)# apply ip next-hop 10.0.0.2
```



---

## apply ipv6 next-hop

Sets the specified next-hop value.

### Syntax

**[no] apply ipv6 next-hop** {<IPv6 address>|**peer -address**}

where:

| Parameter            | Description  |
|----------------------|--|
| <IPv6 address>       | Sets the IP addresses for the next-hop for the matched routes. When multiple addresses are specified they are prioritized in the order in which they are entered. Each next-hop must be an adjacent router.  |
| <b>peer -address</b> | Applied on output, sets the next-hop of the advertised matching routes to the current local address of the local router. Applied on input, sets the next-hop of the received matching routes to the neighbor address, overriding other existing next-hops. |

Using **no** before the command removes the next-hop configuration.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the next-hop IP address:

```
Switch(config-route-map)# apply ipv6 next-hop 2001:db8::8a2e:370:7334
```

---

## apply local-preference

Sets the local preference. The path with the higher value is preferred.

### Syntax

**[no] apply local-preference** <number value>

where:

| Parameter      | Description                                       |
|----------------|---|
| <number value> | Preference value (a number from 0 to 4294967295). |

Using **no** before the command removes the entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the BGP community attribute:

```
Switch(config-route-map)# apply local-preference 5
```

---

## apply metric

Sets a metric value for the matching routes.

### Syntax

**[no] apply metric** *<metric value>*

where:

| Parameter                   | Description                                   |
|-----------------------------|---|
| <i>&lt;metric value&gt;</i> | Metric value (a number from 1 to 4294967295). |

Using **no** before the command removes the entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the metric value:

```
Switch(config-route-map)# apply metric 5
```

---

## apply metric-type

Sets the type of OSPF metric.

### Syntax

**[no] apply metric-type {type-1|type-2}**

where:

| Parameter     | Description  |
|---------------|--|
| <b>type-1</b> | External routes are calculated using both internal and external metrics.                                 |
| <b>type-2</b> | External routes are calculated using only the external metrics. Type 1 routes are preferred over Type 2. |

Using **no** before the command removes the OSPF metric of the current route map.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the OSPF metric type to type-1:

```
Switch(config-route-map)# apply metric-type type-1
```

---

## apply origin

Sets the BGP origin code. This attribute defines the origin of the path information.

### Syntax

```
[no] apply origin {egp <AS number>|igp|incomplete}
```

where:

| Parameter         | Description  |
|-------------------|--|
| <b>egp</b>        | Specifies the AS number for a remote exterior gateway protocol (EGP) system. |
| <AS number>       | AS number value. You can specify the value also in ASDOT format.             |
| <b>igp</b>        | Specifies a local interior gateway protocol (IGP) system.                    |
| <b>incomplete</b> | Specifies an unknown heritage.   |

Using **no** before the command removes the entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the BGP origin:

```
Switch(config-route-map)# apply origin egp 5
```

---

## apply originator-id

Sets the originator ID attribute.

### Syntax

**[no] apply originator-id** *<IP address>*

where:

| Parameter                 | Description                          |
|---------------------------|--------------------------------------|
| <i>&lt;IP address&gt;</i> | Identifier of the originator router. |

Using **no** before the command removes the entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the originator ID attribute:

```
Switch(config-route-map)# apply originator-id 1.1.1.1
```

---

## apply tag

Sets a tag value of the destination routing protocol.

## Syntax

**[no] apply tag** *<tag value>*

where:

| Parameter                | Description  |
|--------------------------|--|
| <i>&lt;tag value&gt;</i> | Identifier of the tag value (a number from 0 to 4294967295). |

Using **no** before the command removes the tag.

## Modes

Route Map Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following configures the originator ID attribute:

```
Switch(config-route-map)# apply tag 4
```

---

## apply weight

Sets the weight of matching routes.

### Syntax

**[no] apply weight** <number>

where:

| Parameter | Description                              |
|-----------|--|
| <number>  | Weight value (a number from 0 to 65535). |

Using **no** before the command removes the entry.

### Modes

Route Map Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the weight:

```
Switch(config-route-map)# apply weight 5
```



---

## Chapter 9. BGP Configuration Mode Commands

These commands enter you into an advanced configuration mode for configuring the switch to receive routes and to advertise static routes, fixed routes and virtual server IP addresses with other internal and external routers.

---

## routing-protocol bgp

Assigns an autonomous system (AS) number to a router and enters the BGP configuration mode.

### Syntax

**[no] routing-protocol bgp** <AS number>

where:

| Parameter   | Function   |
|-------------|--|
| <AS-number> | Number of an AS (a number from 1 to 4294967295). |

Using **no** before the command removes an AS assignment.

### Mode

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command shows how to configure a BGP process for autonomous system 100:

```
Switch(config)# routing-protocol bgp 100
```

### Related Commands

| Command          | Description               |
|------------------|---------------------------|
| configure device | Enter Configuration Mode. |

---

## bestpath

Changes the default best path selection.

## Syntax

**[no] bestpath** <arguments>

where:

| Parameter                         | Description   |
|-----------------------------------|---|
| <b>always-compare-med</b>         | Compares the MED on paths from a different AS.  |
| <b>as-path ignore</b>             | Ignores as-path length in selecting a route.  |
| <b>as-path multipath-relax</b>    | Allows load sharing across providers with different (but equal-length) AS paths. The AS paths must be identical for load sharing. |
| <b>compare-confed-as-path</b>     | Specifies that the AS confederation path length must be used when available in the BGP best path decision process.                |
| <b>compare-routerid</b>           | Compares the router IDs for identical eBGP paths.   |
| <b>dont-compare-originator-id</b> | Avoids comparing an originator-ID for an identical eBGP path.   |
| <b>tie-break-on-age</b>           | Selects always the older preferred route even when the <b>compare-route-id</b> command is set.                                    |
| <b>med confed</b>                 | Enables MED comparison among paths learned from confederation peers.  |
| <b>med missing-as-worst</b>       | Handles a missing MED as the highest MED.   |
| <b>med non-deterministic</b>      | Does not always select the best MED path from among the paths from the same AS numbers.   |
| <b>med remove-recv-med</b>        | Removes received MED attribute.   |
| <b>med remove-send-med</b>        | Remove send MED attribute.  |

Using **no** before the command returns the BGP routing process to the default operation.

## Modes

BGP Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following changes the default best-path selection algorithm to compare the MED on paths from different AS:

```
Switch(config-router)# bestpath always-compare-med
```

---

## bgp

Configures additional BGP settings.

## Syntax

**[no] bgp {as-local-count <number of times>}**

where:

| Parameter             | Description                              |
|-----------------------|--|
| <b>as-local-count</b> | Appends local-as.                        |
| <number of times>     | Number of times local-as to be appended. |

Using **no** before the command turns off this feature.

## Modes

BGP Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following appends 4 times the local-as:

```
Switch(config-router)# bgp as-local-count 4
```

---

## cluster-id

Specifies the router's Cluster ID used when operating as a route reflector. Route reflectors that are part of the same cluster (assigned to the same group of clients) must use identical Cluster IDs.

### Syntax

**[no] cluster-id** {<number> | <IP address>}

where:

| Parameter    | Description  |
|--------------|--|
| <number>     | Cluster-ID as 32 bit quantity (a number from 1 to 4294967295). |
| <IP address> | Cluster-ID in IP address format.                               |

Using **no** before the command removes router's Cluster ID.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures the cluster ID in IP address format:

```
Switch(config-router)# cluster-id 1.1.1.1
```

---

## confederation

Sets AS confederation parameters for the BGP.

### Syntax

**[no] confederation {identifier <AS number>|peers <AS numbers>}**

where:

| Parameter         | Description   |
|-------------------|---|
| <b>identifier</b> | The routing domain confederation AS number. It is an externally visible AS number that identifies a BGP confederation as a whole.                                     |
| <AS number>       | Autonomous system path number (a number from 1 to 65535).   |
| <b>peers</b>      | The peer AS numbers for a BGP confederation. It is an identifier visible only within a BGP confederation and used to represent a Member-AS within that confederation. |
| <AS numbers>      | List of AS peers (a number from 1 to 65535).  |

Using **no** before the command deletes the AS number or the peer AS.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the confederation identifier:

```
Switch(config-router)# confederation identifier 5
```

---

## enforce-first-as

Enforces the neighbor AS to be the first AS number listed in the AS\_path attribute for eBGP.

### Syntax

**[no] enforce-first-as**

Using **no** before the command turns off this enforcement.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enforce the neighbor AS to be the first AS number listed in the AS\_path attribute:

```
Switch(config-router)# enforce-first-as
```



---

## fast-external-failover

Enables BGP fast external failover.

### Syntax

**[no] fast-external-failover**

Using **no** before the command turns off this feature.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows to enable BGP fast external failover:

```
Switch(config-router)# fast-external-failover 5
```

---

## graceful-restart

Specifies the maximum time to keep a restarting peer's stale routes.

### Syntax

**[no] graceful-restart stalepath-time** *<delay value>*

where:

| Parameter                  | Description   |
|----------------------------|---|
| <i>&lt;delay value&gt;</i> | Time value in seconds (a number from 1 to 3600).<br>Default value is 360 seconds. |

Using **no** before the command turns off the feature.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure graceful restart delay value:

```
Switch(config-router)# graceful-restart stalepath-time 180
```

---

## graceful-restart-helper

Enables BGP gracefully restart helper mode feature. BGP router can work as receiving speaker.

### Syntax

**[no] graceful-restart-helper**

Using **no** before the command turns off the feature.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to turn on BGP graceful restart mode:

```
Switch(config-router)# graceful-restart-helper
```

---

## log-neighbor-changes

Generates a system message when a neighbor changes state.

### Syntax

**[no] log-neighbor-changes**

Using **no** before the command turns off the feature.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure this feature:

```
Switch(config-router)# log-neighbor-changes
```

---

## maxas-limit

Configures the eBGP to discard routes that have a high number of autonomous system (AS) numbers in the AS-path attribute.

### Syntax

**[no] maxas-limit** <number>

where:

| Parameter | Description   |
|-----------|---|
| <number>  | Maximum number of AS numbers (a number from 1 to 2000). |

Using **no** before the command turns off this feature.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the maximum number of AS numbers to 10:

```
Switch(config-router)# maxas-limit 10
```

---

## neighbor

Sets the remote autonomous system number for the specified peer or enters the Neighbor mode.

### Syntax

```
[no] neighbor {<IPv4 address> | <IPv4 prefix> | <IPv6 address> | <IPv6 prefix>}  
[remote-as <AS number>]
```

where:

| Parameter      | Description                               |
|----------------|---|
| <IPv4 address> | Neighbor IPv4 address.                    |
| <IPv4 prefix>  | Neighbor IPv4 prefix.                     |
| <IPv6 address> | Neighbor IPv6 address.                    |
| <IPv6 prefix>  | Neighbor IPv6 prefix.                     |
| <AS number>    | AS value (a number from 1 to 4294967295). |

Using **no** before the command removes an AS number.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the neighbor AS number for an IPv4 address:

```
Switch(config-router)# neighbor 1.1.1.1 remote-as 2  
Switch(config-router-neighbor)#
```

---

## router-id

Manually defines the router ID for a BGP speaker.

### Syntax

**[no] router-id** *<IP address>*

where:

| Parameter                 | Description        |
|---------------------------|--------------------|
| <i>&lt;IP address&gt;</i> | Router identifier. |

Using **no** before the command reverts to the previous router ID behavior.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the router ID:

```
Switch(config-router)# router-id 1.1.1.1
```

---

## synchronization

Prevents a BGP router from advertising routes learned from iBGP neighbors, unless those routes are also present in an IGP (for example, OSPF).

### Syntax

**[no] synchronization**

Using **no** before the command turns off the feature.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable synchronization:

```
Switch(config-router)# synchronization
```



---

## timers

Configures the routing timers.

## Syntax

**[no] timers** <keep alive interval> <hold time>

where:

| Parameter             | Description   |
|-----------------------|---|
| <keep alive interval> | Time interval (in seconds) the switch awaits before sending another keepalive message to the BGP neighbor (a number from 0 to 3600). The default is 60.   |
| <hold time>           | Time interval (in seconds) the switch awaits before transitioning the BGP neighbor to IDLE state, if the switch doesn't receive an update or keepalive message from the neighbor (a number from 0 to 3600). The default is 180. |

Using **no** before the command turns off this feature.

## Modes

BGP Configuration Mode

BGP Neighbor Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to configure timers:

```
Switch(config-router)# timers bgp 60 180
```

---

## vrf

Enables or disables BGP to use the default VRF instance.

By default, this is enabled.

### Syntax

**[no] vrf default**

Using **no** before the command turns off the feature.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following enables BGP to use the default VRF instance:

```
Switch(config-router)# vrf default
```

---

# Chapter 10. Address Family Mode Commands

This chapter describes the commands for entering and using BGP Address Family mode.

---

## address-family

Enters address family configuration modes while configuring BGP routing.

### Syntax

**[no] address-family {ipv4|ipv6} unicast**

where:

| Parameter      | Description                  |
|----------------|------------------------------|
| <b>ipv4</b>    | Internet Protocol version 4. |
| <b>ipv6</b>    | Internet Protocol version 6. |
| <b>unicast</b> | Unicast address support.     |

Using **no** before the command turns off this feature.

### Modes

- BGP Configuration Mode
- BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following places the router in global address family configuration mode for the IPv4 unicast address family:

```
Switch(config-router)# address-family ipv4 unicast  
Switch(config-router-af)#
```

---

## aggregate-address

Creates an aggregate entry in the BGP routing table if any more-specific BGP routes are available in the specified range.

### Syntax

```
[no] aggregate-address {<address> | <length>} [as-set]
[summary-only]
```

where:

| Parameter           | Description   |
|---------------------|---|
| <b>as-set</b>       | Generates the autonomous system set path information and community information from the contributing paths. |
| <b>summary-only</b> | Filters all more-specific routes from updates.  |

Using **no** before the command removes the summary address.

### Modes

BGP Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to create an aggregate BGP address:

```
Switch(config-router-af)# aggregate-address 1.1.1.1 255.0.0.0 as-set
```

---

## client-to-client reflection

Enables route reflection from a BGP route reflector to clients.

### Syntax

**[no] client-to-client reflection**

Using **no** before the command turns off this feature.

### Modes

BGP Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure router as a router reflection:

```
Switch(config-router-af)# client-to-client reflection
```

---

## dampening

Enables BGP route dampening or changes BGP route dampening factors.

### Syntax

```
[no] dampening [<half-life> [<reuse> <suppress> <max-duration> [<unreach  
half-life>]]] [route-map <name>]
```

where:

| Parameter           | Description   |
|---------------------|---|
| <half-life>         | Time after which a penalty is decreased by half (a number from 1 to 45). The default is 15 minutes.                                 |
| <reuse>             | Value to start reusing a route (a number from 1 to 20000). The default is 750.  |
| <suppress>          | Value to start suppressing a route (a number from 1 to 20000). The default is 2000.   |
| <max-duration>      | Maximum duration to suppress a stable route (a number from 1 to 255). The default value is 4 times the half-life time (60 minutes). |
| <unreach half-life> | Time after which an unreachable route's penalty is decreased by half (a number from 1 to 45). The default is 15 minutes.            |
| route-map <name>    | Name of the route map that controls where BGP route dampening is enabled.   |

Using **no** before the command turns off the feature.

### Modes

BGP Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables BGP route dampening with a half-life of one minute, a reuse route value of 500, a suppress route value of 2000, and a maximum duration value of three times the half-life time:

```
Switch(config-route-af)# dampening 1 500 2000 3
```

---

## distance

Configures BGP administrative distances (AD).

### Syntax

**[no] distance** <external AD> <internal AD> <local AD>

where:

| Parameter     | Description  |
|---------------|--|
| <internal AD> | Administrative distance to routes inside the AS. The <i>internal AD</i> is from 1 to 255. The default is 200.  |
| <external AD> | Administrative distance to routes outside the AS. The <i>external AD</i> is from 1 to 255. The default is 200. |
| <local AD>    | Administrative distance for local routes. The <i>local AD</i> is from 1 to 255. The default is 200.            |

Using **no** before the command restore the system to its default value.

### Modes

BGP Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets distance:

```
Switch(config-router-af)# distance 100 120 150
```

### Restrictions

A higher distance value means a lower trust rating (e.g., an administrative distance of 255 means that the routing information source cannot be trusted and should be ignored).



---

## maximum-paths

Sets maximum paths allowed for an internal or external route.

### Syntax

**[no] maximum-paths {ebgp|ibgp} <multipath numbers>**

where:

| Parameter           | Description   |
|---------------------|---|
| <b>ebgp</b>         | The maximum paths allowed for an external route.                                |
| <b>ibgp</b>         | The maximum paths allowed for an internal route.                                |
| <multipath numbers> | Value for maximum path numbers (a number from 2 to 32). The default value is 8. |

Using **no** before the command resets the maximum paths allowed for a route to its default value.

### Modes

BGP Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the maximum paths number:

```
Switch(config-router-af)# maximum-paths ibgp 4
```

---

## network

Configures an IP prefix for advertisement.

## Syntax

```
[no] network {<IP address> [mask <network mask>] | <IP prefix length>}  
[backdoor | route-map <name>]
```

where:

| Parameter           | Description   |
|---------------------|---|
| <IP address>        | IPv4 address in the format A.B.C.D.   |
| mask <network mask> | IP subnet address mask.   |
| <IP prefix length>  | IPv4 address in the format A.B.C.D./length  |
| backdoor            | BGP backdoor route. The administrative distance assigned to the network is forced to the administrative distance of the local routes. IGP-learned routes are preferred. A network that is marked as a backdoor is not sourced by the local router, but should be learned from external neighbors. |
| route-map <name>    | Route map attributes.   |

Using **no** before the command removes the IP prefix to advertise.

## Modes

BGP Address Family Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to configure an IP prefix:

```
Switch(config-router-af)# network 1.1.1.1/2 backdoor
```

## Restrictions

For the **backdoor** command, make sure to verify the route is in the BGP table. Otherwise, the command will not have the desired effect.

---

## network synchronization

Performs IGP synchronisation on network routes.

### Syntax

**[no] network synchronization**

Using **no** before the command turns off the feature.

### Modes

BGP Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure IGP synchronization:

```
Switch(config-router-af)# network synchronisation
```

---

## nexthop

Specifies the next-hop address tracking delay timer for critical or non-critical next-hop reachability routes

## Syntax

```
[no] nexthop trigger-delay {critical <delay value> non-critical <delay value>
```

where:

| Parameter     | Description  |
|---------------|--|
| <delay value> | Delay value in milliseconds (a number from 1 to 4294967295). |

Using **no** before the command turns off the feature.

## Modes

BGP Address Family Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how delay timers:

```
Switch(config-router-af)# nexthop trigger-delay critical 5 non-critical 4
```

---

## redistribute

Redistributes routes from a routing domain to BGP.

### Syntax

**[no] redistribute {direct|ospf|static} [route-map <map name>]**

where:

| Parameter                         | Description                                       |
|-----------------------------------|---|
| <b>direct</b>                     | Routes directly connected on an interface.        |
| <b>ospf</b>                       | Routes belonging to OSPF protocol.                |
| <b>static</b>                     | IP static routes.                                 |
| <b>route-map &lt;map name&gt;</b> | Specifies the route maps used for redistribution. |

Using **no** before the command turns off the feature.

### Modes

BGP Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to redistribute routes:

```
Switch(config-router-af)# redistribute direct route-map test
```



---

# Chapter 11. Neighbor Mode Commands

This chapter describes the commands for entering and using BGP Neighbor mode.

---

## neighbor

Sets the remote autonomous system number for the specified peer or enters the Neighbor mode.

### Syntax

```
[no] neighbor {<IPv4 address> | <IPv4 prefix> | <IPv6 address> | <IPv6 prefix>}  
[remote-as <AS number>]
```

where:

| Parameter      | Description                               |
|----------------|---|
| <IPv4 address> | Neighbor IPv4 address.                    |
| <IPv4 prefix>  | Neighbor IPv4 prefix.                     |
| <IPv6 address> | Neighbor IPv6 address.                    |
| <IPv6 prefix>  | Neighbor IPv6 prefix.                     |
| <AS number>    | AS value (a number from 1 to 4294967295). |

Using **no** before the command removes an AS number.

### Modes

BGP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the neighbor AS number for an IPv4 address:

```
Switch(config-router)# neighbor 1.1.1.1 remote-as 2  
Switch(config-router-neighbor)#
```



---

## address-family

Enters neighbor address family configuration modes while configuring BGP routing.

### Syntax

**[no] address-family {ipv4|ipv6} unicast**

where:

| Parameter      | Description                  |
|----------------|------------------------------|
| <b>ipv4</b>    | Internet Protocol version 4. |
| <b>ipv6</b>    | Internet Protocol version 6. |
| <b>unicast</b> | Unicast address support.     |

Using **no** before the command turns off this feature.

### Modes

- BGP Configuration Mode
- BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following places the router in global address family configuration mode for the IPv4 unicast address family:

```
Switch(config-router-neighbor)# address-family ipv4 unicast  
Switch(config-router-neighbor-af)#
```

---

## advertisement-interval

Sets the minimum interval for sending BGP routing updates.

### Syntax

**[no] advertisement-interval** *<time interval>*

where:

| Parameter                    | Description   |
|------------------------------|---|
| <i>&lt;time interval&gt;</i> | Advertisement time interval in seconds (a number from 1 to 65535). The default value is 5 seconds for IBGP and 30 seconds for EBGP. |

Using **no** before the command restores the configuration to its default value.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the time interval:

```
Switch(config-router-neighbor)# advertisement-interval 10
```

---

## bfd

Enables BFD for a BGP peer.

## Syntax

**[no] bfd [multihop]**

where:

| Parameter       | Description   |
|-----------------|---|
| <b>multihop</b> | Configures the BFD session as multihop. Use this if the peer is multiple hops away. |

Using **no** before the command turns off the feature.

## Modes

BGP Neighbor Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following enables BFD on the current BGP neighbor:

```
Switch(config-router-neighbor)# bfd
```

---

## connection-retry-time

Sets the connection retry time.

### Syntax

**[no] connection-retry-time** *<time value>*

where:

| Parameter                 | Description  |
|---------------------------|--|
| <i>&lt;time value&gt;</i> | Connect timer in seconds (a number from 1 to 65535).<br>The default value is 30. |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the connection retry time:

```
Switch(config-router-neighbor)# connection-retry-time 120
```

---

## description

Sets a description for the BGP peer.

## Syntax

**[no] description** *<text>*

where:

| Parameter           | Description   |
|---------------------|---|
| <i>&lt;text&gt;</i> | Text description (a string from 1 to 80 alphanumeric characters). |

Using **no** before the command turns off the feature.

## Modes

BGP Neighbor Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following sets a BGP peer description:

```
Switch(config-router-neighbor)# description BGP peer
```

---

## disallow-infinite-holdtime

Disallows configuration of infinite hold-time.

### Syntax

**[no] disallow-infinite-holdtime**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to disallow configuration of infinite holdtime:

```
Switch(config-router-neighbor)# disallow-infinite-holdtime
```

---

## dont-capability-negotiate

Disables capabilities negotiation.

### Syntax

**[no] dont-capability-negotiate**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to disable capabilities negotiation:

```
Switch(config-router-neighbor)# dont-capability-negotiate
```

### Restrictions

BGP sessions must be manually reset after configuring this feature.

---

## dynamic-capability

Enables dynamic capability. The command triggers an automatic notification and resets session for the BGP neighbor sessions.

### Syntax

**[no] dynamic-capability**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable dynamic capability:

```
Switch(config-router-neighbor)# dynamic-capability
```



---

## ebgp-multihop

Configures the eBGP time-to-live (TTL) value to support eBGP multihop.

### Syntax

**[no] ebgp-multihop** <maximum hop count>

where:

| Parameter           | Description  |
|---------------------|--|
| <maximum hop count> | Maximum hop count number (a number from 1 to 255). |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure an ebgp multihop value of 10:

```
Switch(config-router-neighbor)# ebgp-multihop 10
```

---

## local-as

Specifies AS number to use with BGP neighbor.

### Syntax

```
[no] local-as <number> [no-prepend [replace-as [dual-as]]]
```

where:

| Parameter         | Description  |
|-------------------|--|
| <number>          | AS number (a number from 1 to 4294967295).             |
| <b>no-prepend</b> | Prepends only the configured local-as number.          |
| <b>replace-as</b> | Establishes eBGP using real AS or configured local-as. |
| <b>dual-as</b>    | AS number.   |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the local AS number:

```
Switch(config-router-neighbor)# local-as 100
```

---

## maximum-peers

Specifies maximum number of peers for a prefix.

### Syntax

**[no] maximum-peers** <number>

where:

| Parameter | Description                               |
|-----------|---|
| <number>  | Peer limit value (a number form 1 to 96). |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the maximum number of peers:

```
Switch(config-router-neighbor)# maximum-peers 40
```

---

## password

Configures BGP to use MD5 authentication.

### Syntax

**[no] password [0] <string>**

where:

| Parameter | Description               |
|-----------|---------------------------|
| <b>0</b>  | Uses an un-encrypted key. |
| <string>  | Password string.          |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets a BGP password that will be stored in the local configuration file in an encrypted format:

```
Switch(config-router-neighbor)# password 1qaz2wsx
```

---

## remote-private-AS

Removes private AS numbers from outbound route updates to an eBGP peer.

### Syntax

**[no] remote-private-AS**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets remote-private-AS:

```
Switch(config-router-neighbor)# remote-private-as
```

---

## shutdown

Shuts down the neighbor. A session reset for the BGP neighbor sessions is performed.

### Syntax

**[no] shutdown**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to shut down a neighbor:

```
Switch(config-router-neighbor)# shutdown
```

---

## timers

Configures the routing timers.

## Syntax

**[no] timers** <keep alive interval> <hold time>

where:

| Parameter             | Description   |
|-----------------------|---|
| <keep alive interval> | Time interval (in seconds) the switch awaits before sending another keepalive message to the BGP neighbor (a number from 0 to 3600). The default is 60.   |
| <hold time>           | Time interval (in seconds) the switch awaits before transitioning the BGP neighbor to IDLE state, if the switch doesn't receive an update or keepalive message from the neighbor (a number from 0 to 3600). The default is 180. |

Using **no** before the command turns off this feature.

## Modes

- BGP Configuration Mode
- BGP Neighbor Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to configure timers:

```
Switch(config-router-neighbor)# timers 120 360
```

---

## transport

Configures the local system to not initiate TCP connections to this peer.

### Syntax

**[no] transport connection-mode passive**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to allow a single passive connection:

```
Switch(config-router-neighbor)# transport connection-mode passive
```

### Restrictions

BGP speaker does not initiate a TCP connection to a BGP peer. You must manually reset the BGP sessions after configuring this command.



---

## ttl-security

Sets the minimum number of TTL router hops an IP packet must have to not be discarded.

### Syntax

**[no] ttl-security hops** *<number>*

where:

| Parameter             | Description                         |
|-----------------------|-------------------------------------|
| <i>&lt;number&gt;</i> | AS number (a number from 1 to 254). |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the minimum TTL value:

```
Switch(config-router-neighbor)# ttl-security hops 60
```

---

## update-source

Sets the source of the BGP session and updates.

### Syntax

**[no] update-source** {<interface name>|**ethernet** <chassis number>|**loopback** <loopback interface number>|**vlan** <id>}

where:

| Parameter                                   | Description                                      |
|---|--|
| <interface name>                            | IP interface name.                               |
| <b>ethernet</b> <chassis number>            | Ethernet chassis number.                         |
| <b>loopback</b> <loopback interface number> | Loopback interface value (a number from 0 to 7). |
| <b>vlan</b> <id>                            | VLAN interface number (a number from 1 to 4094). |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the update source:

```
Switch(config-router-neighbor)# update-source loopback 2
```

---

## weight

Sets the default weight for routes from a specific neighbor.

## Syntax

**[no] weight** <number>

where:

| Parameter | Description                              |
|-----------|--|
| <number>  | Weight value (a number from 0 to 65535). |

Using **no** before the command turns off the feature.

## Modes

BGP Neighbor Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following sets the default weight:

```
Switch(config-router-neighbor)# weight 5
```



---

## Chapter 12. Neighbor Address Family Commands

This chapter describes the commands for entering and using BGP Neighbor Address Family mode.

---

## address-family

Enters neighbor address family configuration modes while configuring BGP routing.

### Syntax

**[no] address-family {ipv4|ipv6} unicast**

where:

| Parameter      | Description                  |
|----------------|------------------------------|
| <b>ipv4</b>    | Internet Protocol version 4. |
| <b>ipv6</b>    | Internet Protocol version 6. |
| <b>unicast</b> | Unicast address support.     |

Using **no** before the command turns off this feature.

### Modes

- BGP Configuration Mode
- BGP Neighbor Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following places the router in global address family configuration mode for the IPv4 unicast address family:

```
Switch(config-router-neighbor)# address-family ipv4 unicast
Switch(config-router-neighbor-af)
```

---

## allowas-in

Enables the allowas-in feature for BGP and configures the number of occurrences of the AS number.

### Syntax

**[no] allowas-in** [*<number>*]

where:

| Parameter             | Description   |
|-----------------------|---|
| <i>&lt;number&gt;</i> | Number of occurrences of AS number (a number from 1 to 10). The default value is 3. |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# allowas-in
```

---

## default-originate

Sets a BGP routing process to distribute a default route.

### Syntax

**[no] default-originate [route-map <name>]**

where:

| Parameter                 | Description            |
|---------------------------|------------------------|
| <b>route-map</b> <number> | Name of the route map. |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# default-originate
```



---

## filter-list

Configures AS-path access-list to BGP neighbor.

## Syntax

```
[no] filter-list <access-list name> {in|out}
```

where:

| Parameter          | Description                            |
|--------------------|--|
| <access-list name> | AS-path access-list name.              |
| <b>in</b>          | Applies the filter to incoming routes. |
| <b>out</b>         | Applies the filter to outgoing routes. |

Using **no** before the command turns off the feature.

## Modes

BGP Neighbor Address Family Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to apply an AS-path filter to outgoing routes via AS path access-list ACL1:

```
Switch(config-router-neighbor-af)# filter-list ACL1 out
```

---

## maximum-prefix

Controls how many prefixes can be received from a neighbor.

### Syntax

**[no] maximum-prefix** <number> [*<threshold value>*] [**warning-only**]

where:

| Parameter           | Description  |
|---------------------|--|
| <number>            | Maximum number of prefix limit (a number from 1 to 15870).   |
| <threshold value>   | The percentage of the maximum-prefix limit at which the router starts to generate a warning message. (a number from 1 to 100). |
| <b>warning-only</b> | Sends warning messages only when the limit is exceeded.  |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# maximum-prefix 5 warning-only
```

---

## next-hop-self

Sets the local BGP speaker address as the next-hop address in route updates.

### Syntax

**[no] next-hop-self**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# next-hop-self
```

---

## prefix-list

Configures prefix-list for BGP neighbor.

### Syntax

```
[no] prefix-list <name> {in|out}
```

where:

| Parameter  | Description                            |
|------------|--|
| <name>     | Name of a prefix list.                 |
| <b>in</b>  | Applies the filter to incoming routes. |
| <b>out</b> | Applies the filter to outgoing routes. |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# prefix-list test in
```

---

## route-map

Adds route-map in incoming or outgoing direction to the neighbor.

### Syntax

**[no] route-map** <name> {**in**|**out**}

where:

| Parameter  | Description                            |
|------------|--|
| <name>     | Name of a route map.                   |
| <b>in</b>  | Applies the filter to incoming routes. |
| <b>out</b> | Applies the filter to outgoing routes. |

Using **no** before the command removes all route maps or a specific route map from in-route or out-route map list.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# route-map test in
```

---

## route-reflector-client

Enables the peer as a route reflector client. Configuring route reflector clients, implicitly sets up the local router as a route reflector.

### Syntax

**[no] route-reflector-client**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# route-reflector-client
```

---

## send-community

Enables sending a community attribute to a BGP neighbor.

### Syntax

**[no] send-community [extended]**

where:

| Parameter       | Description                          |
|-----------------|--------------------------------------|
| <b>extended</b> | Sends extended community attributes. |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# send-community
```

---

## soft-reconfiguration

Sets the switch software to start storing BGP peer updates.

### Syntax

**[no] soft-reconfiguration inbound**

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# soft-reconfiguration
```



---

## unsuppress-map

Sets route map to selectively unsuppress suppressed routes.

### Syntax

**[no] unsuppress-map** <name>

where:

| Parameter | Description          |
|-----------|----------------------|
| <name>    | Name of a route map. |

Using **no** before the command turns off the feature.

### Modes

BGP Neighbor Address Family Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router-neighbor-af)# unsuppress-map test
```



---

## Chapter 13. OSPF Configuration Mode Commands

These commands enter you into an advanced configuration mode for configuring the Open Shortest Path First (OSPF) routing instances.

---

## routing-protocol ospf

Configures an Open Shortest Path First (OSPF) routing instance and enters the OSPF configuration mode.

### Syntax

**[no] routing-protocol ospf**

Using **no** before the command terminates an OSPF routing process.

### Mode

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command shows how to enter OSPF configuration mode:

```
Switch(config)# routing-protocol ospf  
Switch(config-router)#
```

---

## area <area id> authentication

Enables authentication for a specific area.

### Syntax

**[no] area <area id> authentication [message-digest]**

where:

| Parameter             | Description  |
|-----------------------|--|
| <area id>             | Decimal value (a number from 0 to 4294967295) or IP address. |
| <b>message-digest</b> | Enables MD5 authentication.                                  |

Using **no** before the command removes the authentication for a specific area.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable authentication for a specific area:

```
Switch(config-router)# area 1.1.1.1 authentication
```

---

## area <area id> default-cost

Sets a cost for the default summary route sent into a stub or NSSA area.

### Syntax

```
[no] area <area id> default-cost <cost value>
```

where:

| Parameter    | Description   |
|--------------|---|
| <area id>    | Decimal value (a number from 0 to 4294967295) or IP address.          |
| <cost value> | Stub's advertised default summary cost (a number from 0 to 16777215). |

Using **no** before the command removes the assigned default-cost route.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets a cost:

```
Switch(config-router)# area 1.1.1.1 default-cost 1000
```

### Restrictions

Use this command only on an area border router that is attached to the NSSA or stub area.

---

## area <area id> filter-list

Sets a filter to advertise summary routes on an Area Border Router (ABR). This command suppresses incoming and outgoing summary routes between the specified area and others.

### Syntax

```
[no] area <area id> filter-list route-map <map name> {in|out}
```

where:

| Parameter            | Description  |
|----------------------|--|
| <area id>            | Decimal value (a number from 0 to 4294967295) or IP address. |
| route-map <map name> | Name of the route map.                                       |
| in                   | Applies the filter to incoming routes.                       |
| out                  | Applies the filter to outgoing routes.                       |

Using **no** before the command removes a filter.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to apply an area filter to incoming routes:

```
Switch(config-router)# area 1.1.1.1 filter-list route-map test in
```

---

## area <area id> nssa

Sets an area as a Not-So-Stubby-Area (NSSA).

### Syntax

```
[no] area <area id> nssa [default-information-originate [metric  
<metric value>][metric-type <metric type value>] [route-map <map-name>]]  
[no-redistribution] [no-summary] [translate type7 always]  
[stability-interval <value>]
```

where:

| Parameter                              | Description   |
|--|---|
| <area id>                              | Decimal value (a number from 0 to 4294967295) or IP address.                        |
| <b>default-information-originate</b>   | Generates a Type7 default into the NSSA area.                                       |
| <b>metric</b> <metric value>           | OSPF default metric value (a number from 0 to 16777214).                            |
| <b>metric-type</b> <metric type value> | OSPF metric type for default routes (a number from 1 to 2).                         |
| <b>route-map</b> <map name>            | Name of the route map.  |
| <b>no-redistribution</b>               | Blocks redistributed link-state advertisements (LSAs) from entering this NSSA area. |
| <b>no-summary</b>                      | Allows an area to be an NSSA area. Summary routes are not injected into it.         |
| <b>translate type7 always</b>          | Always translates Type 7 LSAs to type 5 LSAs.                                       |
| <b>stability-interval</b> <value>      | Time interval in seconds (a number from 0 to 2147483647).                           |

Using **no** before the command removes this setting.

### Modes

OSPF Configuration Mode



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following sets a NSSA area:

```
Switch(config-router)# area 1.1.1.1 nssa
```

## Restrictions

- You cannot redistribute from another protocol into a stub area.
- An area can be configured to be either a stub area or an NSSA, but not both.

---

## area <area id> range

Sets the OSPF summary range.

### Syntax

```
[no] area <area-id> range <ip prefix>/<netnum> <mask>  
[advertise|not-advertise]
```

where:

| Parameter            | Description  |
|----------------------|--|
| <area id>            | Decimal value (a number from 0 to 4294967295) or IP address. |
| <ip prefix>          | IPv4 address prefix.   |
| <netnum>             | Subnet mask length.  |
| <mask>               | Area range prefix mask.                                      |
| <b>advertise</b>     | Advertises a specific range.                                 |
| <b>not-advertise</b> | Does not advertise a specific range.                         |

Using **no** before the command turns off this feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets OSPF summary range:

```
Switch(config-router)# area 1.1.1.1 range 1.1.1.1 255.0.0.0 advertise
```

---

## area <area id> stub

Sets an area as a stub area.

### Syntax

[no] area <area id> stub [no-summary]

where:

| Parameter  | Description   |
|------------|---|
| <area id>  | Decimal value (a number from 0 to 4294967295) or IP address.  |
| no-summary | Sets a totally stubby area. Apply this command when routers in the area do not need to learn about summary LSAs from other areas. |

Using **no** before the command turns off this feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets a stub area:

```
Switch(config-router)# area 1.1.1.1 stub
```

---

## area <area id> virtual-link

Configures a virtual link between two backbone areas that are physically separated by a non-backbone area.

Enters the virtual link configuration mode.

### Syntax

**[no] area** <area id> **virtual-link** <IP address>

where:

| Parameter    | Description  |
|--------------|--|
| <area id>    | Decimal value (a number from 0 to 4294967295) or IP address. |
| <IP address> | The router ID of the virtual link neighbor.                  |

Using **no** before the command removes a virtual link.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure a virtual link:

```
Switch(config-router)# area 1.1.1.1 virtual-link 255.0.0.0
```

---

## auto-cost reference-bandwidth

Controls how OSPF calculates the default metric for the interface.

### Syntax

**auto-cost reference-bandwidth** {<Gbps bandwidth> | <Mbps bandwidth>}  
[gbps|mbps]

**no auto-cost reference-bandwidth**

where:

| Parameter        | Description  |
|------------------|--|
| <Gbps bandwidth> | Bandwidth for Gbps (a number from 1 to 4294).            |
| <Mbps bandwidth> | Bandwidth for Mbps (a number from 1 to 4294967).         |
| <b>gbps</b>      | The reference bandwidth in terms of gigabits per second. |
| <b>mbps</b>      | The reference bandwidth in terms of megabits per second. |

Using **no** before the command assigns cost based only on the interface bandwidth.

**Note:** If no value is provided, **gbps** is used by default.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to control OSPF bandwidth:

```
Switch(config-router)# auto-cost reference-bandwidth 2000 gbps
```

### Restrictions

For multiple links with high bandwidth, please specify a larger reference bandwidth value to differentiate cost on those links.

---

## bfd

Enables BFD on all interfaces.

### Syntax

**[no] bfd**

Using **no** before the command turns off the feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable BFD:

```
Switch(config-router)# bfd
```

---

## default-information originate

Creates a default external route into an OSPF routing domain.

### Syntax

```
[no] default-information originate [always] [metric <metric value>] [metric-type <metric type value>] [route-map <map-name>]
```

where:

| Parameter                              | Description  |
|--|--|
| <b>always</b>                          | Always advertise default route.                                |
| <b>metric</b> <metric value>           | OSPF default metric value (a number from 0 to 16777214).       |
| <b>metric-type</b> <metric type value> | OSPF metric type for the default route (a number from 1 to 2). |
| <b>route-map</b> <map name>            | Name of the route map.   |

Using **no** before the command turns off the feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to create a default external route:

```
Switch(config-router)# default-information originate route-map test
```

### Restrictions

When using this command, you should specify a route-map to avoid a dependency on the default network in the routing table.

---

## default-metric

Configures a default metric for OSPF external LSA. Use this command to have the same metric value for all redistributed routes.

### Syntax

**[no] default-metric** *<value>*

where:

| Parameter            | Description   |
|----------------------|---|
| <i>&lt;value&gt;</i> | Default metric value (a number from 1 to 16777214). |

Using **no** before the command returns the configuration to the default state.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets a default metric for OSPF external LSA:

```
Switch(config-router)# default-metric 3000
```



---

## distance

Configures OSPF administrative distance.

### Syntax

**[no] distance** <value>

where:

| Parameter | Description                         |
|-----------|-------------------------------------|
| <value>   | Distance value. The default is 110. |

Using **no** before the command restores the distance to its default value.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets distance :

```
Switch(config-router)# distance 120
```

### Restrictions

A higher distance value means a lower trust rating (e.g., an administrative distance of 255 means that the routing information source cannot be trusted and should be ignored).

---

## enable db-summary-op

Enables OSPF Database Summary Optimization. This feature is enabled by default.

### Syntax

**[no] enable db-summary-op**

Using **no** before the command turns off this feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable this feature:

```
Switch(config-router)# enable db-summary-op
```

---

## log-adjacency-changes

Configures the router to send a syslog message whenever the state of an OSPF neighbor changes.

### Syntax

**[no] log-adjacency-changes [detail]**

where:

| Parameter     | Description             |
|---------------|-------------------------|
| <b>detail</b> | Logs all state changes. |

Using **no** before the command turns off this feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets a syslog message:

```
Switch(config-router)# log-adjacency-changes
```

---

## max-concurrent-dd

Configures the number of neighbors that can negotiate adjacency at the same time.

### Syntax

**[no] max-concurrent-dd** *<value>*

where:

| Parameter            | Description   |
|----------------------|---|
| <i>&lt;value&gt;</i> | Number of DD processes (a number from 1 to 32). The default value is 5. |

Using **no** before the command turns off this feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets this feature:

```
Switch(config-router)# max-concurrent-dd 10
```

---

## overflow

Sets the maximum number of LSAs that can be installed in LSDB. The feature is disabled by default.

## Syntax

**[no] overflow database** {<max lsas>[**hard|soft**] | **external** <max lsas> <recovery time>}

where:

| Parameter                  | Description   |
|----------------------------|---|
| <max lsas>                 | Maximum number of LSAs (a number from 1 to 4294967294).               |
| <b>hard</b>                | Shut downs the instance if the limit is exceeded.                     |
| <b>soft</b>                | Sends a warning message if the limit is exceeded.                     |
| <b>external</b> <max lsas> | External link maximum number of LSAs (a number from 1 to 2147483647). |
| <recovery time>            | Time to recover, in seconds (a number from 0 to 65535).               |

Using **no** before the command turns off this feature.

## Modes

OSPF Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to configure this feature:

```
Switch(config-router)# overflow database 400 soft
```

---

## redistribute

Redistributes routes from a routing protocol, static route, and connected routes into an OSPF routing table.

### Syntax

```
redistribute {bgp|direct|static} [metric <metric value>]  
[metric-type <metric type value>] [route-map <map-name>] [tag <tag value>]
```

```
no redistribute {bgp|direct|static} [metric|metric-type|  
route-map|tag]
```

where:

| Parameter                              | Description   |
|--|---|
| <b>bgp</b>                             | Routes belonging to BGP protocol.                           |
| <b>direct</b>                          | Routes directly connected on an interface.                  |
| <b>static</b>                          | IP static routes.   |
| <b>metric</b> <metric value>           | OSPF default metric value (a number from 0 to 16777214).    |
| <b>metric-type</b> <metric type value> | OSPF metric type for default routes (a number from 1 to 2). |
| <b>route-map</b> <map name>            | Name of the route map.                                      |
| <b>tag</b> <tag value>                 | Tag value (a number from 0 to 4294967295).                  |

Using **no** before the command turns off the feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable redistribution of routes into an OSPF routing table:

```
Switch(config-router)# redistribute bgp metric 100
```

---

## rfc1583compatibility

Enables the RFC1583 compatibility flag and changes how summary and external routes are calculated.

### Syntax

**[no] rfc1583compatibility**

Using **no** before the command turns off this feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable RFC 1583 compatibility:

```
Switch(config-router)# rfc1583compatibility
```

---

## router-id

Manually defines the router ID for a OSPF speaker.

### Syntax

**[no] router-id** <IP address>

where:

| Parameter    | Description        |
|--------------|--------------------|
| <IP address> | Router identifier. |

Using **no** before the command reverts to the previous router ID behavior.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure the router ID:

```
Switch(config-router)# router-id 1.1.1.1
```



---

## shutdown

Disables the OSPF process.

The **no** form of the command enables the OSPF process.

### Syntax

**[no] shutdown**

### Modes

OSPF Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the OSPF process:

```
Switch(config-router)# no shutdown
```

---

## summary-address

Summarizes or suppresses external routes with the specified address range.

### Syntax

```
[no] summary-address {<ip address>| <ip-prefix/length> <ip mask>}  
[not-advertise] [tag <tag value>]
```

where:

| Parameter              | Description  |
|------------------------|--|
| <ip address>           | IP summary prefix.                                 |
| <ip-prefix/length>     | IP summary prefix/length.                          |
| <ip mask>              | IP summary prefix mask.                            |
| <b>not-advertise</b>   | Suppresses routes that match the specified prefix. |
| <b>tag</b> <tag value> | Tag value (a number from 0 to 4294967295).         |

Using **no** before the command turns off the feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets summary address:

```
Switch(config-router)# summary-address 255.0.0.0/8 tag 19
```

---

## timers lsa-arrival

Sets the minimum interval for accepting the same LSA from OSPF neighbors.

### Syntax

```
[no] timers lsa-arrival <delay value>
```

where:

| Parameter     | Description  |
|---------------|--|
| <delay value> | Minimum delay time, in milliseconds (a number from 10 to 600000). The default value is 1000. |

Using **no** before the command restores the default value.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the lsa timer:

```
Switch(config-router)# timers lsa-arrival 2000
```

---

## timers throttle lsa

Sets rate limiting values for OSPF LSA.

### Syntax

**timers throttle lsa** *<start time>* *<hold interval>* *<max time>*

**no timers throttle lsa**

where:

| Parameter                    | Description   |
|------------------------------|---|
| <i>&lt;start time&gt;</i>    | Starting delay for LSA generation calculation, in milliseconds (a number from 0 to 5000). The default value is 0.         |
| <i>&lt;hold interval&gt;</i> | Incremental delay for LSA generation calculation, in milliseconds (a number from 50 to 30000). The default value is 5000. |
| <i>&lt;max time&gt;</i>      | Maximum delay for LSA generation calculation, in milliseconds (a number from 50 to 30000). The default value is 5000.     |

Using **no** before the command restores the default values.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure rate limiting values for OSPF LSA:

```
Switch(config-router)# timers throttle lsa 100 6000 8000
```

---

## timers throttle spf

Sets the SPF best-path schedule initial delay time and the minimum hold between SPF best-path calculation for OSPF.

### Syntax

**[no] timers throttle spf** *<initial time>* *<min time>* *<max time>*

where:

| Parameter                   | Description  |
|-----------------------------|--|
| <i>&lt;initial time&gt;</i> | Initial SPF scheduled delay, in milliseconds (a number from 1 to 600000).                            |
| <i>&lt;min time&gt;</i>     | Minimum delay between two consecutive SPF calculations (a number from 1 to 600000).                  |
| <i>&lt;max time&gt;</i>     | Maximum delay between two consecutive SPF calculations, in milliseconds (a number from 1 to 600000). |

Using **no** before the command turns off the feature.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets SPF timers:

```
Switch(config-router)# timers throttle spf 200 400 1000
```



---

## Chapter 14. Virtual Link Mode Commands

This chapter describes the commands for entering and using OSPF Virtual Link mode.

---

## area <area id> virtual-link

Configures a virtual link between two backbone areas that are physically separated by a non-backbone area.

Enters the virtual link configuration mode.

### Syntax

**[no] area** <area id> **virtual-link** <IP address>

where:

| Parameter    | Description  |
|--------------|--|
| <area id>    | Decimal value (a number from 0 to 4294967295) or IP address. |
| <IP address> | IPv4 address associated with virtual link neighbor.          |

Using **no** before the command removes a virtual link.

### Modes

OSPF Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to configure a virtual link:

```
Switch(config-router)# area 1.1.1.1 virtual-link 255.0.0.0
```



---

## authentication

Sets an authentication type between virtual-link neighbors.

### Syntax

**[no] authentication [message-digest | null]**

where:

| Parameter             | Description                 |
|-----------------------|-----------------------------|
| <b>message-digest</b> | Enables MD5 authentication. |
| <b>null</b>           | Null authentication.        |

Using **no** before the command removes a virtual link authentication type.

### Modes

OSPF Virtual Link Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets an authentication type:

```
Switch(config-router-vlink)# authentication
```

---

## authentication-key

Sets an authentication key between virtual-link neighbors.

### Syntax

**[no] authentication-key [0] <string>**

where:

| Parameter | Description               |
|-----------|---------------------------|
| <b>0</b>  | Uses an un-encrypted key. |
| <string>  | Password string.          |

Using **no** before the command removes a virtual link authentication.

### Modes

OSPF Virtual Link Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets an authentication between virtual link neighbors:

```
Switch(config-router-vlink)# authentication-key password
```

---

## dead-interval

Sets the health parameters of a hello packet, in seconds, before declaring a silent router to be down.

### Syntax

**[no] dead-interval** <seconds>

where:

| Parameter | Description  |
|-----------|--|
| <seconds> | Time interval (a number from 1 to 65535). The default value is 40 seconds. |

Using **no** before the command restores the default time.

### Modes

OSPF Virtual Link Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets a dead interval value:

```
Switch(config-router-vlink)# dead-interval 120
```

---

## hello-interval

Sets the interval, in seconds, between the hello packets.

### Syntax

**[no] hello-interval** <seconds>

where:

| Parameter | Description  |
|-----------|--|
| <seconds> | Time interval (a number from 1 to 65535). The default value is 10 seconds. |

Using **no** before the command restores the default time.

### Modes

OSPF Virtual Link Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the interval between hello packets:

```
Switch(config-router-vlink)# hello-interval 50
```

---

## message-digest-key

Configures a MD5 key on a virtual link for MD5 authentication.

### Syntax

```
[no] message-digest-key <key id> md5 [0] <password>
```

where:

| Parameter  | Description                              |
|------------|--|
| <key id>   | Key Identifier (a number from 1 to 255). |
| md5        | MD5 authentication.                      |
| 0          | Uses an un-encrypted key.                |
| <password> | Password string.                         |

Using **no** before the command removes a previous configured password.

### Modes

OSPF Virtual Link Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable MD5 authentication on a virtual link:

```
Switch(config-router-vlink)# message-digest-key 1 md5 myPassword
```

---

## retransmit-interval

Configures the interval in seconds, between LSA retransmissions for adjacencies belonging to the virtual link.

### Syntax

**[no] retransmit-interval** <*seconds*>

where:

| Parameter          | Description   |
|--------------------|---|
| < <i>seconds</i> > | Time interval (a number from 1 to 65535). The default value is 1 seconds. |

Using **no** before the command restores the default time.

### Modes

OSPF Virtual Link Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the retransmit-interval value:

```
Switch(config-router-vlink)# retransmit-interval 100
```

---

## transmit-delay

Configures the estimated time, in seconds, taken to transmit LS update packet over the specified virtual link.

### Syntax

**[no] transmit-delay** *<seconds>*

where:

| Parameter              | Description  |
|------------------------|--|
| <i>&lt;seconds&gt;</i> | Time interval (a number from 1 to 3600). The default value is 5 seconds. |

Using **no** before the command restores the default time.

### Modes

OSPF Virtual Link Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following sets the transmit delay value:

```
Switch(config-router-vlink)# transmit-delay 100
```





---

## Chapter 15. TACACS+ Server Mode Commands

This chapter explains how to enter TACACS+ Server Configuration Mode and the commands within that mode.

**Note:** TACACS+ has the following restrictions:

- o Username: maximum 32 characters, only lowercase letters and numbers; must start with a letter.
- o Password: maximum 255 characters, including uppercase lowercase numbers and special characters.

---

## aaa group server tacacs+

Creates or deletes a group of Terminal Access Controller Access-Control System Plus (TACACS+) servers for Authentication, Authorization and Accounting (AAA). After creating a group, you enter TACACS+ server configuration mode for that group.

### Syntax

**[no] aaa group server tacacs+ <server group name>**

where:

| Parameter                | Function   |
|--------------------------|--|
| <i>server group name</i> | The name of the TACACS+ server group. The <i>server group name</i> can be up to 127 characters in length, must start with a letter, and must contain only lowercase letters and numbers. |

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates TACACS+ server group 'tacacs-group-1':

```
Switch(config)# aaa group server tacacs+ tacacs-group-1
Switch(config-tacacs)#
```

---

## server

Adds or removes a server to or from the current Terminal Access Controller Access-Control System Plus (TACACS+) group.

## Syntax

**[no] server** <*server address*>

where:

| Parameter             | Function  |
|-----------------------|---|
| <i>server address</i> | The IPv4 or IPv6 address of the TACACS+ server. |

## Modes

TACACS+ Server Group Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command adds a TACACS+ server to the current group:

```
Switch(config-tacacs)# server 10.190.45.76
```

---

## use-vrf

Sets the Virtual Routing and Forwarding (VRF) instance for this group. Only users who login from an interface that is in this VRF instance will have a chance to login. Other users will get a timeout when trying to authenticate to the servers.

## Syntax

**[no] use-vrf {default|management}**

where:

| Parameter         | Function   |
|-------------------|--|
| <b>default</b>    | Configures the TACACS+ group to use the default VRF instance.    |
| <b>management</b> | Configures the TACACS+ group to use the management VRF instance. |

## Modes

TACACS+ Server Group Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the current group to use the default VRF instance:

```
Switch(config-tacacs)# use-vrf default
```

---

## Chapter 16. RADIUS Server Mode Commands

This chapter explains how to enter RADIUS Server Configuration Mode and the commands within that mode.

**Note:** RADIUS has the following restrictions:

- o Username: maximum 32 characters, only lowercase letters and numbers; must start with a letter.
- o Password: maximum 255 characters, including uppercase lowercase numbers and special characters.

---

## aaa group server radius

Creates or deletes a group of Remote Authentication Dial-In User Service (RADIUS) servers for Authentication, Authorization and Accounting (AAA). After creating a group, you enter RADIUS server configuration mode for that group.

### Syntax

**[no] aaa group server radius** <*server group name*>

where:

| Parameter                | Function  |
|--------------------------|---|
| <i>server group name</i> | The name of the RADIUS server group. The <i>server group name</i> can be up to 127 characters, it must start with a letter, and it must contain only lowercase letters and numbers. |

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command creates RADIUS server group 'radius-group-1':

```
Switch(config)# aaa group server radius radius-group-1
Switch(config-radius)#
```

---

## server

Adds or removes a server to or from the current Remote Authentication Dial-In User Service (RADIUS) group.

## Syntax

**[no] server** <*server address*>

where:

| Parameter             | Function                                       |
|-----------------------|--|
| <i>server address</i> | The IPv4 or IPv6 address of the RADIUS server. |

## Modes

RADIUS Server Group Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command adds a RADIUS server to the current group:

```
Switch(config-radius)# server 10.190.45.76
```

---

## source-interface

Configures the source switch interface to be used to connect to the Remote Authentication Dial-In User Service (RADIUS) server.

### Syntax

```
[no] source-interface {<interface name>|loopback <loopback interface> |  
|mgmt 0|vlan <VLAN ID>}
```

where:

| Parameter                                 | Function  |
|---|---|
| <i>interface name</i>                     | Configures the switch interface identified by its name to be used to connect to the RADIUS server.                                    |
| <b>loopback</b> <i>loopback interface</i> | Configures the specified loopback interface to be used to connect to the RADIUS server. The <i>loopback interface</i> is from 0 to 7. |
| <b>mgmt 0</b>                             | Configures the management interface to be used to connect to the RADIUS server.   |
| <b>vlan</b> <i>VLAN ID</i>                | Configures the specified VLAN to be used to connect to the RADIUS server. The <i>VLAN ID</i> is from 1 to 4094.                       |

### Modes

RADIUS Server Group Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures VLAN 105 as the source interface to be used to connect to the RADIUS server:

```
Switch(config-radius)# source-interface vlan 105
```



---

## use-vrf

Sets the Virtual Routing and Forwarding (VRF) instance for this group. Only users who login from an interface that is in this VRF instance will have a chance to login. Other users will get a timeout when trying to authenticate to the servers.

## Syntax

**[no] use-vrf {default|management}**

where:

| Parameter         | Function  |
|-------------------|---|
| <b>default</b>    | Configures the RADIUS group to use the default VRF instance.    |
| <b>management</b> | Configures the RADIUS group to use the management VRF instance. |

## Modes

RADIUS Server Group Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command configures the current group to use the default VRF instance:

```
Switch(config-radius)# use-vrf default
```



---

## Chapter 17. SPAN Session Mode Commands

This chapter describes how to enter SPAN Session Configuration Mode and the commands in this mode.

---

## monitor session

Adds or removes a Switch Port Analyzer (SPAN) session. After the creation of a SPAN session, enters SPAN Session Configuration Mode.

### Syntax

**[no] monitor session** <*session number*>

where:

| Parameter             | Function  |
|-----------------------|---|
| <i>session number</i> | The SPAN session number. The <i>session number</i> is from 1 to 18. |

The **no** version of this command with the argument **all** removes all SPAN sessions:

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds a SPAN session:

```
Switch(config)# monitor session 7
```

---

## description

Adds or removes a short description of the current Switch Port Analyzer (SPAN) session.

## Syntax

**[no] description** <*description*>

where:

| Parameter          | Function   |
|--------------------|--|
| <i>description</i> | The description string of the SPAN session. The <i>description</i> can be up to 32 characters in length. |

## Modes

SPAN Session Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command describes the current SPAN session as 'SPAN session 3':

```
Switch(config-monitor)# description SPAN session 3
```

---

## destination

Adds or removes a destination interface for the current Switch Port Analyzer (SPAN) session.

## Syntax

```
[no] destination interface {ethernet <chassis number/port number>|  
port-aggregation <LAG number>}
```

where:

| Parameter                                  | Function   |
|--|--|
| ethernet <i>chassis number/port number</i> | Sets the specified ethernet interface as the SPAN session destination interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| port-aggregation <i>LAG number</i>         | Sets the specified Link Aggregation Group (LAG) as the SPAN session destination interface. The <i>VLAN number</i> is from 1 to 4096.                                   |

## Modes

SPAN Session Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets ethernet interface 1/8 as the SPAN session destination interface:

```
Switch(config-monitor)# destination interface ethernet 1/8
```

---

## shut

Configures the Switch Port Analyzer (SPAN) session as being shut down for monitoring.

Using the **no** form of the command configures the SPAN session as not being shut down for monitor.

## Syntax

[no] shut

## Modes

SPAN Session Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures the SPAN session as being shut down:

```
Switch(config-monitor)# shut
```

---

## source

Adds or removes a source interface for the current Switch Port Analyzer (SPAN) session.

## Syntax

```
[no] source interface {ethernet <chassis number/port number>|  
port-aggregation <LAG number>}
```

where:

| Parameter                                  | Function  |
|--|---|
| ethernet <i>chassis number/port number</i> | Sets the specified ethernet interface as the SPAN session source interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| port-aggregation <i>LAG number</i>         | Sets the specified Link Aggregation Group (LAG) as the SPAN session source interface. The <i>VLAN number</i> is from 1 to 4096.                                   |

## Modes

SPAN Session Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command sets ethernet interface 1/8 as the SPAN session source interface:

```
Switch(config-monitor)# source interface ethernet 1/8
```



---

## Chapter 18. Control Plane Mode Commands

This chapter describes how to enter Control Plane Configuration Mode and the commands available in this mode.

---

## control-plane

Enters Control Plane Configuration mode.

### Syntax

**control-plane**

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enters Control Plane Configuration Mode:

```
Switch(config)# control-plane
```

---

## service-policy

Defines the control plane service policy.

### Syntax

**service-policy input** *copp-system-policy*

where:

| Parameter                 | Function                                      |
|---------------------------|---|
| input                     | Defines the ingress service policy.           |
| <i>copp-system-policy</i> | The name of the control plane service policy. |

### Modes

Control Plane Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command defines the control plane ingress service policy as *copp-system-policy*:

```
Switch(config-cp)# service-policy input copp-system-policy
```



---

## Chapter 19. Key Chain Mode Commands

This chapter describes commands for configuring authentication keychains and keys.

---

## key chain

Adds an authentication keychain and enters Key Chain Configuration mode.

### Syntax

**[no] key chain** <*key chain name*>

where:

| Parameter             | Function                                 |
|-----------------------|--|
| <i>key chain name</i> | The name of the authentication keychain. |

Using **no** before this command removes the authentication keychain.

### Modes

- Configuration Mode
- Key Chain Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds an authentication keychain named 'kc-30':

```
Switch(config)# key chain kc-30
```

---

## key

Adds or removes an authentication key. After creating an authentication key, the user enters Key Configuration mode.

## Syntax

**[no] key** <*key ID*>

where:

| Parameter     | Function   |
|---------------|--|
| <i>key ID</i> | The authentication key identification number. The <i>key ID</i> is from 0 to 2147483647. |

## Modes

- Key Chain Configuration Mode
- Key Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command adds an authentication key '1900':

```
Switch(config-keychain)# key 1900
```

---

## accept-lifetime

Configures the time interval during which the authentication key on the key chain is accepted as valid when received.

The earliest acceptable starting date is January 1, 1993.

## Syntax

```
[no] accept-lifetime <start time> <start day> <start month> <start year>  
{<end time> <end day> <end month> <end year>|duration <duration>|  
infinite}
```

where:

| Parameter                       | Function   |
|---------------------------------|--|
| <i>start time</i>               | The key is considered valid starting with this time. The <i>start time</i> format is <i>HH:mm:ss</i> , where: <ul style="list-style-type: none"><li>• <i>HH</i> is the hour of the day (range is 00 to 24)</li><li>• <i>mm</i> is the minute of the hour (range is 00 to 60)</li><li>• <i>ss</i> is the second of the minute (range is 00 to 60)</li></ul> |
| <i>start day</i>                | The key is considered valid starting with this day. The <i>start day</i> is from 1 to 31. Default value is 1.  |
| <i>start month</i>              | The key is considered valid starting with this month. The <i>start month</i> is from January to December. Default value is 1.  |
| <i>start year</i>               | The key is considered valid starting with this year. The <i>start year</i> is from 1993 to 2035. Default value is 1993.  |
| <i>end time</i>                 | The key is considered valid until this time. The <i>end time</i> format is <i>HH:mm:ss</i> , where: <ul style="list-style-type: none"><li>• <i>HH</i> is the hour of the day (range is 00 to 24)</li><li>• <i>mm</i> is the minute of the hour (range is 00 to 60)</li><li>• <i>ss</i> is the second of the minute (range is 00 to 60)</li></ul>           |
| <i>end day</i>                  | The key is considered valid until this day. The <i>end day</i> is from 1 to 31.  |
| <i>end month</i>                | The key is considered valid until this month. The <i>end month</i> is from January to December.  |
| <i>end year</i>                 | The key is considered valid until this year. The <i>end year</i> is from 1993 to 2035.   |
| <b>duration</b> <i>duration</i> | The key is valid for specified amount of seconds. The <i>duration</i> is from 1 to 2147483646.   |
| <b>infinite</b>                 | The key never expires.   |

Using the **no** form of the command resets the accept lifetime interval to its default value.



## Modes

Key Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures an authentication key to be valid from January 20, 2016 starting at 8 AM for one year, as specified in seconds:

```
Switch(config-keychain-key)# accept-lifetime 8:0:0 30 January 2016  
duration 31536000
```

---

## key-string

Adds or removes an authentication key string. The key string must be included in sent or received packets by the routing protocol being authenticated.

### Syntax

**[no] key-string** <*key string*>

where:

| Parameter         | Function   |
|-------------------|--|
| <i>key string</i> | The <i>key string</i> can be up to 80 alphanumeric characters in length. |

### Modes

Key Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command adds the string 'key01' to the current authentication key:

```
Switch(config-keychain-key)# key-string key01
```

---

## send-lifetime

Configures the time interval during which the authentication key on the key chain is valid when sent.

The earliest acceptable starting date is January 1, 1993.

## Syntax

**[no] send-lifetime** <start time> <start day> <start month> <start year> {<end time> <end day> <end month> <end year>}|**duration** <duration>|**infinite**}

where:

| Parameter                       | Function   |
|---------------------------------|--|
| <i>start time</i>               | The key is considered valid starting with this time. The <i>start time</i> format is <i>HH:mm:ss</i> , where: <ul style="list-style-type: none"><li>• <i>HH</i> is the hour of the day (range is 00 to 24)</li><li>• <i>mm</i> is the minute of the hour (range is 00 to 60)</li><li>• <i>ss</i> is the second of the minute (range is 00 to 60)</li></ul> |
| <i>start day</i>                | The key is considered valid starting with this day. The <i>start day</i> is from 1 to 31. Default value is 1.  |
| <i>start month</i>              | The key is considered valid starting with this month. The <i>start month</i> is from January to December. Default value is January.  |
| <i>start year</i>               | The key is considered valid starting with this year. The <i>start year</i> is from 1993 to 2035. Default value is 1993.  |
| <i>end time</i>                 | The key is considered valid until this time. The <i>end time</i> format is <i>HH:mm:ss</i> , where: <ul style="list-style-type: none"><li>• <i>HH</i> is the hour of the day (range is 00 to 24)</li><li>• <i>mm</i> is the minute of the hour (range is 00 to 60)</li><li>• <i>ss</i> is the second of the minute (range is 00 to 60)</li></ul>           |
| <i>end day</i>                  | The key is considered valid until this day. The <i>end day</i> is from 1 to 31.  |
| <i>end month</i>                | The key is considered valid until this month. The <i>end month</i> is from January to December.  |
| <i>end year</i>                 | The key is considered valid until this year. The <i>end year</i> is from 1993 to 2035.   |
| <b>duration</b> <i>duration</i> | The key is valid for specified amount of seconds. The <i>duration</i> is from 1 to 2147483646.   |
| <b>infinite</b>                 | The key never expires.   |

Using the **no** form of the command resets the send lifetime interval to its default value.

## Modes

Key Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command configures an authentication key to be valid from January 30, 2016, starting at 8 AM, for one year, as specified in seconds:

```
Switch(config-keychain-key)# send-lifetime 8:0:0 30 January 2016 duration  
31536000
```

---

## Chapter 20. IP ACL Mode Commands

This chapter describes the commands available to configure IP Access Control Lists (ACL).

---

## ip access-list

Adds or removes an Access Control List (ACL). After creating an ACL, the user enters ACL Configuration Mode.

### Syntax

**[no] ip access-list** <ACL name>

where:

| Parameter       | Function         |
|-----------------|------------------|
| <i>ACL name</i> | The name of ACL. |

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates an ACL named 'acl-03':

```
Switch(config)# ip access-list acl-03
```

---

## deny

Enables or disables the discarding of packets.

## Syntax

```
[no] [<ACL sequence number>] deny {<IANA protocol number>|ahp|any|  
eigrp|esp|gre|igmp|ip|nos|ospf|pcp|pim} {<source address>|any|  
host <single source address>} {<destination address>|any|host <single destination  
address>} [dscp <dscp value>|precedence <precedence value>] [fragments]
```

where:

| Parameter                   | Function  |
|-----------------------------|---|
| <i>ACL sequence number</i>  | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.  |
| <i>IANA protocol number</i> | Discards packets based on the protocol number assigned by the Internet Assigned Numbers Authority (IANA). The <i>IANA protocol number</i> is from 1 to 255.   |
| ahp                         | Discards Authentication Header (AH) packets.  |
| any                         | Depending on the position where this parameter is used it can mean the discarding of: <ul style="list-style-type: none"><li>• packets regardless of their source protocol, or</li><li>• packets regardless of their source address, or</li><li>• packets regardless of their destination address.</li></ul> |
| eigrp                       | Discards Enhanced Interior Gateway Routing Protocol (EIGRP) packets.  |
| esp                         | Discards Encapsulating Security Payload (ESP) packets.  |
| gre                         | Discards Generic Routing Encapsulation (GRE) packets.   |
| igmp                        | Discards Internet Group Management Protocol (IGMP) packets.   |
| ip                          | Discards Internet Protocol version 4 (IPv4) encapsulation packets.  |
| nos                         | Discards KA9Q NOS compatible IP over IP tunneling packets.  |
| ospf                        | Discards Open Shortest Path First (OSPF) packets.   |
| pcp                         | Discards IP Payload Compression Protocol (PCP) packets.   |
| pim                         | Discards Protocol Independent Multicast (PIM) packets.  |

| Parameter                                     | Function  |
|---|---|
| <i>source address</i>                         | Discards packets received from the specified source address. It can be written as: <ul style="list-style-type: none"> <li>● <i>source IPv4 address source wildcard mask</i></li> <li>● <i>source IPv4 address/network mask length</i></li> </ul>  |
| <b>host</b> <i>single source address</i>      | Discards packets received from the specified single source IPv4 address.  |
| <i>destination address</i>                    | Discards packets sent to the specified destination address. It can be written as: <ul style="list-style-type: none"> <li>● <i>destination IPv4 address destination wildcard mask</i></li> <li>● <i>destination IPv4 address/network mask length</i></li> </ul>  |
| <b>host</b> <i>single destination address</i> | Discards packets sent to the specified single destination IPv4 address.   |
| <b>dscp</b> <i>dscp value</i>                 | Discards packets based on their DiffServ Code Point (DSCP) value. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"> <li>● <b>af11</b> - AF11 DSCP (001010)</li> <li>● <b>af12</b> - AF12 DSCP (001100)</li> <li>● <b>af13</b> - AF13 DSCP (001110)</li> <li>● <b>af21</b> - AF21 DSCP (010010)</li> <li>● <b>af22</b> - AF22 DSCP (010100)</li> <li>● <b>af23</b> - AF23 DSCP (010110)</li> <li>● <b>af31</b> - AF31 DSCP (011010)</li> <li>● <b>af32</b> - AF32 DSCP (011100)</li> <li>● <b>af33</b> - AF33 DSCP (011110)</li> <li>● <b>af41</b> - AF41 DSCP (100010)</li> <li>● <b>af42</b> - AF42 DSCP (100100)</li> <li>● <b>af43</b> - AF43 DSCP (100110)</li> <li>● <b>cs1</b> - CS1(precedence 1) DSCP (001000)</li> <li>● <b>cs2</b> - CS2(precedence 2) DSCP (010000)</li> <li>● <b>cs3</b> - CS3(precedence 3) DSCP (011000)</li> <li>● <b>cs4</b> - CS4(precedence 4) DSCP (100000)</li> <li>● <b>cs5</b> - CS5(precedence 5) DSCP (101000)</li> <li>● <b>cs6</b> - CS6(precedence 6) DSCP (110000)</li> <li>● <b>cs7</b> - CS7(precedence 7) DSCP (111000)</li> <li>● <b>default</b> - Default DSCP (000000)</li> <li>● <b>ef</b> - EF DSCP (101110)</li> </ul> |



| Parameter                             | Function   |
|---------------------------------------|--|
| precedence<br><i>precedence value</i> | Discards packets based on their precedence value. The <i>precedence value</i> is from 0 to 7 or it can be one of the following: <ul style="list-style-type: none"> <li>● routine - Routine precedence (0)</li> <li>● priority - Priority precedence (1)</li> <li>● immediate - Immediate precedence (2)</li> <li>● flash - Flash precedence (3)</li> <li>● flash-override - Flash override precedence (4)</li> <li>● critical - Critical precedence (5)</li> <li>● internet - Internetwork control precedence (6)</li> <li>● network - Network control precedence (7)</li> </ul> |
| fragments                             | Checks non-initial fragments.  |

## Modes

ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the discarding of OSPF packets received from the single source address 10.240.35.78 with any destination:

```
Switch(config-acl)# deny ospf host 10.240.35.78 any
```

---

## deny icmp

Enables or disables the discarding of Internet Control Message Protocol (ICMP) packets.

### Syntax

```
[no] [<ACL sequence number>] deny icmp {<source address>|any|host  
<single source address>} {<destination address>|any|host <single destination  
address>} [<ICMP type>|administratively-prohibited|  
alternate-address|conversion-error|dod-host-prohibited|  
dod-net-prohibited|dscp <dscp value>|echo|echo-reply|  
general-parameter-problem|host-isolated|  
host-precedence-unreachable|host-redirect|host-tos-redirect|  
host-tos-unreachable|host-unknown|host-unreachable|  
information-reply|information-request|mask-reply|  
mask-request|mobile-redirect|net-redirect|net-tos-redirect|  
net-tos-unreachable|net-unreachable|network-unknown|  
no-room-for-option|option-missing|packet-too-big|  
parameter-problem|port-unreachable|precedence <precedence value>|  
precedence-unreachable|protocol-unreachable|  
reassembly-timeout|redirect|router-advertisement|  
router-solicitation|source-quench|source-route-failed|  
time-exceeded|timestamp-reply|timestamp-request|traceroute|  
ttl-exceeded|unreachable] [fragments]
```

where:

| Parameter                              | Function   |
|--|--|
| <i>ACL sequence number</i>             | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.   |
| <i>source address</i>                  | Discards ICMP packets received from the specified source address. It can be written as: <ul style="list-style-type: none"><li>• <i>source IPv4 address source wildcard mask</i></li><li>• <i>source IPv4 address/network mask length</i></li></ul>               |
| any                                    | Discards ICMP packets received or sent from or to any source or destination address.   |
| host <i>single source address</i>      | Discards ICMP packets received from the specified single source IPv4 address.  |
| <i>destination address</i>             | Discards ICMP packets sent to the specified destination address. It can be written as: <ul style="list-style-type: none"><li>• <i>destination IPv4 address destination wildcard mask</i></li><li>• <i>destination IPv4 address/network mask length</i></li></ul> |
| host <i>single destination address</i> | Discards ICMP packets sent to the specified single destination IPv4 address.   |

| Parameter                   | Function  |
|-----------------------------|---|
| <i>ICMP type</i>            | Discards ICMP packets based on their type. The <i>ICMP type</i> is from 0 to 255.   |
| administratively-prohibited | Discards ICMP administratively prohibited packets.  |
| alternate-address           | Discards ICMP alternate address packets.  |
| conversion-error            | Discards ICMP datagram conversion error packets.  |
| dod-host-prohibited         | Discards ICMP host prohibited packets.  |
| dod-net-prohibited          | Discards ICMP network prohibited packets.   |
| dscp <i>dscp value</i>      | Discards ICMP packets based on their DiffServ Code Point (DSCP) value. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"> <li>● af11 - AF11 DSCP (001010)</li> <li>● af12 - AF12 DSCP (001100)</li> <li>● af13 - AF13 DSCP (001110)</li> <li>● af21 - AF21 DSCP (010010)</li> <li>● af22 - AF22 DSCP (010100)</li> <li>● af23 - AF23 DSCP (010110)</li> <li>● af31 - AF31 DSCP (011010)</li> <li>● af32 - AF32 DSCP (011100)</li> <li>● af33 - AF33 DSCP (011110)</li> <li>● af41 - AF41 DSCP (100010)</li> <li>● af42 - AF42 DSCP (100100)</li> <li>● af43 - AF43 DSCP (100110)</li> <li>● cs1 - CS1(precedence 1) DSCP (001000)</li> <li>● cs2 - CS2(precedence 2) DSCP (010000)</li> <li>● cs3 - CS3(precedence 3) DSCP (011000)</li> <li>● cs4 - CS4(precedence 4) DSCP (100000)</li> <li>● cs5 - CS5(precedence 5) DSCP (101000)</li> <li>● cs6 - CS6(precedence 6) DSCP (110000)</li> <li>● cs7 - CS7(precedence 7) DSCP (111000)</li> <li>● default - Default DSCP (000000)</li> <li>● ef - EF DSCP (101110)</li> </ul> |
| echo                        | Discards ICMP echo packets.   |
| echo-reply                  | Discards ICMP echo replies.   |
| general-parameter-problem   | Discards ICMP packets that have a problem.  |
| host-isolated               | Discards ICMP host isolated packets.  |
| host-precedence-unreachable | Discards ICMP host unreachable for precedence packets.  |

| <b>Parameter</b>      | <b>Function</b>  |
|-----------------------|--|
| host-redirect         | Discards ICMP host redirect packets.   |
| host-tos-redirect     | Discards ICMP host redirects for Type of Services (ToS).                             |
| host-tos-unreacheable | Discards ICMP host unreachable for ToS packets.                                      |
| host-unknown          | Discards ICMP host unknown packets.  |
| host-unreachable      | Discards ICMP host unreachable packets.  |
| information-reply     | Discards ICMP information replies.   |
| information-request   | Discards ICMP information requests.  |
| mask-reply            | Discards ICMP network mask replies.  |
| mask-request          | Discards ICMP network mask requests.   |
| mobile-redirect       | Discards ICMP mobile redirects.  |
| net-redirect          | Discards ICMP network redirects.   |
| net-tos-redirect      | Discards ICMP network redirects for ToS.   |
| net-tos-unreacheable  | Discards ICMP network unreachable for ToS packets.                                   |
| net-unreachable       | Discards ICMP network unreachable packets.   |
| network-unknown       | Discards ICMP network unknown packets.   |
| no-room-for-option    | Discards ICMP packets where a parameter is required but there is no space available. |
| option-missing        | Discards ICMP packets where a parameter is required but it is missing.               |
| packet-too-big        | Discards ICMP packets that are too large requiring fragmentation.                    |
| parameter-problem     | Discards all ICMP packets with parameter problems.                                   |
| port-unreachable      | Discards ICMP port unreachable packets.  |

| Parameter                             | Function  |
|---------------------------------------|---|
| precedence<br><i>precedence value</i> | Discards ICMP packets based on their precedence value. The <i>precedence value</i> is from 0 to 7 or it can be one of the following: <ul style="list-style-type: none"> <li>● routine - Routine precedence (0)</li> <li>● priority - Priority precedence (1)</li> <li>● immediate - Immediate precedence (2)</li> <li>● flash - Flash precedence (3)</li> <li>● flash-override - Flash override precedence (4)</li> <li>● critical - Critical precedence (5)</li> <li>● internet - Internetwork control precedence (6)</li> <li>● network - Network control precedence (7)</li> </ul> |
| precedence-unreachable                | Discards ICMP precedence cutoff packets.  |
| protocol-unreachable                  | Discards ICMP protocol unreachable packets.   |
| reassembly-timeout                    | Discards ICMP reassembly timeouts.  |
| redirect                              | Discards all ICMP redirects.  |
| router-advertisement                  | Discards ICMP router discovery advertisements.  |
| router-solicitation                   | Discards ICMP router discovery solicitations.   |
| source-quench                         | Discards ICMP source quenches.  |
| source-route-failed                   | Discards ICMP source route failed packets.  |
| time-exceeded                         | Discards all ICMP time exceeded messages.   |
| timestamp-reply                       | Discards ICMP timestamp replies.  |
| timestamp-request                     | Discards ICMP timestamp requests.   |
| traceroute                            | Discards ICMP trace route packets.  |
| ttl-exceeded                          | Discards ICMP Time to Live (TTL) exceeded packets.  |
| unreachable                           | Discards all ICMP unreachable packets.  |
| fragments                             | Checks non-initial fragments.   |

## Modes

ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the discarding of ICMP packets received from the single source address 10.240.35.78 with any destination:

```
Switch(config-acl)# deny icmp host 10.240.35.78 any
```

---

## deny tcp

Enables or disables the discarding of Transmission Control Protocol (TCP) packets.

### Syntax

```
[no] [<ACL sequence number>] deny tcp {<source address>|any|host <single source address>} [{eq|gt|lt|neq} <source port>|range <source port range>} {<destination address>|any|host <single destination address>} [{eq|gt|lt|neq} <destination port>|range <destination port range>} [ack] [established] [fin] [psh] [rst] [syn] [urg] [dscp <dscp value>] precedence <precedence value>] [fragments]
```

where:

| Parameter                         | Function  |
|-----------------------------------|---|
| <i>ACL sequence number</i>        | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.  |
| <i>source address</i>             | Discards TCP packets received from the specified source address. It can be written as: <ul style="list-style-type: none"><li>• <i>source IPv4 address source wildcard mask</i></li><li>• <i>source IPv4 address/network mask length</i></li></ul> |
| any                               | Discards TCP packets received or sent from or to any source or destination address.   |
| eq                                | Discards TCP packets with source port number equal to the specified value.  |
| gt                                | Discards TCP packets with source port number greater than the specified value.  |
| lt                                | Discards TCP packets with source port number lower than the specified value.  |
| neq                               | Discards TCP packets with source port number not equal to the specified value.  |
| <i>source port</i>                | The TCP source port number. It is from 0 to 65535.  |
| <i>destination port</i>           | The TCP destination port number. It is from 0 to 65535.   |
| range                             | Discards TCP packets with port numbers included in the specified port range.  |
| <i>source port range</i>          | The TCP source port range. It is from 0 to 65535.   |
| <i>destination port range</i>     | The TCP destination port range. It is from 0 to 65535.  |
| <i>host single source address</i> | Discards TCP packets received from the specified single source IPv4 address.  |

| Parameter                              | Function  |
|--|---|
| <i>destination address</i>             | Discards TCP packets sent to the specified destination address. It can be written as: <ul style="list-style-type: none"> <li>• <i>destination IPv4 address destination wildcard mask</i></li> <li>• <i>destination IPv4 address / network mask length</i></li> </ul>  |
| <i>host single destination address</i> | Discards TCP packets sent to the specified single destination IPv4 address.   |
| <b>ack</b>                             | Discards TCP packets that have matching acknowledgment bits.  |
| <b>established</b>                     | Discards TCP packets that belong to an established TCP connection.  |
| <b>fin</b>                             | Discards TCP packets that have matching finish bits.  |
| <b>psh</b>                             | Discards TCP packets that have matching push bits.  |
| <b>rst</b>                             | Discards TCP packets that have matching reset bits.   |
| <b>syn</b>                             | Discards TCP packets that have matching synchronize bits.   |
| <b>urg</b>                             | Discards TCP packets that have matching urgent bits.  |
| <b>dscp</b> <i>dscp value</i>          | Discards TCP packets based on their DiffServ Code Point (DSCP) value. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"> <li>• <b>af11</b> - AF11 DSCP (001010)</li> <li>• <b>af12</b> - AF12 DSCP (001100)</li> <li>• <b>af13</b> - AF13 DSCP (001110)</li> <li>• <b>af21</b> - AF21 DSCP (010010)</li> <li>• <b>af22</b> - AF22 DSCP (010100)</li> <li>• <b>af23</b> - AF23 DSCP (010110)</li> <li>• <b>af31</b> - AF31 DSCP (011010)</li> <li>• <b>af32</b> - AF32 DSCP (011100)</li> <li>• <b>af33</b> - AF33 DSCP (011110)</li> <li>• <b>af41</b> - AF41 DSCP (100010)</li> <li>• <b>af42</b> - AF42 DSCP (100100)</li> <li>• <b>af43</b> - AF43 DSCP (100110)</li> <li>• <b>cs1</b> - CS1(precedence 1) DSCP (001000)</li> <li>• <b>cs2</b> - CS2(precedence 2) DSCP (010000)</li> <li>• <b>cs3</b> - CS3(precedence 3) DSCP (011000)</li> <li>• <b>cs4</b> - CS4(precedence 4) DSCP (100000)</li> <li>• <b>cs5</b> - CS5(precedence 5) DSCP (101000)</li> <li>• <b>cs6</b> - CS6(precedence 6) DSCP (110000)</li> <li>• <b>cs7</b> - CS7(precedence 7) DSCP (111000)</li> <li>• <b>default</b> - Default DSCP (000000)</li> <li>• <b>ef</b> - EF DSCP (101110)</li> </ul> |



| Parameter                              | Function  |
|--|---|
| <pre>precedence precedence value</pre> | <p>Discards TCP packets based on their precedence value. The <i>precedence value</i> is from 0 to 7 or it can be one of the following:</p> <ul style="list-style-type: none"> <li>● <code>routine</code> - Routine precedence (0)</li> <li>● <code>priority</code> - Priority precedence (1)</li> <li>● <code>immediate</code> - Immediate precedence (2)</li> <li>● <code>flash</code> - Flash precedence (3)</li> <li>● <code>flash-override</code> - Flash override precedence (4)</li> <li>● <code>critical</code> - Critical precedence (5)</li> <li>● <code>internet</code> - Internetwork control precedence (6)</li> <li>● <code>network</code> - Network control precedence (7)</li> </ul> |

## Modes

ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the discarding of TCP packets received from any source with any destination with source and destination ports 540 that match on their acknowledgment bits:

```
Switch(config-acl)# deny tcp any eq 540 any eq 540 ack
```

---

## deny udp

Enables or disables the discarding of User Datagram Protocol (UDP) packets.

### Syntax

```
[no] [<ACL sequence number>] deny udp {<source address>|any|host <single source address>} [{eq|gt|lt|neq} <source port>|range <source port range>} {<destination address>|any|host <single destination address>} [{eq|gt|lt|neq} <destination port>|range <destination port range>] [ack] [established] [fin] [psh] [rst] [syn] [urg] [dscp <dscp value>] [precedence <precedence value>] [fragments]
```

where:

| Parameter                         | Function  |
|-----------------------------------|---|
| <i>ACL sequence number</i>        | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.  |
| <i>source address</i>             | Discards UDP packets received from the specified source address. It can be written as: <ul style="list-style-type: none"><li>• <i>source IPv4 address source wildcard mask</i></li><li>• <i>source IPv4 address / network mask length</i></li></ul> |
| any                               | Discards UDP packets received or sent from or to any source or destination address.   |
| eq                                | Discards UDP packets with source port number equal to the specified value.  |
| gt                                | Discards UDP packets with source port number greater than the specified value.  |
| lt                                | Discards UDP packets with source port number lower than the specified value.  |
| neq                               | Discards UDP packets with source port number not equal to the specified value.  |
| <i>source port</i>                | The UDP source port number. It is from 0 to 65535.  |
| <i>destination port</i>           | The UDP destination port number. It is from 0 to 65535.   |
| range                             | Discards UDP packets with port numbers included in the specified port range.  |
| <i>source port range</i>          | The UDP source port range. It is from 0 to 65535.   |
| <i>destination port range</i>     | The UDP destination port range. It is from 0 to 65535.  |
| host <i>single source address</i> | Discards UDP packets received from the specified single source IPv4 address.  |

| Parameter                                     | Function   |
|---|--|
| <i>destination address</i>                    | Discards UDP packets sent to the specified destination address. It can be written as: <ul style="list-style-type: none"> <li>● <i>destination IPv4 address destination wildcard mask</i></li> <li>● <i>destination IPv4 address/network mask length</i></li> </ul>   |
| <b>host</b> <i>single destination address</i> | Discards UDP packets sent to the specified single destination IPv4 address.  |
| <b>dscp</b> <i>dscp value</i>                 | Discards UDP packets based on their DiffServ Code Point (DSCP) value. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"> <li>● af11 - AF11 DSCP (001010)</li> <li>● af12 - AF12 DSCP (001100)</li> <li>● af13 - AF13 DSCP (001110)</li> <li>● af21 - AF21 DSCP (010010)</li> <li>● af22 - AF22 DSCP (010100)</li> <li>● af23 - AF23 DSCP (010110)</li> <li>● af31 - AF31 DSCP (011010)</li> <li>● af32 - AF32 DSCP (011100)</li> <li>● af33 - AF33 DSCP (011110)</li> <li>● af41 - AF41 DSCP (100010)</li> <li>● af42 - AF42 DSCP (100100)</li> <li>● af43 - AF43 DSCP (100110)</li> <li>● cs1 - CS1(precedence 1) DSCP (001000)</li> <li>● cs2 - CS2(precedence 2) DSCP (010000)</li> <li>● cs3 - CS3(precedence 3) DSCP (011000)</li> <li>● cs4 - CS4(precedence 4) DSCP (100000)</li> <li>● cs5 - CS5(precedence 5) DSCP (101000)</li> <li>● cs6 - CS6(precedence 6) DSCP (110000)</li> <li>● cs7 - CS7(precedence 7) DSCP (111000)</li> <li>● default - Default DSCP (000000)</li> <li>● ef - EF DSCP (101110)</li> </ul> |
| <b>precedence</b> <i>precedence value</i>     | Discards UDP packets based on their precedence value. The <i>precedence value</i> is from 0 to 7 or it can be one of the following: <ul style="list-style-type: none"> <li>● routine - Routine precedence (0)</li> <li>● priority - Priority precedence (1)</li> <li>● immediate - Immediate precedence (2)</li> <li>● flash - Flash precedence (3)</li> <li>● flash-override - Flash override precedence (4)</li> <li>● critical - Critical precedence (5)</li> <li>● internet - Internetwork control precedence (6)</li> <li>● network - Network control precedence (7)</li> </ul>   |

## Modes

ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the discarding of UDP packets received from any source with source ports between 240 and 500 that have any destination with destination ports greater than 1000:

```
Switch(config-acl)# deny udp any range 240-500 any gt 1000
```

---

## permit

Enables or disables the forwarding of packets.

## Syntax

```
[no] [<ACL sequence number>] permit {<IANA protocol number>|ahp|any|  
eigrp|esp|gre|igmp|ip|nos|ospf|pcp|pim} {<source address>|any|  
host <single source address>} {<destination address>|any|host <single destination  
address>} [dscp <dscp value>|precedence <precedence value>] [fragments]
```

where:

| Parameter                   | Function  |
|-----------------------------|---|
| <i>ACL sequence number</i>  | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.  |
| <i>IANA protocol number</i> | Forwards packets based on the protocol number assigned by the Internet Assigned Numbers Authority (IANA). The <i>IANA protocol number</i> is from 1 to 255.   |
| ahp                         | Forwards Authentication Header (AH) packets.  |
| any                         | Depending on the position where this parameter is used it can mean the forwarding of: <ul style="list-style-type: none"><li>• packets regardless of their source protocol, or</li><li>• packets regardless of their source address, or</li><li>• packets regardless of their destination address.</li></ul> |
| eigrp                       | Forwards Enhanced Interior Gateway Routing Protocol (EIGRP) packets.  |
| esp                         | Forwards Encapsulating Security Payload (ESP) packets.  |
| gre                         | Forwards Generic Routing Encapsulation (GRE) packets.   |
| igmp                        | Forwards Internet Group Management Protocol (IGMP) packets.   |
| ip                          | Forwards Internet Protocol version 4 (IPv4) encapsulation packets.  |
| nos                         | Forwards KA9Q NOS compatible IP over IP tunneling packets.  |
| ospf                        | Forwards Open Shortest Path First (OSPF) packets.   |
| pcp                         | Forwards IP Payload Compression Protocol (PCP) packets.   |
| pim                         | Forwards Protocol Independent Multicast (PIM) packets.  |

| Parameter                                     | Function  |
|---|---|
| <i>source address</i>                         | Forwards packets received from the specified source address. It can be written as: <ul style="list-style-type: none"> <li>● <i>source IPv4 address source wildcard mask</i></li> <li>● <i>source IPv4 address/network mask length</i></li> </ul>  |
| <b>host</b> <i>single source address</i>      | Forwards packets received from the specified single source IPv4 address.  |
| <i>destination address</i>                    | Forwards packets sent to the specified destination address. It can be written as: <ul style="list-style-type: none"> <li>● <i>destination IPv4 address destination wildcard mask</i></li> <li>● <i>destination IPv4 address/network mask length</i></li> </ul>  |
| <b>host</b> <i>single destination address</i> | Forwards packets sent to the specified single destination IPv4 address.   |
| <b>dscp</b> <i>dscp value</i>                 | Forwards packets based on their DiffServ Code Point (DSCP) value. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"> <li>● <b>af11</b> - AF11 DSCP (001010)</li> <li>● <b>af12</b> - AF12 DSCP (001100)</li> <li>● <b>af13</b> - AF13 DSCP (001110)</li> <li>● <b>af21</b> - AF21 DSCP (010010)</li> <li>● <b>af22</b> - AF22 DSCP (010100)</li> <li>● <b>af23</b> - AF23 DSCP (010110)</li> <li>● <b>af31</b> - AF31 DSCP (011010)</li> <li>● <b>af32</b> - AF32 DSCP (011100)</li> <li>● <b>af33</b> - AF33 DSCP (011110)</li> <li>● <b>af41</b> - AF41 DSCP (100010)</li> <li>● <b>af42</b> - AF42 DSCP (100100)</li> <li>● <b>af43</b> - AF43 DSCP (100110)</li> <li>● <b>cs1</b> - CS1(precedence 1) DSCP (001000)</li> <li>● <b>cs2</b> - CS2(precedence 2) DSCP (010000)</li> <li>● <b>cs3</b> - CS3(precedence 3) DSCP (011000)</li> <li>● <b>cs4</b> - CS4(precedence 4) DSCP (100000)</li> <li>● <b>cs5</b> - CS5(precedence 5) DSCP (101000)</li> <li>● <b>cs6</b> - CS6(precedence 6) DSCP (110000)</li> <li>● <b>cs7</b> - CS7(precedence 7) DSCP (111000)</li> <li>● <b>default</b> - Default DSCP (000000)</li> <li>● <b>ef</b> - EF DSCP (101110)</li> </ul> |

| Parameter                             | Function   |
|---------------------------------------|--|
| precedence<br><i>precedence value</i> | Forwards packets based on their precedence value. The <i>precedence value</i> is from 0 to 7 or it can be one of the following: <ul style="list-style-type: none"> <li>● routine - Routine precedence (0)</li> <li>● priority - Priority precedence (1)</li> <li>● immediate - Immediate precedence (2)</li> <li>● flash - Flash precedence (3)</li> <li>● flash-override - Flash override precedence (4)</li> <li>● critical - Critical precedence (5)</li> <li>● internet - Internetwork control precedence (6)</li> <li>● network - Network control precedence (7)</li> </ul> |
| fragments                             | Checks non-initial fragments.  |

## Modes

ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the forwarding of EIGRP packets received from any source with any destination:

```
Switch(config-acl)# deny eigrp any any
```

---

## permit icmp

Enables or disables the forwarding of Internet Control Message Protocol (ICMP) packets.

### Syntax

```
[no] [<ACL sequence number>] permit icmp {<source address>|any|host
<single source address>} {<destination address>|any|host <single destination
address>} [<ICMP type>|administratively-prohibited|
alternate-address|conversion-error|dod-host-prohibited|
dod-net-prohibited|dscp <dscp value>|echo|echo-reply|
general-parameter-problem|host-isolated|
host-precedence-unreachable|host-redirect|host-tos-redirect|
host-tos-unreachable|host-unknown|host-unreachable|
information-reply|information-request|mask-reply|
mask-request|mobile-redirect|net-redirect|net-tos-redirect|
net-tos-unreachable|net-unreachable|network-unknown|
no-room-for-option|option-missing|packet-too-big|
parameter-problem|port-unreachable|precedence <precedence value>|
precedence-unreachable|protocol-unreachable|
reassembly-timeout|redirect|router-advertisement|
router-solicitation|source-quench|source-route-failed|
time-exceeded|timestamp-reply|timestamp-request|traceroute|
ttl-exceeded|unreachable] [fragments]
```

where:

| Parameter                              | Function   |
|--|--|
| <i>ACL sequence number</i>             | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.   |
| <i>source address</i>                  | Forwards ICMP packets received from the specified source address. It can be written as: <ul style="list-style-type: none"><li>• <i>source IPv4 address source wildcard mask</i></li><li>• <i>source IPv4 address/network mask length</i></li></ul>               |
| any                                    | Forwards ICMP packets received or sent from or to any source or destination address.   |
| host <i>single source address</i>      | Forwards ICMP packets received from the specified single source IPv4 address.  |
| <i>destination address</i>             | Forwards ICMP packets sent to the specified destination address. It can be written as: <ul style="list-style-type: none"><li>• <i>destination IPv4 address destination wildcard mask</i></li><li>• <i>destination IPv4 address/network mask length</i></li></ul> |
| host <i>single destination address</i> | Forwards ICMP packets sent to the specified single destination IPv4 address.   |



| Parameter                   | Function  |
|-----------------------------|---|
| <i>ICMP type</i>            | Forwards ICMP packets based on their type. The <i>ICMP type</i> is from 0 to 255.   |
| administratively-prohibited | Forwards ICMP administratively prohibited packets.  |
| alternate-address           | Forwards ICMP alternate address packets.  |
| conversion-error            | Forwards ICMP datagram conversion error packets.  |
| dod-host-prohibited         | Forwards ICMP host prohibited packets.  |
| dod-net-prohibited          | Forwards ICMP network prohibited packets.   |
| dscp <i>dscp value</i>      | Forwards ICMP packets based on their DiffServ Code Point (DSCP) value. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"> <li>● af11 - AF11 DSCP (001010)</li> <li>● af12 - AF12 DSCP (001100)</li> <li>● af13 - AF13 DSCP (001110)</li> <li>● af21 - AF21 DSCP (010010)</li> <li>● af22 - AF22 DSCP (010100)</li> <li>● af23 - AF23 DSCP (010110)</li> <li>● af31 - AF31 DSCP (011010)</li> <li>● af32 - AF32 DSCP (011100)</li> <li>● af33 - AF33 DSCP (011110)</li> <li>● af41 - AF41 DSCP (100010)</li> <li>● af42 - AF42 DSCP (100100)</li> <li>● af43 - AF43 DSCP (100110)</li> <li>● cs1 - CS1(precedence 1) DSCP (001000)</li> <li>● cs2 - CS2(precedence 2) DSCP (010000)</li> <li>● cs3 - CS3(precedence 3) DSCP (011000)</li> <li>● cs4 - CS4(precedence 4) DSCP (100000)</li> <li>● cs5 - CS5(precedence 5) DSCP (101000)</li> <li>● cs6 - CS6(precedence 6) DSCP (110000)</li> <li>● cs7 - CS7(precedence 7) DSCP (111000)</li> <li>● default - Default DSCP (000000)</li> <li>● ef - EF DSCP (101110)</li> </ul> |
| echo                        | Forwards ICMP echo packets.   |
| echo-reply                  | Forwards ICMP echo replies.   |
| general-parameter-problem   | Forwards ICMP packets that have a problem.  |
| host-isolated               | Forwards ICMP host isolated packets.  |
| host-precedence-unreachable | Forwards ICMP host unreachable for precedence packets.  |

| <b>Parameter</b>      | <b>Function</b>  |
|-----------------------|--|
| host-redirect         | Forwards ICMP host redirect packets.   |
| host-tos-redirect     | Forwards ICMP host redirects for Type of Services (ToS).                             |
| host-tos-unreacheable | Forwards ICMP host unreachable for ToS packets.                                      |
| host-unknown          | Forwards ICMP host unknown packets.  |
| host-unreachable      | Forwards ICMP host unreachable packets.  |
| information-reply     | Forwards ICMP information replies.   |
| information-request   | Forwards ICMP information requests.  |
| mask-reply            | Forwards ICMP network mask replies.  |
| mask-request          | Forwards ICMP network mask requests.   |
| mobile-redirect       | Forwards ICMP mobile redirects.  |
| net-redirect          | Forwards ICMP network redirects.   |
| net-tos-redirect      | Forwards ICMP network redirects for ToS.   |
| net-tos-unreacheable  | Forwards ICMP network unreachable for ToS packets.                                   |
| net-unreachable       | Forwards ICMP network unreachable packets.   |
| network-unknown       | Forwards ICMP network unknown packets.   |
| no-room-for-option    | Forwards ICMP packets where a parameter is required but there is no space available. |
| option-missing        | Forwards ICMP packets where a parameter is required but it is missing.               |
| packet-too-big        | Forwards ICMP packets that are too large requiring fragmentation.                    |
| parameter-problem     | Forwards all ICMP packets with parameter problems.                                   |
| port-unreachable      | Forwards ICMP port unreachable packets.  |

| Parameter                             | Function  |
|---------------------------------------|---|
| precedence<br><i>precedence value</i> | Forwards ICMP packets based on their precedence value. The <i>precedence value</i> is from 0 to 7 or it can be one of the following: <ul style="list-style-type: none"> <li>● routine - Routine precedence (0)</li> <li>● priority - Priority precedence (1)</li> <li>● immediate - Immediate precedence (2)</li> <li>● flash - Flash precedence (3)</li> <li>● flash-override - Flash override precedence (4)</li> <li>● critical - Critical precedence (5)</li> <li>● internet - Internetwork control precedence (6)</li> <li>● network - Network control precedence (7)</li> </ul> |
| precedence-unreachable                | Forwards ICMP precedence cutoff packets.  |
| protocol-unreachable                  | Forwards ICMP protocol unreachable packets.   |
| reassembly-timeout                    | Forwards ICMP reassembly timeouts.  |
| redirect                              | Forwards all ICMP redirects.  |
| router-advertisement                  | Forwards ICMP router discovery advertisements.  |
| router-solicitation                   | Forwards ICMP router discovery solicitations.   |
| source-quench                         | Forwards ICMP source quenches.  |
| source-route-failed                   | Forwards ICMP source route failed packets.  |
| time-exceeded                         | Forwards all ICMP time exceeded messages.   |
| timestamp-reply                       | Forwards ICMP timestamp replies.  |
| timestamp-request                     | Forwards ICMP timestamp requests.   |
| traceroute                            | Forwards ICMP trace route packets.  |
| ttl-exceeded                          | Forwards ICMP Time to Live (TTL) exceeded packets.  |
| unreachable                           | Forwards all ICMP unreachable packets.  |
| fragments                             | Checks non-initial fragments.   |

## Modes

ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the forwarding of ICMP packets received from the single source address 10.240.35.78 with any destination:

```
Switch(config-acl)# permit icmp host 10.240.35.78 any
```

---

## permit tcp

Enables or disables the forwarding of Transmission Control Protocol (TCP) packets.

### Syntax

```
[no] [<ACL sequence number>] permit tcp {<source address>|any|host  
<single source address>} [{eq|gt|lt|neq} <source port>|range <source port  
range>} {<destination address>|any|host <single destination address>}  
[{eq|gt|lt|neq} <destination port>|range <destination port range>} [ack]  
[established] [fin] [psh] [rst] [syn] [urg] [dscp <dscp value>|  
precedence <precedence value>] [fragments]
```

where:

| Parameter                         | Function  |
|-----------------------------------|---|
| <i>ACL sequence number</i>        | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.  |
| <i>source address</i>             | Forwards TCP packets received from the specified source address. It can be written as: <ul style="list-style-type: none"><li>• <i>source IPv4 address source wildcard mask</i></li><li>• <i>source IPv4 address/network mask length</i></li></ul> |
| any                               | Forwards TCP packets received or sent from or to any source or destination address.   |
| eq                                | Forwards TCP packets with source port number equal to the specified value.  |
| gt                                | Forwards TCP packets with source port number greater than the specified value.  |
| lt                                | Forwards TCP packets with source port number lower than the specified value.  |
| neq                               | Forwards TCP packets with source port number not equal to the specified value.  |
| <i>source port</i>                | The TCP source port number. It is from 0 to 65535.  |
| <i>destination port</i>           | The TCP destination port number. It is from 0 to 65535.   |
| range                             | Forwards TCP packets with port numbers included in the specified port range.  |
| <i>source port range</i>          | The TCP source port range. It is from 0 to 65535.   |
| <i>destination port range</i>     | The TCP destination port range. It is from 0 to 65535.  |
| host <i>single source address</i> | Forwards TCP packets received from the specified single source IPv4 address.  |

| Parameter                                     | Function  |
|---|---|
| <i>destination address</i>                    | Forwards TCP packets sent to the specified destination address. It can be written as: <ul style="list-style-type: none"> <li>• <i>destination IPv4 address destination wildcard mask</i></li> <li>• <i>destination IPv4 address / network mask length</i></li> </ul>  |
| <b>host</b> <i>single destination address</i> | Forwards TCP packets sent to the specified single destination IPv4 address.   |
| <b>ack</b>                                    | Forwards TCP packets that have matching acknowledgment bits.  |
| <b>established</b>                            | Forwards TCP packets that belong to an established TCP connection.  |
| <b>fin</b>                                    | Forwards TCP packets that have matching finish bits.  |
| <b>psh</b>                                    | Forwards TCP packets that have matching push bits.  |
| <b>rst</b>                                    | Forwards TCP packets that have matching reset bits.   |
| <b>syn</b>                                    | Forwards TCP packets that have matching synchronize bits.   |
| <b>urg</b>                                    | Forwards TCP packets that have matching urgent bits.  |
| <b>dscp</b> <i>dscp value</i>                 | Forwards TCP packets based on their DiffServ Code Point (DSCP) value. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"> <li>• <b>af11</b> - AF11 DSCP (001010)</li> <li>• <b>af12</b> - AF12 DSCP (001100)</li> <li>• <b>af13</b> - AF13 DSCP (001110)</li> <li>• <b>af21</b> - AF21 DSCP (010010)</li> <li>• <b>af22</b> - AF22 DSCP (010100)</li> <li>• <b>af23</b> - AF23 DSCP (010110)</li> <li>• <b>af31</b> - AF31 DSCP (011010)</li> <li>• <b>af32</b> - AF32 DSCP (011100)</li> <li>• <b>af33</b> - AF33 DSCP (011110)</li> <li>• <b>af41</b> - AF41 DSCP (100010)</li> <li>• <b>af42</b> - AF42 DSCP (100100)</li> <li>• <b>af43</b> - AF43 DSCP (100110)</li> <li>• <b>cs1</b> - CS1(precedence 1) DSCP (001000)</li> <li>• <b>cs2</b> - CS2(precedence 2) DSCP (010000)</li> <li>• <b>cs3</b> - CS3(precedence 3) DSCP (011000)</li> <li>• <b>cs4</b> - CS4(precedence 4) DSCP (100000)</li> <li>• <b>cs5</b> - CS5(precedence 5) DSCP (101000)</li> <li>• <b>cs6</b> - CS6(precedence 6) DSCP (110000)</li> <li>• <b>cs7</b> - CS7(precedence 7) DSCP (111000)</li> <li>• <b>default</b> - Default DSCP (000000)</li> <li>• <b>ef</b> - EF DSCP (101110)</li> </ul> |

| Parameter                              | Function  |
|--|---|
| <pre>precedence precedence value</pre> | <p>Forwards TCP packets based on their precedence value. The <i>precedence value</i> is from 0 to 7 or it can be one of the following:</p> <ul style="list-style-type: none"> <li>● <code>routine</code> - Routine precedence (0)</li> <li>● <code>priority</code> - Priority precedence (1)</li> <li>● <code>immediate</code> - Immediate precedence (2)</li> <li>● <code>flash</code> - Flash precedence (3)</li> <li>● <code>flash-override</code> - Flash override precedence (4)</li> <li>● <code>critical</code> - Critical precedence (5)</li> <li>● <code>internet</code> - Internetwork control precedence (6)</li> <li>● <code>network</code> - Network control precedence (7)</li> </ul> |

## Modes

ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the forwarding of TCP packets received from any source with any destination with source and destination ports 540 that match on their acknowledgment bits:

```
Switch(config-acl)# permit tcp any eq 540 any eq 540 ack
```

---

## permit udp

Enables or disables the forwarding of User Datagram Protocol (UDP) packets.

### Syntax

```
[no] [<ACL sequence number>] permit udp {<source address>|any|host  
<single source address>} [{eq|gt|lt|neq} <source port>|range <source port  
range>] {<destination address>|any|host <single destination address>}  
[{eq|gt|lt|neq} <destination port>|range <destination port range>} [ack]  
[established] [fin] [psh] [rst] [syn] [urg] [dscp <dscp value>|  
precedence <precedence value>] [fragments]
```

where:

| Parameter                         | Function  |
|-----------------------------------|---|
| <i>ACL sequence number</i>        | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.  |
| <i>source address</i>             | Forwards UDP packets received from the specified source address. It can be written as: <ul style="list-style-type: none"><li>• <i>source IPv4 address source wildcard mask</i></li><li>• <i>source IPv4 address/network mask length</i></li></ul> |
| any                               | Forwards UDP packets received or sent from or to any source or destination address.   |
| eq                                | Forwards UDP packets with source port number equal to the specified value.  |
| gt                                | Forwards UDP packets with source port number greater than the specified value.  |
| lt                                | Forwards UDP packets with source port number lower than the specified value.  |
| neq                               | Forwards UDP packets with source port number not equal to the specified value.  |
| <i>source port</i>                | The UDP source port number. It is from 0 to 65535.  |
| <i>destination port</i>           | The UDP destination port number. It is from 0 to 65535.   |
| range                             | Forwards UDP packets with port numbers included in the specified port range.  |
| <i>source port range</i>          | The UDP source port range. It is from 0 to 65535.   |
| <i>destination port range</i>     | The UDP destination port range. It is from 0 to 65535.  |
| host <i>single source address</i> | Forwards UDP packets received from the specified single source IPv4 address.  |



| Parameter                                     | Function   |
|---|--|
| <i>destination address</i>                    | Forwards UDP packets sent to the specified destination address. It can be written as: <ul style="list-style-type: none"> <li>● <i>destination IPv4 address destination wildcard mask</i></li> <li>● <i>destination IPv4 address/network mask length</i></li> </ul>   |
| <b>host</b> <i>single destination address</i> | Forwards UDP packets sent to the specified single destination IPv4 address.  |
| <b>dscp</b> <i>dscp value</i>                 | Forwards UDP packets based on their DiffServ Code Point (DSCP) value. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"> <li>● af11 - AF11 DSCP (001010)</li> <li>● af12 - AF12 DSCP (001100)</li> <li>● af13 - AF13 DSCP (001110)</li> <li>● af21 - AF21 DSCP (010010)</li> <li>● af22 - AF22 DSCP (010100)</li> <li>● af23 - AF23 DSCP (010110)</li> <li>● af31 - AF31 DSCP (011010)</li> <li>● af32 - AF32 DSCP (011100)</li> <li>● af33 - AF33 DSCP (011110)</li> <li>● af41 - AF41 DSCP (100010)</li> <li>● af42 - AF42 DSCP (100100)</li> <li>● af43 - AF43 DSCP (100110)</li> <li>● cs1 - CS1(precedence 1) DSCP (001000)</li> <li>● cs2 - CS2(precedence 2) DSCP (010000)</li> <li>● cs3 - CS3(precedence 3) DSCP (011000)</li> <li>● cs4 - CS4(precedence 4) DSCP (100000)</li> <li>● cs5 - CS5(precedence 5) DSCP (101000)</li> <li>● cs6 - CS6(precedence 6) DSCP (110000)</li> <li>● cs7 - CS7(precedence 7) DSCP (111000)</li> <li>● default - Default DSCP (000000)</li> <li>● ef - EF DSCP (101110)</li> </ul> |
| <b>precedence</b> <i>precedence value</i>     | Forwards UDP packets based on their precedence value. The <i>precedence value</i> is from 0 to 7 or it can be one of the following: <ul style="list-style-type: none"> <li>● routine - Routine precedence (0)</li> <li>● priority - Priority precedence (1)</li> <li>● immediate - Immediate precedence (2)</li> <li>● flash - Flash precedence (3)</li> <li>● flash-override - Flash override precedence (4)</li> <li>● critical - Critical precedence (5)</li> <li>● internet - Internetwork control precedence (6)</li> <li>● network - Network control precedence (7)</li> </ul>   |

## Modes

ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables the forwarding of UDP packets received from any source with source ports between 240 and 500 that have any destination with destination ports greater than 1000:

```
Switch(config-acl)# permit udp any range 240-500 any gt 1000
```

---

## statistics per-entry

Enables or disables the collection of statistics for each Access Control List (ACL) entry.

### Syntax

```
[no] statistics per-entry
```

### Modes

ACL Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the collection of statistics for each ACL entry:

```
Switch(config-acl)# statistics per-entry
```



---

## Chapter 21. ARP ACL Mode Commands

This chapter describes the commands available in Address Resolution Protocol (ARP) Access Control List (ACL) Configuration Mode.

---

## arp access-list

Creates an Address Resolution Protocol (ARP) Access Control List (ACL). After creating an ARP ACL, enters ARP ACL Configuration mode.

### Syntax

**[no] arp access-list** <ACL name>

where:

| Parameter       | Function         |
|-----------------|------------------|
| <i>ACL name</i> | The name of ACL. |

Using **no** before the command deletes the ARP ACL.

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates an ARP ACL named `acl-03`:

```
Switch(config)# arp access-list acl-03
```

---

## deny

Enables or disables the discarding of Address Resolution Protocol (ARP) packets.

## Syntax

```
[no] [<ACL sequence number>] deny [request|response] ip {<source IPv4 address>|any|host <single source address> {mac {<source MAC address> <MAC wildcard>|any|host <source MAC address>}}}
```

where:

| Parameter                    | Function  |
|------------------------------|---|
| <i>ACL sequence number</i>   | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.  |
| request                      | Discards only ARP request packets.  |
| response                     | Discards only ARP response packets.   |
| <i>source address</i>        | The IPv4 address of the ARP source. The source address can be specified in one of two formats: <ul style="list-style-type: none"><li>• &lt;IPv4 address&gt; &lt;IPv4 wildcard mask&gt;</li><li>• &lt;IPv4 address/network mask length&gt;</li></ul> |
| any                          | Discards ARP packets from any source address.   |
| host                         | Discards ARP packets from the specified source.   |
| <i>single source address</i> | The IPv4 address of the ARP source. The single source address is specified in <IPv4 address>.   |
| mac                          | Discards ARP packets from source MAC address.   |
| <i>source MAC address</i>    | The MAC address of the ARP source. It can be specified in one of the following formats: <ul style="list-style-type: none"><li>• X.X.X</li><li>• XX-XX-XX-XX-XX-XX</li><li>• XX:XX:XX:XX:XX:XX</li><li>• XXXX.XXXX.XXXX</li></ul>                    |
| <i>source MAC wildcard</i>   | The wildcard for the source MAC address.  |

## Modes

ARP ACL Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command discards ARP packets from any source with source MAC address `a3:46:78:be:01:98` and MAC wildcard `0000.0000.ffff`:

```
Switch(config-arp-acl)# deny ip any mac a3:46:78:be:01:98 0000.0000.ffff
```



---

## permit

Enables or disables the forwarding of Address Resolution Protocol (ARP) packets.

## Syntax

```
[no] [<ACL sequence number>] permit [request|response] ip  
{<source address>|any|host <single source address> {mac {<source MAC address>  
<MAC wildcard>|any|host <source MAC address>}}}}
```

where:

| Parameter                    | Function  |
|------------------------------|---|
| <i>ACL sequence number</i>   | The sequence number of the IPv4 Access Control List (ACL). The <i>ACL sequence number</i> is from 1 to 2147483645.  |
| <i>request</i>               | Forwards only ARP request packets.  |
| <i>response</i>              | Forwards only ARP response packets.   |
| <i>source address</i>        | The IPv4 address of the ARP source. The source address can be specified in one of two formats: <ul style="list-style-type: none"><li>• &lt;IPv4 address&gt; &lt;IPv4 wildcard mask&gt;</li><li>• &lt;IPv4 address/network mask length&gt;</li></ul> |
| <i>any</i>                   | Forwards ARP packets from any source IPv4 address.  |
| <i>host</i>                  | Forwards ARP packets from the specified source.   |
| <i>single source address</i> | The IPv4 address of the ARP source. The single source address is specified in <IPv4 address>.   |
| <i>mac</i>                   | Forwards ARP packets from source MAC address.   |
| <i>source MAC address</i>    | The MAC address of the ARP source. It can be specified in one of the following formats: <ul style="list-style-type: none"><li>• X.X.X</li><li>• XX-XX-XX-XX-XX-XX</li><li>• XX:XX:XX:XX:XX:XX</li><li>• XXXX.XXXX.XXXX</li></ul>                    |
| <i>source MAC wildcard</i>   | The wildcard for the source MAC address.  |

## Modes

ARP ACL Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command forwards ARP packets from any source with source MAC address `a3:46:78:be:01:98` and MAC wildcard `0000.0000.ffff`:

```
Switch(config-arp-acl)# permit ip any mac a3:46:78:be:01:98  
0000.0000.ffff
```

---

## statistics per-entry

Enables or disables the collection of statistics for each Address Resolution Protocol (ARP) entry.

### Syntax

**[no] statistics per-entry**

### Modes

ARP ACL Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the collection of statistics for each ARP entry:

```
Switch(config-arp-acl)# statistics per-entry
```



---

## Chapter 22. MAC ACL Mode Commands

This chapter describes the commands you need to get into and use MAC ACL Mode.

---

## mac access-list

Creates a MAC access control list and enters MAC ACL Configuration Mode.

### Syntax

**[no] mac access-list** <MAC ACL>

where:

| Parameter      | Definition  |
|----------------|---|
| <i>MAC ACL</i> | The name of the MAC access control list; a string up to 64 characters long. |

Using **no** before the command removes the MAC ACL.

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command creates MAC ACL MyACL:

```
Switch(config)# mac access-list MyACL
Switch(config-mac-acl)#
```

### Related Commands

| Command                   | Description                     |
|---------------------------|---------------------------------|
| <a href="#">configure</a> | Configures terminal parameters. |

---

## deny

Specifies which packets to reject.

## Syntax

```
deny [<sequence number>] {{<source MAC> [<source wildcard>]} | any |  
  host <source MAC>} {{<destination MAC> [<destination wildcard>]} | any |  
  host <destination MAC>} {<protocol> | cos <cos> | vlan <vlan>}  
  [cos <cos>] [vlan <vlan>]
```

where:

| Parameter               | Definition   |
|-------------------------|--|
| <i>sequence number</i>  | ACL sequence number; an integer from 1-2147483645.   |
| <i>source MAC</i>       | The source MAC address in the format XXXX.XXXX.XXXX.   |
| <i>source wildcard</i>  | Optional source wildcard MAC address in the format XXXX.XXXX.XXXX.   |
| <b>any</b>              | Any source or destination  |
| <b>host</b>             | A single source or destination host  |
| <i>destination MAC</i>  | The destination MAC address in the format XXXX.XXXX.XXXX.  |
| <i>destination MAC</i>  | Optional destination wildcard MAC address in the format XXXX.XXXX.XXXX.  |
| <i>protocol</i>         | The protocol; one of the following: <ul style="list-style-type: none"><li>● <i>protocol</i>: any Ethertype value (text)</li><li>● <b>aarp</b>: AARP Ethertype - 0x80f3</li><li>● <b>appletalk</b>: Appletalk Ethertype - 0x80b</li><li>● <b>decnet-iv</b>: DECNET-IV Ethertype - 0x6003</li><li>● <b>diagnostic</b>: Diagnostic Ethertype - 0x6005</li><li>● <b>etype-6000</b>: Etype-6000 Ethertype - 0x6000</li><li>● <b>etype-8042</b>: Etype-8042 Ethertype - 0x8042</li><li>● <b>ip</b>: IP Ethertype - 0x0800</li><li>● <b>lat</b>: LAT Ethertype - 0x6004</li><li>● <b>lavc-sca</b>: LAVC-SCA Ethertype - 0x6007</li><li>● <b>mop-console</b>: MOP-Console Ethertype - 0x6002</li><li>● <b>mop-dump</b>: MOP-Dump Ethertype - 0x6001</li><li>● <b>vines-echo</b>: Vines-Echo Ethertype - 0x0baf</li></ul> |
| <b>cos</b> <i>cos</i>   | The Class of Service number; an integer from 0-7.  |
| <b>vlan</b> <i>vlan</i> | The VLAN number; an integer from 1-3999.   |

Using **no** before the command negates it.

## Modes

MAC ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command denies packets from ACL sequence 2 with source `aaaa.bbbb.cccc` with wildcard `dddd.eeee.ffff` and destination host `1111.2222.3333` using IP protocol:

```
Switch(config-mst)# 2 deny aaaa.bbbb.cccc dddd.eeee.ffff host  
1111.2222.3333 ip
```

The following command denies packets from any source and destination host `aaaa.bbbb.cccc` with Class of Service 2:

```
Switch(config-mst)# deny any host aaaa.bbbb.cccc cos 2
```

## Related Commands

| Command                         | Description                                |
|---------------------------------|--|
| <a href="#">configure</a>       | Configures terminal parameters.            |
| <a href="#">mac access-list</a> | Creates a MAC access control list.         |
| <a href="#">permit</a>          | Specifies which packets to allow through.. |



---

## permit

Specifies which packets to allow through.

## Syntax

```
permit [<sequence number>] {{<source MAC> [<source wildcard>]} | any |  
  host <source MAC>} {{<destination MAC> [<destination wildcard>]} | any |  
  host <destination MAC>} {<protocol> | cos <cos> | vlan <vlan>}  
  [cos <cos>] [vlan <vlan>]
```

where:

| Parameter               | Definition   |
|-------------------------|--|
| <i>sequence number</i>  | ACL sequence number; an integer from 1-2147483645.   |
| <i>source MAC</i>       | The source MAC address in the format XXXX.XXXX.XXXX.   |
| <i>source wildcard</i>  | Optional source wildcard MAC address in the format XXXX.XXXX.XXXX.   |
| <b>any</b>              | Any source or destination  |
| <b>host</b>             | A single source or destination host  |
| <i>destination MAC</i>  | The destination MAC address in the format XXXX.XXXX.XXXX.  |
| <i>destination MAC</i>  | Optional destination wildcard MAC address in the format XXXX.XXXX.XXXX.  |
| <i>protocol</i>         | The protocol; one of the following: <ul style="list-style-type: none"><li>• <i>protocol</i>: any Ethertype value (text)</li><li>• <b>aarp</b>: AARP Ethertype - 0x80f3</li><li>• <b>appletalk</b>: Appletalk Ethertype - 0x80b</li><li>• <b>decnet-iv</b>: DECNET-IV Ethertype - 0x6003</li><li>• <b>diagnostic</b>: Diagnostic Ethertype - 0x6005</li><li>• <b>etype-6000</b>: Etype-6000 Ethertype - 0x6000</li><li>• <b>etype-8042</b>: Etype-8042 Ethertype - 0x8042</li><li>• <b>ip</b>: IP Ethertype - 0x0800</li><li>• <b>lat</b>: LAT Ethertype - 0x6004</li><li>• <b>lavc-sca</b>: LAVC-SCA Ethertype - 0x6007</li><li>• <b>mop-console</b>: MOP-Console Ethertype - 0x6002</li><li>• <b>mop-dump</b>: MOP-Dump Ethertype - 0x6001</li><li>• <b>vines-echo</b>: Vines-Echo Ethertype - 0x0baf</li></ul> |
| <b>cos</b> <i>cos</i>   | The Class of Service number; an integer from 0-7.  |
| <b>vlan</b> <i>vlan</i> | The VLAN number; an integer from 1-3999.   |

Using **no** before the command negates it.

## Modes

MAC ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command accepts packets from ACL sequence 2 with source `aaaa.bbbb.cccc` with wildcard `dddd.eeee.ffff` and destination host `1111.2222.3333` using IP protocol:

```
Switch(config-mst)# 2 permit aaaa.bbbb.cccc dddd.eeee.ffff host  
1111.2222.3333 ip
```

The following command permits packets from any source and destination host `aaaa.bbbb.cccc` with Class of Service 2:

```
Switch(config-mst)# deny any host aaaa.bbbb.cccc cos 2
```

## Related Commands

| Command                         | Description                        |
|---------------------------------|------------------------------------|
| <a href="#">configure</a>       | Configures terminal parameters.    |
| <a href="#">mac access-list</a> | Creates a MAC access control list. |
| <a href="#">deny</a>            | Specifies which packets to reject. |

---

## statistics

Collects statistics for each ACL entry.

## Syntax

```
statistics per-entry
```

## Modes

MAC ACL Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command collects statistics from each ACL entry:

```
Switch(config-mst)# statistics per-entry
```

## Related Commands

| Command                         | Description                        |
|---------------------------------|------------------------------------|
| <a href="#">configure</a>       | Configures terminal parameters.    |
| <a href="#">mac access-list</a> | Creates a MAC access control list. |



---

## Chapter 23. MST Mode Commands

This chapter describes how to enter Multiple Spanning Tree (MST) Configuration Mode and the commands in this mode.

---

## spanning-tree mst configuration

Enters MST configuration mode.

### Syntax

**[no] spanning-tree mst configuration**

Using **no** before the command restores the default MST configuration.

### Modes

Global Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following shows how to enable MST configuration mode:

```
Switch(config)# spanning-tree mst configuration
Switch(config-mst)#
```

---

## cancel

Exits MST configuration mode and aborts changes.

## Syntax

**cancel**

## Modes

MST Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following exits MST Configuration Mode without saving changes:

```
Switch(config-mst)# cancel
Switch(config)
```

---

## instance

Maps the specified VLANs to the Spanning Tree instance. If a VLAN does not exist, it is not created automatically.

## Syntax

**[no] instance** <number> **vlan** <vlan number>

where:

| Parameter          | Description   |
|--------------------|---|
| <i>number</i>      | Instance number; an integer from 0-64. Instance 0 refers to CIST. |
| <i>vlan number</i> | VLAN number; an integer from 1-4094.                              |

Using **no** before the command removes the specified VLANs or all VLANs from the Spanning Tree instance and adds them to CIST.

## Modes

MST Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command maps instance 5 to VLAN 4094:

```
Switch(config-mst)# instance 5 vlan 4094
```



---

## name

Configures a name for the MSTP region. All devices within an MSTP region must have the same region name.

## Syntax

**[no] name** <region name>

where:

| Parameter          | Description  |
|--------------------|--|
| <i>region name</i> | MSTP region name (up to 32 alphanumeric characters). |

Using **no** before the command removes a specified region name.

## Modes

MST Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following configures a region name:

```
Switch(config-mst)# name test
```

---

## revision

Configures a revision number for the MSTP region. The revision is used as a numerical identifier for the region. All devices within an MSTP region must have the same revision number.

## Syntax

**[no] revision** *<number>*

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>&lt;number&gt;</i> | Revision number for the MST region (a number from 0 to 65535). The default value is 0. |

Using **no** before the command restores the default setting.

## Modes

MST Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following configures a revision number:

```
Switch(config-mst)# revision 200
```

---

## Chapter 24. PKI Mode Commands

This chapter describes how to enter Public Key Infrastructure (PKI) Configuration Mode and the commands available in this mode.

---

## pki

Creates a Public Key Infrastructure (PKI) profile. After command execution, you enter PKI Configuration command mode.

### Syntax

**pki** <PKI profile name>

where:

| Parameter               | Description  |
|-------------------------|--|
| <i>PKI profile name</i> | The name of the PKI profile. The <i>PKI profile name</i> can be up to 16 characters in length. |

The following command deletes the specified PKI profile:

**no pki** <PKI profile name>

### Modes

Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command creates a PKI profile called pkiProfile1:

```
Switch(config)# pki pkiProfile1
Switch(config-pki)#
```

---

## ca import

Copies a new Certificate Authority (CA) from the specified SFTP URL.

### Syntax

```
ca import <SFTP URL> [vrf {default|management}]
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>SFTP URL</i>       | The location of the CA on the remote SFTP server. The <i>SFTP URL</i> format is:<br><br><i>sftp://username@server address/filepath</i> |
| <b>vrf default</b>    | Copies the new CA using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b> | Copies the new CA using the management VRF instance.   |

### Modes

PKI Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command copies a new CA from a remote SFTP server:

```
Switch(config-pki)# ca import sftp://Admin1@CAserver1:caDir/importCA1
```

---

## ca delete

Deletes a Certificate Authority (CA) from the switch.

## Syntax

**ca delete** <*subject*>

where:

| Parameter      | Description  |
|----------------|--|
| <i>subject</i> | Deletes the CA identified by subject name. The <i>subject</i> can contain the country name (for example, C=US), the state or province name (for example, ST=CA), and other fields present in the CA. |

## Modes

PKI Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command deletes a CA from the switch:

```
Switch(config-pki)# ca delete C=US, ST=Maryland, L=Baltimore, O=Test CA, Limited, OU=Server Research Department, CA/emailAddress=test@example.com, CN=Test
```

---

## csr generate

Creates a new Certificate Signing Request (CSR). During the CSR generation process, you are prompted to define the information of each field of the CSR. After the CSR is generated, it needs to be exported to a Certificate Authority (CA) to be signed and then imported back to the switch.

## Syntax

**csr generate**

## Modes

PKI Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command generates a new CSR:

```
Switch(config-pki)# csr generate
Country Name (2 letter code) [US]:
State or Province Name (full name) [California]:
Locality Name (eg, city) [Santa Clara]:
Organization Name (eg, company) [Lenovo Networking Operating System]:
Organizational Unit Name (eg, section) [Network Engineering]:
Common Name (eg, FQDN or YOUR name) []:
Email (eg, email address) []:
Confirm generate csr? (y/n)
```

---

## csr export

Copies the newly generated CSR to a Certificate Authority (CA) to be signed with its private key.

### Syntax

```
csr export <SFTP URL> [vrf {default|management}]
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>SFTP URL</i>       | The location of the CA on the remote SFTP server. The <i>SFTP URL</i> format is:<br><br><i>sftp://username@server address/filepath</i> |
| <b>vrf default</b>    | Copies the new CSR using the default Virtual Routing and Forwarding (VRF) instance.  |
| <b>vrf management</b> | Copies the new CSR using the management VRF instance.  |

### Modes

PKI Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command copies the newly generated CSR to a remote CA:

```
Switch(config-pki)# csr export sftp://Admin1@CAserver1:csrDir/export
```



---

## csr import

Copies the signed CSR from the remote Certificate Authority (CA) to the switch.

### Syntax

```
csr import <SFTP URL> [vrf {default|management}]
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>SFTP URL</i>       | The location of the signed CSR on the remote SFTP server. The <i>SFTP URL</i> format is:<br><br><i>sftp://username@server address/filepath</i> |
| <b>vrf default</b>    | Copies the signed CSR using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b> | Copies the signed CSR using the management VRF instance.   |

### Modes

PKI Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command copies the signed CSR from a remote CA:

```
Switch(config-pki)# csr import sftp://Admin1@CAserver1:csrDir/import
```

---

## host-cert generate

Creates a new host certificate to connect to the SSL to be used during the key exchange. During the host certificate generation process, you are prompted to define the information of each field of the certificate.

### Syntax

```
host-cert generate
```

### Modes

PKI Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command generates a new host certificate:

```
Switch(config-pki)# host-cert generate
Country Name (2 letter code) [US]:
State or Province Name (full name) [California]:
Locality Name (eg, city) [Santa Clara]:
Organization Name (eg, company) [Lenovo Networking Operating System]:
Organizational Unit Name (eg, section) [Network Engineering]:
Common Name (eg, FQDN or YOUR name) []:
Email (eg, email address) []:
Confirm generate certificate? (y/n) [n]
```

---

## host-cert certificate import

Copies the host certificate from a remote Certificate Authority (CA) to the switch.

**Note:** After both the host certificate and the private key are copied to the switch, a validation process will be performed on the pair (host certificate and private key).

### Syntax

```
host-cert certificate import <SFTP URL> [vrf {default|  
management}]
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <i>SFTP URL</i>       | The location of the host certificate on the remote SFTP server. The <i>SFTP URL</i> format is:<br><br><i>sftp://username@server address/filepath</i> |
| <b>vrf default</b>    | Copies the host certificate using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b> | Copies the host certificate using the management VRF instance.   |

### Modes

PKI Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command copies a host certificate from a remote CA:

```
Switch(config-pki)# host-cert certificate import  
sftp://Admin1@CAserver1:host-certDir/import
```

---

## host-cert private-key import

Copies the private key from a remote Certificate Authority (CA) to the switch.

**Note:** After both the host certificate and the private key are copied to the switch, a validation process will be performed on the pair (host certificate and private key).

### Syntax

```
host-cert private-key import <SFTP URL> [vrf {default|  
management}]
```

where:

| Parameter             | Description   |
|-----------------------|---|
| <i>SFTP URL</i>       | The location of the private key on the remote SFTP server. The <i>SFTP URL</i> format is:<br><br><i>sftp://username@server address/filepath</i> |
| <b>vrf default</b>    | Copies the private key using the default Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf management</b> | Copies the private key using the management VRF instance.   |

### Modes

PKI Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command copies a private key from a remote CA:

```
Switch(config-pki)# host-cert private-key import  
sftp://Admin1@CAserver1:privateKeyDir/import
```

---

## host-cert delete

Deletes the host certificate. This will also delete the private key associated with the host certificate.

### Syntax

```
host-cert delete
```

### Modes

PKI Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command deletes the host certificate and private key pair:

```
Switch(config-pki)# host-cert delete
```



---

## Chapter 25. Policy Map Mode Commands

This chapter describes how to enter Policy Map Configuration Mode and the commands in this mode.

---

## policy-map

Enters Policy-Map Configuration Mode or creates a policy map that can be attached to one or more interfaces to specify a service policy.

### Syntax

**[no] policy-map** <name>

where:

| Parameter   | Description      |
|-------------|------------------|
| <i>name</i> | Policy map name. |

Using **no** before the command removes a specified policy map.

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following configures a policy map named test:

```
Switch(config)# policy-map test
Switch(config-pmap-qos)#
```



---

## class

Sets class map properties.

## Syntax

```
class {<name>|class-default|type qos {<name>|class-default}}  
{display|end|exit|help|no|police|save|where}
```

where:

| Parameter                   | Description   |
|-----------------------------|---|
| <i>name</i>                 | Sets the class map name.  |
| <b>class-default</b>        | Sets the default class map name.  |
| <b>type qos</b> <i>name</i> | Sets the class map type.  |
| <b>display</b>              | Displays system information.  |
| <b>end</b>                  | Exits the current command mode and enters Privileged EXEC Mode.   |
| <b>exit</b>                 | Leaves the current command mode and go down to the previous command mode.<br>If in User EXEC Mode, logs off the switch. |
| <b>help</b>                 | Gives a brief description of the interactive help system.   |
| <b>no</b>                   | Negates a command or set its defaults   |
| <b>police</b>               | Specifies a policer configuration   |
| <b>save</b>                 | Saves running configuration.  |
| <b>where</b>                | Shows which ISCLI mode you are in.  |

## Modes

Policy-Map Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to attach a class map to a policy map:

```
Switch(config-pmap-qos)# class test
Switch(config-pmap-c-qos)#
```

---

## apply

Applies class map policies.

## Syntax

```
[no] apply {cos <CoS value>|dscp <DSCP value>|precedence <precedence value>|qos-group <QoS group value>}
```

where:

| Parameter              | Description  |
|------------------------|--|
| cos <i>CoS value</i>   | Defines the specified Class of Service (CoS) as the classification criterion. The <i>CoS value</i> is from 0 to 7 and it can be specified as a range.  |
| dscp <i>DSCP value</i> | Defines the specified DiffServ Code Point (DSCP) as the classification criterion. The <i>DSCP value</i> is from 0 to 63 or one of the following: <ul style="list-style-type: none"><li>● af11 - AF11 DSCP (001010)</li><li>● af12 - AF12 DSCP (001100)</li><li>● af13 - AF13 DSCP (001110)</li><li>● af21 - AF21 DSCP (010010)</li><li>● af22 - AF22 DSCP (010100)</li><li>● af23 - AF23 DSCP (010110)</li><li>● af31 - AF31 DSCP (011010)</li><li>● af32 - AF32 DSCP (011100)</li><li>● af33 - AF33 DSCP (011110)</li><li>● af41 - AF41 DSCP (100010)</li><li>● af42 - AF42 DSCP (100100)</li><li>● af43 - AF43 DSCP (100110)</li><li>● cs1 - CS1(precedence 1) DSCP (001000)</li><li>● cs2 - CS2(precedence 2) DSCP (010000)</li><li>● cs3 - CS3(precedence 3) DSCP (011000)</li><li>● cs4 - CS4(precedence 4) DSCP (100000)</li><li>● cs5 - CS5(precedence 5) DSCP (101000)</li><li>● cs6 - CS6(precedence 6) DSCP (110000)</li><li>● cs7 - CS7(precedence 7) DSCP (111000)</li><li>● default - Default DSCP (000000)</li><li>● ef - EF DSCP (101110)</li></ul> |

| Parameter                                       | Description  |
|---|--|
| <code>precedence</code> <i>precedence value</i> | <p>Defines the precedence as the classification criterion. The precedence value is from 0 to 7 or it can be one of the following:</p> <ul style="list-style-type: none"> <li>● <code>routine</code> - Routine precedence (0)</li> <li>● <code>priority</code> - Priority precedence (1)</li> <li>● <code>immediate</code> - Immediate precedence (2)</li> <li>● <code>flash</code> - Flash precedence (3)</li> <li>● <code>flash-override</code> - Flash override precedence (4)</li> <li>● <code>critical</code> - Critical precedence (5)</li> <li>● <code>internet</code> - Internetwork control precedence (6)</li> <li>● <code>network</code> - Network control precedence (7)</li> </ul> |
| <code>qos-group</code> <i>QoS group value</i>   | <p>Defines the specified Quality of Service (QoS) group as the classification criterion. The <i>QoS group value</i> is from 0 to 7 and it can be specified as a range.</p>   |

Using **no** before the command

## Modes

Policy-Map Class Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to define a precedence value:

```
Switch(config-pmap-c-qos)# apply precedence 2
```

---

## Chapter 26. VLAN Mode Commands

These commands enter you into an advanced configuration mode for configuring the VLAN attributes, change the status of each VLAN, change the port membership of each VLAN, and delete VLANs.

---

## vlan

Creates a VLAN and enters into the VLAN configuration mode.

## Syntax

**[no] vlan** *<vlan list>*

where:

| Parameter                | Description                              |
|--------------------------|--|
| <i>&lt;vlan list&gt;</i> | Individual VLAN ID or range(s) of VLANs. |

Using **no** before the command deletes the VLAN or range of VLANs.

## Modes

Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to create lists of VLANs:

```
Switch(config)# vlan 1-5,10
```

```
Switch(config)# vlan 2-5,7-19
```

## Restrictions

- If the specified VLAN(s) doesn't exist, it will be created.
- By default, VLAN 1 is the only VLAN configured on the switch. All ports are members of VLAN 1 by default. Up to 3999 VLANs can be configured on the switch.
- VLANs can be assigned any number between 1 and 3999. VLANs 4000-4094 are reserved for switch management.
- In RPVST+ mode, a maximum of 500 VLANs is allowed.

---

## flood

Enables or disables the switch to flood unregistered IP multicast traffic to all ports. The default setting is enabled.

## Syntax

**[no] flood [ipv4|ipv6]**

where:

| Parameter   | Description   |
|-------------|---------------|
| <b>ipv4</b> | IPv4 packets. |
| <b>ipv6</b> | IPv6 packets. |

Using **no** before the command turns off the feature.

## Modes

VLAN Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enables flood management:

```
Switch(config-vlan)# flood ipv4
```

---

## ip igmp snooping

Enables or disables Internet Group Management Protocol (IGMP) snooping on the current VLAN.

By default, IGMP Snooping is enabled.

### Syntax

```
[no] ip igmp snooping
```

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables IGMP Snooping on the current VLAN:

```
Switch(config-vlan)# ip igmp snooping
```



---

## ip igmp snooping fast-leave

Enables or disables Internet Group Management Protocol (IGMP) snooping fast-leave processing on the current VLAN.

### Syntax

```
[no] ip igmp snooping fast-leave
```

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables IGMP Snooping fast-leave:

```
Switch(config-vlan)# ip igmp snooping fast-leave
```

---

## ip igmp snooping last-member-query-interval

When a multicast host leaves an Internet Group Management Protocol (IGMP) group, the host sends an IGMP leave message. To check if this host is the last to leave the group, an IGMP query is sent out as soon as the leave message is received and a timer (last-member-query-interval) is started.

If fast-leave processing is disabled, the switch waits until the timer expires and then removes the switch port from the group. If fast-leave processing is enabled, the timer is ignored and the switch immediately removes the switch port from the IGMP group.

This command configures the last-member-query-interval.

Use the **no** form of this command to reset the timer to its default value.

The default last-member-query-interval value is 1 second.

### Syntax

**[no] ip igmp snooping last-member-query-interval** *<time interval>*

where:

| Parameter            | Function   |
|----------------------|--|
| <i>time interval</i> | The time, in seconds, a switch waits until it removes an IGMP group from a switch port if no reports are received. The <i>time interval</i> is from 1 to 25. |

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures a last-member-query-interval of 3 seconds:

```
Switch(config-vlan)# ip igmp snooping last-member-query-interval 3
```

---

## ip igmp snooping mrouter interface

Adds or removes a layer 2 interface as a static multicast router port.

### Syntax

```
[no] ip igmp snooping mrouter interface {ethernet <chassis  
number/port number>|port-aggregation <LAG number>}
```

where:

| Parameter                                  | Function  |
|--|---|
| ethernet <i>chassis number/port number</i> | Configures a static mrouter on the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| port-aggregation <i>LAG number</i>         | Configures a static mrouter on the specified LAG. The <i>LAG number</i> is from 1 to 4096.  |

To remove all static multicast router ports, use the following command:

```
no ip igmp snooping mrouter interface all
```

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command configures interface ethernet 1/12 as a static mrouter port:

```
Switch(config-vlan)# ip igmp snooping mrouter interface ethernet 1/12
```

---

## ip igmp snooping querier

Enables or disables the Internet Group Management Protocol (IGMP) snooping querier on the current VLAN.

### Syntax

**[no] ip igmp snooping querier** <querier address>

where:

| Parameter              | Function                                  |
|------------------------|---|
| <i>querier address</i> | The IPv4 address of the snooping querier. |

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables the IGMP Snooping querier:

```
Switch(config-vlan)# ip igmp snooping querier 10.124.54.66
```

---

## ip igmp snooping querier-timeout

Configures the querier timeout interval.

### Syntax

**[no] ip igmp snooping querier-timeout** *<timeout interval>*

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>timeout interval</i> | Querier timeout interval, in seconds (a number from 1 to 65535). The default value is 255. |

Using **no** before the command restores the default settings.

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the querier timeout interval to 400:

```
Switch(config-vlan)# ip igmp snooping querier-timeout 400
```

---

## ip igmp snooping query-interval

Configures the IGMP router query interval, in seconds.

### Syntax

**[no] ip igmp snooping query-interval** *<time interval>*

where:

| Parameter            | Function  |
|----------------------|---|
| <i>time interval</i> | IGMP query interval, in seconds (a number from 1 to 18000). The default value is 125. |

Using **no** before the command restores the default settings.

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the query interval to 200:

```
Switch(config-vlan)# ip igmp snooping query-interval 200
```

---

## ip igmp snooping query-max-response-time

Configures the maximum time, in seconds, allowed before responding to a Membership Query message.

### Syntax

**[no] ip igmp snooping query-max-response-time** <*time interval*>

where:

| Parameter            | Function   |
|----------------------|--|
| <i>time interval</i> | Maximum response time allowed before responding to a query message (a number from 1 to 25). The default value is 10. |

Using **no** before the command restores the default settings.

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the maximum response time to 25:

```
Switch(config-vlan)# ip igmp snooping query-max-response-time 25
```

---

## ip igmp snooping report-suppression

Enables or disables the suppression of Internet Group Management Protocol (IGMP) snooping reports.

When enabled, the snooping switch only sends the first report for a group to the multicast routers. Subsequent reports for the same group are not forwarded to the multicast router.

When disabled, all reports are forwarded to multicast routers. This report suppression is applied only for IGMP v1 and v2 reports.

By default, report suppression is enabled.

### Syntax

```
[no] ip igmp snooping report-suppression
```

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enables IGMP Snooping report suppression:

```
Switch(config-vlan)# ip igmp snooping report-suppression
```



---

## ip igmp snooping robustness-variable

Configures the IGMP Robustness variable.

### Syntax

**[no] ip igmp snooping robustness-variable** <*robustness value*>

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>robustness value</i> | Robustness value (a number from 1 to 7). The default value is 2. |

Using **no** before the command restores the default settings.

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets IGMP robustness value to 5:

```
Switch(config-vlan)# ip igmp snooping robustness-variable 5
```

---

## ip igmp snooping startup-query-count

Configures the Startup Query Count, which is the number of IGMP Queries sent out at startup. Each Query is separated by the Startup Query Interval.

### Syntax

**[no] ip igmp snooping startup-query-count** <*number of queries*>

where:

| Parameter                | Function   |
|--------------------------|--|
| <i>number of queries</i> | Number of queries (a number from 1 to 10). The default value is 2. |

Using **no** before the command restores the default settings.

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the startup query count value to 5:

```
Switch(config-vlan)# ip igmp snooping startup-query-count 5
```

---

## ip igmp snooping startup-query-interval

Configures the Startup Query Interval, which is the interval between General Queries sent out at startup.

### Syntax

**[no] ip igmp snooping startup-query-interval** *<time interval>*

where:

| Parameter            | Function  |
|----------------------|---|
| <i>time interval</i> | Query interval at startup, in seconds. (a number from 1 to 18000). The default value is 31. |

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets the startup query interval to 100 seconds:

```
Switch(config-vlan)# ip igmp snooping startup-query-interval 100
```

---

## ip igmp snooping static-group

Configures a static member for a multicast group.

### Syntax

```
[no] ip igmp snooping static-group <multicast address> [source  
<IP address>] interface {ethernet <chassis number/port number> |  
port-aggregation <LAG number>}
```

where:

| Parameter                                    | Function  |
|--|---|
| <i>multicast address</i>                     | Specified multicast IP address.   |
| <b>source</b> <IP address>                   | Configures a Multicast Address to join.   |
| <b>ethernet</b> <chassis number/port number> | Configures a multicast group static member for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>port-aggregation</b> <LAG number>         | Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.  |

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets a new static member for a multicast group on a VLAN:

```
Switch(config-vlan)# ip igmp snooping static-group source 1.1.1.1  
interface port-aggregation 5
```

---

## ip igmp snooping version

Configures the IGMP Snooping version.

### Syntax

**[no] ip igmp snooping version** <version number>

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>version number</i> | IGMP Snooping version number (2 or 3). The default version is 3. |

### Modes

VLAN Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command sets IGMP Snooping version number 2:

```
Switch(config-vlan)# ip igmp snooping version 2
```

---

## name

Assigns a name to the VLAN or changes the existing name. The default VLAN name is the first one.

## Syntax

**[no] name**

Using **no** before the command sets the VLAN name to default VLAN name.

## Modes

VLAN Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to configure a VLAN name:

```
Switch(config-vlan)# name VLAN0002
```

---

## state

Activates or suspends a VLAN. The default state is active.

## Syntax

**[no] state {active|suspend}**

Using **no** before the command restores the default settings.

## Modes

VLAN Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following shows how to suspend a VLAN:

```
Switch(config-vlan)# state suspend
```





---

## Chapter 27. VRRP Mode Commands

Virtual Router Redundancy Protocol (VRRP) Configuration Mode commands are a subset of Interface Mode commands. This chapter describes the commands needed to enter and use VRRP Configuration Mode.

---

## vrrp

Enters Virtual Router Redundancy Protocol (VRRP) configuration mode for an interface.

### Syntax

**vrrp** <virtual router identifier> [**ipv6**]

where:

| Parameter                        | Description   |
|----------------------------------|---|
| <i>virtual router identifier</i> | The virtual router identifier; an integer from 1-255. |
| <b>ipv6</b>                      | Optional; assume IPv6 address family.                 |

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

This command only works on virtual routers.

### Example

The following command enters VRRP mode, configuring virtual router 2:

```
Switch(config-if)# vrrp 2
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## accept-mode

Sets accept mode for the session for a virtual router.

### Syntax

**[no] accept-mode**

Using **no** before the command negates it.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

This command only works on virtual routers.

### Example

The following command sets accept mode for the virtual router:

```
Switch(config-if-vrrp)# accept-mode
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |

---

## address

Sets the IP address for the session for a virtual router.

## Syntax

**[no] address** <*IP address*>

where:

| Parameter         | Description              |
|-------------------|--------------------------|
| <i>IP address</i> | An IPv4 or IPv6 address. |

Using **no** before the command removes the IP address.

## Modes

VRRP Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Restrictions

This command only works on virtual routers.

## Example

The following command sets the IP address to 10.2.2.55 for the virtual router:

```
Switch(config-if-vrrp)# address 10.2.2.55
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |

---

## advertisement-interval

Sets the advertisement interval for the session for a virtual router.

### Syntax

**[no] advertisement-interval** <*interval*>

where:

| Parameter       | Description   |
|-----------------|---|
| <i>interval</i> | The advertisement interval, in hundredths of a second, in multiples of 5; an integer from 5-4095. |

Using **no** before the command removes the advertisement interval.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

This command only works on virtual routers.

### Example

The following command sets the advertisement interval to 1000 (ten seconds) for the virtual router:

```
Switch(config-if-vrrp)# advertisement-interval 1000
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |

---

## preempt

Sets preempt for the session for a virtual router.

### Syntax

**[no] preempt**

Using **no** before the command removes preempt mode.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

This command only works on virtual routers.

### Example

The following command sets preempt mode for the session for the virtual router:

```
Switch(config-if-vrrp)# preempt
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |

---

## priority

Sets the router priority within the virtual router.

## Syntax

**[no] priority** <priority>

where:

| Parameter       | Description  |
|-----------------|--|
| <i>priority</i> | The router priority within virtual router; an integer from 1-254, or 255 if your own router. |

Using **no** before the command removes the priority.

## Modes

VRRP Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Restrictions

This command only works on virtual routers.

## Example

The following command sets the priority to 2 for the virtual router:

```
Switch(config-if-vrrp)# priority 2
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |

---

## shutdown

Disables VRRP for this session on this virtual router.

### Syntax

**shutdown**

Using **no** before the command negates it.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command disables VRRP for this session on this virtual router:

```
Switch(config-if-vrrp)# shutdown
```

### Restrictions

This command only works on virtual routers.

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |



---

## switch-back-delay

Sets the virtual router switch-back delay interval.

### Syntax

**[no] switch-back-delay** <interval>

where:

| Parameter       | Description   |
|-----------------|---|
| <i>interval</i> | The switch-back delay, in milliseconds; an integer from 1-500000. |

Using **no** before the command without any argument removes the switch-back delay.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

This command only works on virtual routers.

### Example

The following command sets the switch-back delay to 3000 milliseconds for the virtual router:

```
Switch(config-if-vrrp)# switch-back-delay 3000
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |

---

## track interface

Enables failover tracking for the specified interface for this VRRP session.

### Syntax

**[no] track interface** <interface name> **priority** <priority>

where:

| Parameter             | Description                                |
|-----------------------|--|
| <i>interface name</i> | The name of the interface.                 |
| <i>priority</i>       | The priority delta; an integer from 1-253. |

Using **no** before the command removes failover tracking from the specified interface.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

- This command only works on virtual routers.
- The interface must already exist for this command to work.
- VRRP tracking cannot be applied to a VRRP bound interface.
- VRRP tracking can be applied only to Layer 3 interfaces.

### Example

The following command enables failover tracking for the interface `MyInterface` with a priority of 2 on the virtual router:

```
Switch(config-if-vrrp)# track interface MyInterface priority 2
```

When `MyInterface` goes down, the priority is decremented by 2 of this VR.

---

## track interface ethernet

Enables failover tracking for the specified ethernet interface for this VRRP session.

### Syntax

**[no] track interface ethernet** <slot>/<chassis> **priority** <priority>

where:

| Parameter       | Description                                |
|-----------------|--|
| <i>slot</i>     | The ethernet slot number.                  |
| <i>chassis</i>  | The ethernet chassis number                |
| <i>priority</i> | The priority delta; an integer from 1-253. |

Using **no** before the command removes failover tracking from the specified interface.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

- This command only works on virtual interfaces.
- The interface must already exist for this command to work.
- VRRP tracking cannot be applied to a VRRP bound interface.
- VRRP tracking can be applied only to Layer 3 interfaces.

### Example

The following command enables failover tracking for the interface 1/1 with a priority delta of 3 on the virtual router:

```
Switch(config-if-vrrp)# track interface ethernet 1/1 priority 3
```

---

## track interface vlan

Enables failover tracking for the specified VLAN interface for this VRRP session.

### Syntax

**[no] track interface vlan** <VLAN number> **priority** <priority>

where:

| Parameter          | Description                                |
|--------------------|--|
| <i>VLAN number</i> | The VLAN number; an integer from 1-4094.   |
| <i>priority</i>    | The priority delta; an integer from 1-253. |

Using **no** before the command removes failover tracking from the specified interface.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

- This command only works on virtual interfaces.
- The VLAN must already exist for this command to work.
- VRRP tracking cannot be applied to a VRRP bound interface.
- VRRP tracking can be applied only to Layer 3 interfaces.

### Example

The following command enables failover tracking for vlan 2 with a priority delta of 3 on the virtual router:

```
Switch(config-if-vrrp)# track interface vlan 2 priority 3
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |

---

## v2-compatible

Enables backwards compatibility for the specified VLAN interface for this VRRP session.

### Syntax

**[no] v2-compatible**

Using **no** before the command disables backwards compatibility for the specified interface.

### Modes

VRRP Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Restrictions

This command only works on virtual routers.

### Example

The following command enables backwards compatibility on the virtual router:

```
Switch(config-if-vrrp)# v2-compatible
```

### Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |
| <a href="#">vrrp</a>      | Enter VRRP Configuration Mode.      |



---

## Chapter 28. VDM Commands

This chapter describes how to enter Virtual Domain Manager (VDM) Configuration Mode and the commands available in this mode.

---

## vdm nutanix

Enter VDM Configuration Mode for Nutanix Cloud Manager.

### Syntax

**[no] vdm nutanix**

Using **no** before the command removes the VDM configuration from the switch.

### Modes

Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command shows how to enter VDM Configuration mode for Nutanix Cloud Manager:

```
Switch(config)# vdm nutanix
Switch(config-vdm)#
```



---

## add interface

Adds switch interfaces to be managed by the VDM.

### Syntax

```
add interface {ethernet <chassis number/port number> |  
port-aggregation <LAG number>}
```

where:

| Parameter   | Description  |
|---|--|
| <b>ethernet</b> <i>chassis number/port number</i> | Adds the specified ethernet port to the VDM. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>port-aggregation</b> <i>LAG number</i>         | Adds the specified Link Aggregation Group (LAG) to the VDM. <i>LAG number</i> is an integer from 1 to 4096.                        |

### Modes

VDM Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command adds ethernet interface 1/12 to the VDM:

```
Switch(config-vdm)# add interface ethernet 1/12
```

---

## ip address

Configures the IP address of the VDM.

### Syntax

**ip address** <IPv4 address> **vrf** {**default**|**management**}

where:

| Parameter           | Description  |
|---------------------|--|
| <i>IPv4 address</i> | The IP address of the VDM in IPv4 format (X.X.X.X).                              |
| <b>vrf</b>          | Specifies the Virtual Routing and Forwarding (VRF) instance used for VDM access. |
| <b>default</b>      | Configures VDM to use the default VRF instance.                                  |
| <b>management</b>   | Configures VDM to use the management VRF instance.                               |

### Modes

VDM Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures the IP address of the VDM:

```
Switch(config-vdm)# ip address 10.130.76.8
```

The following command configures the IP address of the VDM and configures VDM to use the default VRF instance for access:

```
Switch(config-vdm)# ip address 10.130.76.8 vrf default
```

---

## refresh-vms-url

Configures the Uniform Resource Locator (URL) used by the VDM to refresh the virtual machine information.

### Syntax

**[no] refresh-vms-url** <URL>

where:

| Parameter | Description  |
|-----------|--|
| URL       | The URL of the machine offering the virtual machine information. |

Using **no** before the command removes the URL for refreshing the virtual machine information.

### Modes

VDM Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures the virtual machine information refresh URL:

```
Switch(config-vdm)# refresh-vms-url https://<NUTANIX CLUSTER>:9440/api/  
/nutanix/v3/vms/list
```

---

## refresh-vnet-url

Configures the Uniform Resource Locator (URL) used by the VDM to refresh the virtual network information.

### Syntax

**[no] refresh-vnet-url** <URL>

where:

| Parameter | Description  |
|-----------|--|
| URL       | The URL of the machine offering the virtual network information. |

Using **no** before the command removes the URL for refreshing the virtual network information.

### Modes

VDM Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures the virtual network information refresh URL:

```
Switch(config-vdm)# refresh-vnet-url https://<NUTANIX CLUSTER>:9440/api/  
/nutanix/v3/networks/list
```

---

## remove interface

Removes switch interfaces from being managed by the VDM.

### Syntax

```
remove interface {ethernet <chassis number/port number> |  
port-aggregation <LAG number>}
```

where:

| Parameter   | Description   |
|---|---|
| <b>ethernet</b> <i>chassis number/port number</i> | Removes the specified ethernet port from the VDM. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>port-aggregation</b> <i>LAG number</i>         | Removes the specified Link Aggregation Group (LAG) from the VDM. <i>LAG number</i> is an integer from 1 to 4096.                        |

### Modes

VDM Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command removes ethernet interface 1/12 from the VDM:

```
Switch(config-vdm)# remove interface ethernet 1/12
```

---

## subscribe

Subscribes to events generated by VDM.

## Syntax

```
subscribe server-url <URL> client-url <URL> {vm|vnetwork}
```

where:

| Parameter                    | Description                           |
|------------------------------|---------------------------------------|
| <b>server-url</b> <i>URL</i> | Configures the URL of the VDM.        |
| <b>client-url</b> <i>URL</i> | Configures the URL of the switch.     |
| <b>vm</b>                    | Subscribes to virtual machine events. |
| <b>vnetwork</b>              | Subscribes to virtual network events. |

## Modes

VDM Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command subscribes to events generated by VDM:

```
Switch(config-vdm)# subscribe server-url https://<CLUSTER>:9440/api/nutanix/v3/webhook client-url https://<ip>:443/nos/api/cfg/nutanix/network vnetwork
```

```
Switch(config-vdm)# subscribe server-url https://<CLUSTER>:9440/api/nutanix/v3/webhook client-url http://<ip>:8090/nos/api/cfg/nutanix/network vnetwork
```

```
Switch(config-vdm)# subscribe server-url https://<CLUSTER>:9440/api/nutanix/v3/webhook client-url https://<ip>:443/nos/api/cfg/nutanix/vm vm
```

```
Switch(config-vdm)# subscribe server-url https://<CLUSTER>:9440/api/nutanix/v3/webhook client-url http://<ip>:8090/nos/api/cfg/nutanix/vm vm
```

---

## topo-discovery-url

Configures the topology discovery Uniform Resource Locator (URL) used to query the server for all virtual machines (VMs) attached to the switch interfaces.

### Syntax

**topo-discovery-url** <URL>

where:

| Parameter | Description  |
|-----------|--|
| URL       | The URL used to discover VMs attached to the switch. |

### Modes

VDM Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures the topology discovery URL:

```
Switch(config-vdm)# topo-discovery-url  
https://<ip>:9440/PrismGateway/services/rest/v1/vms
```

---

## topo-startup-delay

Configures the topology discovery delay used to query the server for all virtual machines (VMs) attached to the switch interfaces.

### Syntax

**topo-startup-delay** <*seconds*>

where:

| Parameter      | Description   |
|----------------|---|
| <i>seconds</i> | The topology startup delay time, in seconds; an integer from 1-300. Default value: 90.<br><b>Note:</b> This must be higher than the vLAG startup delay. |

### Modes

VDM Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command configures the topology discovery URL:

```
Switch(config-vdm)# topo-startup-delay 120
```



---

## unsubscribe

Unsubscribes from events generated by VDM.

### Syntax

**unsubscribe server-url** <URL> **client-url** <URL> {vm|vnetwork}

where:

| Parameter             | Description                        |
|-----------------------|------------------------------------|
| <b>server-url</b> URL | Configures the URL of the VDM.     |
| <b>client-url</b> URL | Configures the URL of the switch.  |
| <b>vm</b>             | Unsubscribes from VM events.       |
| <b>vnetwork</b>       | Unsubscribes from VNETWORK events. |

### Modes

VDM Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command unsubscribes from events generated by VDM:

```
Switch(config-vdm)# unsubscribe server-url https://<CLUSTER>:9440/api/nutanix/v3/webhook client-url https://switch_url
```

---

## username

Configures the user credentials (username and associated password) for the VDM.

## Syntax

**username** <username> **password** [**encrypted**] <password>

where:

| Parameter        | Description  |
|------------------|--|
| <i>username</i>  | The name of the user.                                |
| <b>encrypted</b> | The specified password is encrypted.                 |
| <i>password</i>  | The password associated with the specified username. |

## Modes

VDM Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command configures an username and an encrypted password for the VDM:

```
Switch(config-vdm)# username User1 password encrypted myPassword
```

---

## Chapter 29. EVC Service Mode Commands

Ethernet Virtual Connection (EVC) service commands configure an EVC service. To execute them, you must first enter Interface Mode. For more information on Interface Mode, see [Chapter 5, "Interface Mode Commands."](#)

---

## service

Enter EVC Service Mode.

## Syntax

**service instance** <Instance ID> **evc-id** <EVC ID>

where:

| Parameter          | Description                       |
|--------------------|-----------------------------------|
| <i>Instance ID</i> | The instance ID to map to the EVC |
| <i>EVC ID</i>      | The EVC ID of the SVLAN.          |

## Modes

Interface Configuration Mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command enters EVC service configuration mode with instance ID 1 and EVC ID 1:

```
Switch(config-if)# service instance 1 evc-id 1
```

## Related Commands

| Command                   | Description                         |
|---------------------------|-------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode. |

---

## exit-service-instance-mode

Exit EVC Service Mode and return to Interface mode

### Syntax

**exit-service-instance-mode**

where:

| Parameter          | Description                       |
|--------------------|-----------------------------------|
| <i>Instance ID</i> | The instance ID to map to the EVC |
| <i>EVC ID</i>      | The EVC ID of the SVLAN.          |

### Modes

Service Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command exits EVC service configuration mode:

```
Switch(if-service-instance)# exit-service-instance-mode
```

### Related Commands

| Command                   | Description                          |
|---------------------------|--------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode.  |
| <a href="#">service</a>   | Enter EVC Service Configuration Mode |

---

## service instance

Enter an EVC Service Mode instance.

### Syntax

**service instance** <Instance ID> **evc-id** <EVC ID>

where:

| Parameter          | Description                       |
|--------------------|-----------------------------------|
| <i>Instance ID</i> | The instance ID to map to the EVC |
| <i>EVC ID</i>      | The EVC ID of the SVLAN.          |

### Modes

Interface Configuration Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command enters an EVC service with instance ID 1 and EVC ID 1:

```
Switch(if-service-instance)# service instance 1 evc-id 1
```

### Related Commands

| Command                   | Description                          |
|---------------------------|--------------------------------------|
| <a href="#">interface</a> | Enter Interface Configuration Mode.  |
| <a href="#">service</a>   | Enter EVC Service Configuration Mode |

---

## Chapter 30. Display Commands

The commands in this chapter display information and statistics about the switch.

---

## display aaa accounting

Displays the current Authentication, Authorization and Accounting (AAA) accounting settings.

### Syntax

```
display aaa accounting
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the current accounting settings:

```
Switch> display aaa accounting  
  
          default: local  
          console: local
```



---

## display aaa authentication

Displays the current Authentication, Authorization and Accounting (AAA) authentication settings.

### Syntax

**display aaa authentication [login error-enable]**

where:

| Parameter          | Function  |
|--------------------|---|
| login error-enable | Displays the status of the error-enable option. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the current authentication settings:

```
Switch> display aaa authentication
          default: local
          console: local
```

The following command displays the current status of the error-enable option:

```
Switch> display aaa authentication login error-enable
disabled
```

---

## display aaa authorization

Displays the current Authentication, Authorization and Accounting (AAA) authorization settings.

### Syntax

**display aaa authorization [all]**

where:

| Parameter | Function   |
|-----------|--|
| all       | Displays all authorization settings, including the switch default configuration. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the current authorization settings:

```
Switch> display aaa authorization
```

The following command displays the current authorization and default switch configuration:

```
Switch> display aaa authorization all  
  
AAA command authorization:  
local
```

---

## display aaa groups

Displays the current configured Authentication, Authorization and Accounting (AAA) groups.

### Syntax

```
display aaa groups
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the currently configured AAA groups:

```
Switch> display aaa groups
radius
```

---

## display aaa user default-role

Displays the default role a user takes if authenticated by Authentication, Authorization and Accounting (AAA) and the server does not reply with user role information.

### Syntax

```
display aaa user default-role
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the user's current default role:

```
Switch> display aaa user default-role
enabled
```

---

## display access-lists

Displays all the configured Access Control Lists (ACLs).

### Syntax

**display access-lists** [*<access-list name>*] [**expanded**|**summary**]

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>access-list name</i> | The name of the ACL.   |
| expanded                | Displays the contents of each ACE (Access Control Entry).  |
| summary                 | Displays a summary of each ACL, including the total number of configured ACEs and the interfaces on which the ACL is configured or active. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following commands display ACLs:

```
Switch> display access-lists

IP access list copp-system-acl-authentication
  10 permit tcp any eq 389 any
  20 permit udp any eq 1812 any
  30 permit udp any eq 1813 any
IP access list copp-system-acl-domain
  10 permit tcp any eq domain any
  20 permit udp any eq domain any
IP access list copp-system-acl-igmp
  10 permit igmp any any
IP access list copp-system-acl-igmp-query
  10 permit igmp any any 17
IP access list copp-system-acl-ntp
  10 permit udp any eq ntp any
IP access list copp-system-acl-pim
  10 permit pim any any
...
```

---

## display alias

Displays the configured command aliases.

### Syntax

**display alias**

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays the configured command aliases:

```
Switch> display alias

CLI alias information
Total number : 2
=====
neidyn      : neighbor 1.1.1.0/32
dvlan135   : display vlan id 135
```

---

## display alias-config

Displays the contents of the command alias configuration file.

### Syntax

```
display alias-config
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays the commands used to define the command aliases:

```
Switch> display alias-config  
  
alias neidyn neighbor 1.1.1.0/32  
alias dvlan135 display vlan id 135
```

---

## display arp access-lists

Displays Access Control Lists (ACLs) applied to Address Resolution Protocol (ARP) packets.

### Syntax

**display arp access-lists** [*<access-list name>*]

where:

| Parameter               | Function             |
|-------------------------|----------------------|
| <i>access-list name</i> | The name of the ACL. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays ACLs applied to ARP packets:

```
Switch> display arp access-lists
```



---

## display banner motd

Displays the login banner or motd (message of the day).

### Syntax

```
display banner motd
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the login banner:

```
Switch> display banner motd  
This is the message of the day.
```

---

## display bfd

Displays Bidirectional Forwarding Detection (BFD) information.

### Syntax

**display bfd**

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BFD information:

```
Switch> display bfd

BFD ID: 00      Start Time:Thu Jan  1 00:00:32 1970
BFD Admin State: DOWN
Number of Sessions:  0
Slow Timer: 2000
BFD Notifications disabled
Next Session Discriminator:  1
```

---

## display bfd neighbors

Displays Bidirectional Forwarding Detection (BFD) neighbors.

### Syntax

**display bfd neighbors [details]**

where:

| Parameter | Function   |
|-----------|--|
| details   | Displays all BFD protocol parameters and timers for each neighbor. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BFD neighbor information:

```
Switch> display bfd neighbors
Codes: LD/RD          - Local Discriminator/Remote Discriminator
      RH/RD          - Remote Heard/Remote State
OurAddr      NeighAddr      LD/RD  RH/RS      Holddown(mult) State
Interface
23.1.1.1     23.1.1.2                 2/1    UP          300( 3)
UP   Vlan23

OurAddr      NeighAddr      LD/RD  RH/RS      Holddown(mult) State
Interface
24.1.1.1     24.1.1.2                 4/2    ADMIN_DOWN 6000( 3)  DOWN
Vlan24

OurAddr      NeighAddr      LD/RD  RH/RS      Holddown(mult) State
Interface
190.1.1.1    190.1.1.2                 5/0    DOWN       0( 0)
DOWN Ethernet1/2
```

---

## display bfd neighbors application

Displays Bidirectional Forwarding Detection (BFD) information for the specified protocol on which BFD is enabled.

### Syntax

**display bfd neighbors application** *<protocol name>* [**details**]

where:

| Parameter            | Function   |
|----------------------|--|
| <i>protocol name</i> | The name of the protocol. The <i>protocol name</i> parameter can have only one of the following values: <ul style="list-style-type: none"><li>• bgp</li><li>• ospf</li></ul> |
| <b>details</b>       | Displays all BFD protocol parameters and timers for each neighbor.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BFD neighbor information for BGP:

```
Switch> display bfd neighbors application bgp
```

---

## display bfd neighbors dest-ip

Displays Bidirectional Forwarding Detection (BFD) information for the specified destination IPv4 or IPv6 address.

### Syntax

```
display bfd neighbors dest-ip <destination IPv4 or IPv6 address>  
[src-ip <source IPv4 or IPv6 address>] [details]
```

where:

| Parameter                                   | Function  |
|---|---|
| <i>destination IPv4 or IPv6 address</i>     | The destination IPv4 or IPv6 address.   |
| <b>src-ip</b> <source IPv4 or IPv6 address> | Displays BFD neighbor information for the specified pair of destination and source IPv4 or IPv6 addresses.<br><b>Note:</b> The destination and source IP addresses must be of the same type, either IPv4 or IPv6. |
| <b>details</b>                              | Displays all BFD protocol parameters and timers for each neighbor.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BFD neighbor information for destination IPv4 address 10.245.34.22:

```
Switch> display bfd neighbors dest-ip 10.245.34.22
```

---

## display bfd neighbors interface

Displays Bidirectional Forwarding Detection (BFD) information for the specified interface.

### Syntax

**display bfd neighbors interface** <interface name> [**details**]

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>interface name</i> | The name of the interface.   |
| details               | Displays all BFD protocol parameters and timers for each neighbor. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BFD information for interface Ethernet 1/12:

```
Switch> display bfd neighbors interface ethernet1/12
```

---

## display bfd neighbors src-ip

Displays Bidirectional Forwarding Detection (BFD) information for the specified source IPv4 or IPv6 address.

### Syntax

**display bfd neighbors src-ip** *<source IPv4 or IPv6 address>* [**dest-ip** *<destination IPv4 or IPv6 address>*] [**details**]

where:

| Parameter  | Function  |
|--|---|
| <i>source IPv4 or IPv6 address</i>                             | The source IPv4 or IPv6 address.  |
| <b>dest-ip</b> <i>&lt;destination IPv4 or IPv6 address&gt;</i> | Displays BFD neighbor information for the specified pair of source and destination IPv4 or IPv6 addresses.<br><b>Note:</b> The source and destination IP addresses must be of the same type, either IPv4 or IPv6. |
| <b>details</b>   | Displays all BFD protocol parameters and timers for each neighbor.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BFD neighbor information for source IPv4 address 10.245.34.22:

```
Switch> display bfd neighbors src-ip 10.245.34.22
```

---

## display bfd neighbors vrf

Displays Bidirectional Forwarding Detection (BFD) neighbors associated with the specified Virtual Routing and Forwarding (VRF) instance.

### Syntax

```
display bfd neighbors vrf {all|default|management} [details]
```

where:

| Parameter         | Function  |
|-------------------|---|
| <b>all</b>        | Displays BFD information about the neighbors associated with all VRF instances.                   |
| <b>default</b>    | Displays BFD information about the neighbors associated with the default VRF instance.            |
| <b>management</b> | Displays BFD information about the neighbors associated with the management VRF instance.         |
| <b>details</b>    | Displays detailed BFD information about the neighbors associated with the specified VRF instance. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BFD neighbors associated with the default VRF instance:

```
Switch> display bfd neighbors vrf default
```



---

## display bgp

Displays Border Gateway Protocol (BGP) route information.

### Syntax

```
display bgp [{ipv4|ipv6} unicast] [<IPv4 or IPv6 network address>  
[/<prefix length> [longer-prefixes]]]
```

where:

| Parameter                           | Function   |
|-------------------------------------|--|
| ipv4                                | Displays BGP information for the IPv4 address family.  |
| ipv6                                | Displays BGP information for the IPv6 address family.  |
| unicast                             | Displays BGP information for the unicast address family.   |
| <i>IPv4 or IPv6 network address</i> | The IPv4 or IPv6 network address.  |
| <i>prefix length</i>                | The IPv4 or IPv6 network mask length.  |
| longer-prefixes                     | Displays BGP route information for the specified network and any subnetworks with a prefix length equal to or greater than the prefix specified. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP route information:

```
Switch> display bgp
```

---

## display bgp community

Displays Border Gateway Protocol (BGP) routes that match the specified community.

### Syntax

```
display bgp [all|{ip|ipv4|ipv6} unicast] community [<community number> [exact-match]] [local-AS] [no-advertise] [no-export]
```

where:

| Parameter               | Function  |
|-------------------------|---|
| all                     | Displays BGP information for all IP address families.   |
| ip/ipv4                 | Displays BGP information for the IPv4 address family.   |
| ipv6                    | Displays BGP information for the IPv6 address family.   |
| unicast                 | Displays BGP information for the unicast address family.  |
| <i>community number</i> | The number of the BGP community. The format for the community number is AA:NN (autonomous system number: community number). |
| exact-match             | Displays only an exact match for the specified community.   |
| local-AS                | Displays BGP routes not advertised outside the local autonomous system (AS).  |
| no-advertise            | Displays BGP routes not advertised to any peer (internal or external).  |
| no-export               | Displays BGP routes advertised only to peers in the same AS.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays BGP routes matching any community 10:23:

```
Switch> display bgp community 10:23
```

---

## display bgp community vrf

Displays Border Gateway Protocol (BGP) routes that match any community associated with the specified Virtual Routing and Forwarding (VRF) instance.

### Syntax

```
display bgp [all|{ip|ipv4|ipv6} unicast] community vrf {all|default}
```

where:

| Parameter | Function   |
|-----------|--|
| all       | Displays BGP information for all IP address families.                              |
| ip/ipv4   | Displays BGP information for the IPv4 address family.                              |
| ipv6      | Displays BGP information for the IPv6 address family.                              |
| unicast   | Displays BGP information for the unicast address family.                           |
| all       | Displays BGP routes matching communities associated with any VRF instance.         |
| default   | Displays BGP routes matching communities associated with the default VRF instance. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes for communities associated with the default VRF instance:

```
Switch> display bgp community vrf default
```

---

## display bgp community-list

Displays Border Gateway Protocol (BGP) routes that match the specified community list.

### Syntax

```
display bgp [all|{ip|ipv4|ipv6} unicast] community-list  
<community list name> [exact-match] [vrf {all|default}]
```

where:

| Parameter                  | Function   |
|----------------------------|--|
| <b>all</b>                 | Displays BGP information for all IP address families.  |
| <b>ip/ipv4</b>             | Displays BGP information for the IPv4 address family.  |
| <b>ipv6</b>                | Displays BGP information for the IPv6 address family.  |
| <b>unicast</b>             | Displays BGP information for the unicast address family.   |
| <i>community list name</i> | The name of the BGP community list.  |
| <b>exact-match</b>         | Displays only an exact match for the specified community list.   |
| <b>vrf all</b>             | Displays BGP routes matching the specified community list associated with any Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf default</b>         | Displays BGP routes matching the specified community list associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the community list 'comlist1':

```
Switch> display bgp community-list comlist1
```

---

## display bgp dampening

Displays Border Gateway Protocol (BGP) dampening information.

### Syntax

```
display bgp [{ipv4|ipv6} unicast] dampening {dampened-paths|flap-statistics|parameters}
```

where:

| Parameter       | Function   |
|-----------------|--|
| ipv4            | Displays BGP information for the IPv4 address family.    |
| ipv6            | Displays BGP information for the IPv6 address family.    |
| unicast         | Displays BGP information for the unicast address family. |
| dampened-paths  | Displays all dampened paths.                             |
| flap-statistics | Displays flap statistics for BGP routes.                 |
| parameters      | Displays all dampening parameters.                       |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays all dampened paths:

```
Switch> display bgp dampening dampened-paths
```

The following command displays flap statistics for BGP routes:

```
Switch> display bgp dampening flap-statistics
```

The following command displays all dampening parameters:

```
Switch> display bgp dampening parameters
```

---

## display bgp filter-list

Displays Border Gateway Protocol (BGP) routes matching a specified filter list.

### Syntax

**display bgp** [{ipv4|ipv6} unicast] **filter-list** <filter list name>

where:

| Parameter               | Function   |
|-------------------------|--|
| ipv4                    | Displays BGP information for the IPv4 address family.    |
| ipv6                    | Displays BGP information for the IPv6 address family.    |
| unicast                 | Displays BGP information for the unicast address family. |
| <i>filter list name</i> | The name of the BGP filter list.                         |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes that match filter list 'flist3':

```
Switch> display bgp filter-list flist3
```

---

## display bgp inconsistent-as

Displays Border Gateway Protocol (BGP) routes with inconsistent Autonomous System (AS) paths.

### Syntax

```
display bgp inconsistent-as
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes with inconsistent AS paths:

```
Switch> display bgp inconsistent-as
```



---

## display bgp neighbors

Displays Border Gateway Protocol (BGP) neighbors.

### Syntax

```
display bgp [{ip|ipv4|ipv6} unicast] neighbors [<IPv4 or IPv6 address> [advertised-routes|received-routes]]
```

where:

| Parameter            | Function   |
|----------------------|--|
| ip/ipv4              | Displays BGP information for the IPv4 address family.          |
| ipv6                 | Displays BGP information for the IPv6 address family.          |
| unicast              | Displays BGP information for the unicast address family.       |
| IPv4 or IPv6 address | The IPv4 or IPv6 address of the BGP neighbor.                  |
| advertised-routes    | Displays the BGP routes advertised for the specified neighbor. |
| received-routes      | Displays the BGP routes received from the specified neighbor.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP neighbors:

```
Switch> display bgp neighbors
```

---

## display bgp neighbors flap-statistics

Displays Border Gateway Protocol (BGP) neighbors.

### Syntax

```
display bgp {ip|ipv4|ipv6} unicast neighbors <IPv4 or IPv6 address> flap-statistics
```

where:

| Parameter                   | Function  |
|-----------------------------|---|
| ip/ipv4                     | Displays BGP information for the IPv4 address family.                                 |
| ipv6                        | Displays BGP information for the IPv6 address family.                                 |
| unicast                     | Displays BGP information for the unicast address family.                              |
| <i>IPv4 or IPv6 address</i> | The IPv4 or IPv6 address of the BGP neighbor.   |
| flap-statistics             | Displays the flap statistics for the BGP routes received from the specified neighbor. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays flap statistics for the BGP routes received from the neighbor with IPv4 address 10.243.2.54:

```
Switch> display bgp ipv4 unicast neighbors 10.243.2.54 flap-statistics
```

---

## display bgp neighbors routes

Displays Border Gateway Protocol (BGP) routes received or advertised to or from the specified neighbor.

### Syntax

**display bgp neighbors** <IPv4 or IPv6 address> **routes**

where:

| Parameter            | Function                                      |
|----------------------|---|
| IPv4 or IPv6 address | The IPv4 or IPv6 address of the BGP neighbor. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays all BGP routes received or advertised to or from the neighbor with IPv4 address 10.254.22.36:

```
Switch> display bgp neighbors 10.254.22.36 routes
```

---

## display bgp ip neighbors routes

Displays Border Gateway Protocol (BGP) routes received or advertised to or from the specified neighbor for the IP unicast address family.

### Syntax

```
display bgp {ip|ipv4|ipv6} unicast neighbors <IPv4 or IPv6 address>  
routes [advertised|dampened|received] [vrf {all|default}]
```

where:

| Parameter            | Function   |
|----------------------|--|
| ip/ipv4              | Displays BGP routes for the IPv4 address family.   |
| ipv6                 | Displays BGP routes for the IPv6 address family.   |
| unicast              | Displays BGP routes for the unicast address family.  |
| IPv4 or IPv6 address | The IPv4 or IPv6 address of the BGP neighbor.  |
| advertised           | Displays BGP routes advertised for the neighbor.   |
| dampened             | Displays all BGP dampened routes received from the specified neighbor.                     |
| received             | Displays all BGP routes received from the neighbor.  |
| vrf all              | Displays all BGP routes associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default          | Displays all BGP routes associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays all BGP routes received or advertised to or from the neighbor with IPv4 address 10.254.22.36:

```
Switch> display bgp ip unicast neighbors 10.254.22.36 routes
```

---

## display bgp neighbors vrf

Displays Border Gateway Protocol (BGP) neighbors associated with the specified Virtual Routing and Forwarding (VRF) instance.

### Syntax

```
display bgp {ip|ipv4|ipv6} unicast neighbors [<IPv4 or IPv6 address>] vrf {all|default}
```

where:

| Parameter                   | Function   |
|-----------------------------|--|
| ip/ipv4                     | Displays BGP information for the IPv4 address family.            |
| ipv6                        | Displays BGP information for the IPv6 address family.            |
| unicast                     | Displays BGP information for the unicast address family.         |
| <i>IPv4 or IPv6 address</i> | The IPv4 or IPv6 address of the BGP neighbor.                    |
| all                         | Displays BGP neighbors associated with any VRF instance.         |
| default                     | Displays BGP neighbors associated with the default VRF instance. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP neighbors associated with the default VRF instance:

```
Switch> display bgp ip unicast neighbors vrf default
```

---

## display bgp nexthop-tracking

Displays Border Gateway Protocol (BGP) next-hop tracking information.

### Syntax

```
display bgp nexthop-tracking
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP next-hop tracking information:

```
Switch> display bgp nexthop-tracking

Configured NHT: ENABLED
NHT Critical Delay time-interval for afi 1 safi 1 : 3000 ms
NHT Non Critical Delay time-interval for afi 1 safi 1 : 10000 ms
NHT Critical Delay time-interval for afi 1 safi 2 : 3000 ms
NHT Non Critical Delay time-interval for afi 1 safi 2 : 10000 ms
NHT Critical Delay time-interval for afi 2 safi 1 : 3000 ms
NHT Non Critical Delay time-interval for afi 2 safi 1 : 10000 ms
BGP VRF: (Default) VRF_ID 0
BGP Instance: (Default), AS: 23, router-id 10.241.41.21
NHT is Enabled
Rcvd Msg count from NSM: 0
NHT delay-timer [Index:0] remaining seconds: 0
NHT delay-timer [Index:1] remaining seconds: 0
NHT delay-timer [Index:2] remaining seconds: 0
NHT delay-timer [Index:3] remaining seconds: 0
NHT delay-timer [Index:4] remaining seconds: 0
NHT delay-timer [Index:5] remaining seconds: 0
BGP nexthop(s):
Total number of IPV4 nexthops : 0
Total number of IPV6 nexthops : 0
```

---

## display bgp nexthop-tree-details

Displays Border Gateway Protocol (BGP) next-hop tree information.

### Syntax

```
display bgp nexthop-tree-details
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP next-hop tree information:

```
Switch> display bgp nexthop-tree-details
```

---

## display bgp paths

Displays all the Border Gateway Protocol (BGP) paths stored in the database.

### Syntax

**display bgp** [{ipv4|ipv6} unicast] paths

where:

| Parameter | Function   |
|-----------|--|
| ipv4      | Displays BGP information for the IPv4 address family.    |
| ipv6      | Displays BGP information for the IPv6 address family.    |
| unicast   | Displays BGP information for the unicast address family. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP path information:

```
Switch> display bgp paths
```



---

## display bgp policy

Displays Border Gateway Protocol (BGP) policy statistics.

### Syntax

```
display bgp {ipv4|ipv6} unicast policy statistics
redistribute {all|direct|static} [vrf {all|default}]
```

where:

| Parameter   | Function  |
|-------------|---|
| ipv4        | Displays BGP information for the IPv4 address family.   |
| ipv6        | Displays BGP information for the IPv6 address family.   |
| unicast     | Displays BGP information for the unicast address family.  |
| all         | Displays BGP policy statistics for all redistributed routes.                                      |
| direct      | Displays BGP policy statistics for direct redistributed routes.                                   |
| static      | Displays BGP policy statistics for static redistributed routes.                                   |
| vrf all     | Displays BGP policy statistics associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default | Displays BGP policy statistics associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP policy statistics for all redistributed routes:

```
Switch> display bgp ipv4 unicast policy statistics redistribute all
```

---

## display bgp prefix-list

Displays Border Gateway Protocol (BGP) routes matching the specified prefix list.

### Syntax

**display bgp prefix-list** <prefix list name>

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>prefix list name</i> | The name of the prefix list used to filter BGP routes. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the prefix list 'preflist1':

```
Switch> display bgp prefix-list preflist1
```

---

## display bgp process

Displays Border Gateway Protocol (BGP) process information.

### Syntax

```
display bgp process
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP process information:

```
Switch> display bgp process

BGP Process Information
BGP Process ID           : 2202
BGP Protocol Tag         : 23
BGP Protocol State       : Running

BGP attributes information
BGP AS path entries      : 0

Information regarding configured VRFs:

BGP Information for VRF default
VRF Id                   : 0
VRF state                 : UP
Router-ID                 : 10.241.41.21
Configured Router-ID     : 10.241.41.21
...
```

---

## display bgp quote-regexp

Displays Border Gateway Protocol (BGP) routes matching the autonomous system (AS) path regular expression.

### Syntax

**display bgp** [{ipv4|ipv6} unicast] **quote-regexp** <regular expression>

where:

| Parameter          | Function   |
|--------------------|--|
| ipv4               | Displays BGP information for the IPv4 address family.    |
| ipv6               | Displays BGP information for the IPv6 address family.    |
| unicast            | Displays BGP information for the unicast address family. |
| regular expression | The regular expression to match the AS path.             |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the AS path regular expression "65550":

```
Switch> display bgp quote-regexp "65550"
```

---

## display bgp regexp

Displays Border Gateway Protocol (BGP) routes matching the autonomous system (AS) path regular expression.

### Syntax

**display bgp regexp** <regular expression>

where:

| Parameter                 | Function                                     |
|---------------------------|--|
| <i>regular expression</i> | The regular expression to match the AS path. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the AS path regular expression "172":

```
Switch> display bgp regexp 172
```

---

## display bgp route-map

Displays Border Gateway Protocol (BGP) route maps.

### Syntax

**display bgp** [{ipv4|ipv6} unicast] **route-map** <route map name>

where:

| Parameter      | Function   |
|----------------|--|
| ipv4           | Displays BGP information for the IPv4 address family.    |
| ipv6           | Displays BGP information for the IPv6 address family.    |
| unicast        | Displays BGP information for the unicast address family. |
| route map name | The name of the route map.                               |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP route map 'path-34':

```
Switch> display bgp route-map path-34
```

---

## display bgp sessions

Displays Border Gateway Protocol (BGP) session information for all BGP peers.

### Syntax

```
display bgp sessions [vrf {all|default}]
```

where:

| Parameter   | Function  |
|-------------|---|
| vrf all     | Displays BGP session information for peers associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default | Displays BGP session information only for peers associated with the default VRF instance.                     |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP session information:

```
Switch> display bgp sessions
```

---

## display bgp statistics

Displays Border Gateway Protocol (BGP) traffic statistics.

### Syntax

```
display bgp statistics
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP traffic statistics:

```
Switch> display bgp statistics
```



---

## display bgp vrf

Displays Border Gateway Protocol (BGP) information for the specified Virtual Routing and Forwarding (VRF) instance.

### Syntax

```
display bgp [{ipv4|ipv6} unicast] vrf {all|default}
```

where:

| Parameter | Function   |
|-----------|--|
| ipv4      | Displays BGP information for the IPv4 address family.    |
| ipv6      | Displays BGP information for the IPv6 address family.    |
| unicast   | Displays BGP information for the unicast address family. |
| all       | Displays BGP information for all the VRF instances.      |
| default   | Displays BGP information for the default VRF instance.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP information for all VRF instances:

```
Switch> display bgp vrf all
```

---

## display boot

Displays the contents of the BOOT variable, including the versions of the active and standby images, the configured boot image, the scheduled reboot time, and the currently configured hardware profile for the switch ports.

## Syntax

**display boot [portmode]**

where:

| Parameter | Function                                     |
|-----------|--|
| portmode  | Displays only the current portmode settings. |

## Modes

- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                   |
|---------|--------------------------------|
| 10.1    | The command was introduced.    |
| 10.2    | The ZTP mode output was added. |

## Example

The following command displays the contents of the BOOT variable:

```
Switch# display boot
Current FLASH software:
  active image: version 10.4.2.0, downloaded 02:05:34 UTC Sun May 15 2016
  standby image: version 10.4.2.0, downloaded 01:22:52 UTC Mon May 16 2016
  Uboot: version 10.4.2.0, downloaded 02:05:36 UTC Sun May 15 2016
Currently set to boot software active image
Currently scheduled reboot time: none
Current port mode: default mode
```

For a switch running in ZTP mode, the output of this command is the following:

```
Switch# display boot
Current ZTP State: Enable
Current FLASH software:
  active image: version 10.4.2.0, downloaded 18:39:47 UTC Wed Sep 16 2015
  standby image: version 10.4.2.0, downloaded 18:44:40 UTC Wed Sep 16 2015
  Uboot: version 10.4.2.0, downloaded 17:49:51 UTC Thu Jul 30 2015
Currently set to boot software active image
Currently scheduled reboot time: none
Current port mode: default mod
```

For the NE10032, the output of this command displays additional information, such as BIOS, Grub, and ONIE versions, and the status of the secure boot feature:

```
Switch# display boot

Current ZTP State: Enable
Current FLASH software:
  active image: version 10.4.2.0, downloaded 13:47:03 UTC Fri May 12 2017
  standby image: version 10.4.2.0, downloaded 10:28:35 UTC Fri May 12 2017
  Grub: version 10.4.2.0, downloaded 13:47:04 UTC Fri May 12 2017
  BIOS: version ALPHA.5.33.0206B, release date 05/10/2017
  Secure Boot: Disabled
  ONIE: version unknown, downloaded unknown
Currently set to boot software active image
Current port mode:
  Port Ethernet1/30 is set in 40G mode
```

---

## display bridge-port interfaces brief

Displays a short summary of all layer 2 interfaces.

### Syntax

```
display bridge-port interfaces brief
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays a short summary of layer 2 interfaces:

```
Switch# display bridge-port interfaces brief
Flags:
S - Static port-aggregation   P - LACP port-aggregation
-----
Ethernet      VLAN  Type      Mode      Status Reason      Speed  Port
Interface                                           Agg#
-----
Ethernet1/1   10    Ethernet  trunk     up      none        10000 1000
(P)
Ethernet1/2   10    Ethernet  trunk     up      none        10000 1000
(P)
Ethernet1/3   1     Ethernet  access    down    Protocol down 10000  --
Ethernet1/4   1     Ethernet  access    down    Protocol down 10000  --
Ethernet1/5   1     Ethernet  access    down    Protocol down 10000  --
Ethernet1/6   1     Ethernet  access    down    Protocol down 10000  --
Ethernet1/7   1     Ethernet  access    down    Protocol down 10000  --
Ethernet1/8   1     Ethernet  access    down    Protocol down 10000  --
Ethernet1/9   10    Ethernet  trunk     up      none        10000 2000
```

---

## display cee

Displays Converged Enhanced Ethernet (CEE) information.

### Syntax

```
display cee [interface ethernet <chassis number/port number> [dcbx  
{admin-details|ctrl|operational-details|remote-details}]]
```

where:

| Parameter                         | Description   |
|-----------------------------------|---|
| <b>interface ethernet</b>         | Displays PFC information for the specified ethernet port.                             |
| <i>chassis number/port number</i> | The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>dcbx admin-details</b>         | Displays DCBX administrative details for the specified ethernet port.                 |
| <b>dcbx ctrl</b>                  | Displays DCBX control state machine information for the specified ethernet port.      |
| <b>dcbx operational-details</b>   | Displays DCBX operational details for the specified ethernet port.                    |
| <b>dcbx remote-details</b>        | Displays DCBX remote details for the specified ethernet port.                         |

### Modes

User EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Restrictions

This command is not supported on the NE1032T and the NE1072T.

## Example

The following command displays CEE information:

```
Switch> display cee

CEE feature setting: On

ETS information:
ETS Global Admin Configuration:
PGID   BW%   COSq  Priorities  Description
=====
0      10    0     0 1 2
1      0     NA
2      40    2     4 5 6 7
3      50    3     3
4      0     4
5      0     5
6      0     6
7      0     7
15     NA    1

ETS Global Operational Configuration:
PGID   BW%   COSq  Priorities  Description
=====
0      10    0     0 1 2
1      0     NA
2      40    2     4 5 6 7
3      50    3     3
4      0     4
5      0     5
6      0     6
7      0     7
15     NA    1

ETS Interface Admin Configuration
-----
ETS Willing mode is not supported on the Switch.

Interface          Advertise
=====
Ethernet1/1        On
Ethernet1/2        On
Ethernet1/3        On
Ethernet1/4        On
Ethernet1/5        On
Ethernet1/6        On
...
```

The following command displays DCBX administrative details for ethernet port 1/12:

```
Switch> display cee interface ethernet 1/12 dcbx admin-details

Current DCBX Administrative configuration on Interface : Ethernet1/12

PFC administrative details
=====
State Advertise Willing  Cap  Priorities  Syncd
-----
On   On       Off    2    3           On

ETS administrative details
=====
State Advertise Willing  PGID   BW%    Priorities  Syncd
-----
On   On       Off    0     10    0 1 2      on
On   On       Off    1     0     4 5 6 7    on
On   On       Off    2     40    3          on
On   On       Off    3     50    3          on
On   On       Off    4     0     3          on
On   On       Off    5     0     3          on
On   On       Off    6     0     3          on
On   On       Off    7     0     3          on

Application priority administrative details
=====
State Advertise Willing  Protocol  ProtoID  Priorities
-----
On   On       Off    0         0         0 1 2 3 4 5 6 7
```

The following command displays DCBX control state machine information for ethernet port 1/12:

```
Switch> display cee interface ethernet 1/12 dcbx ctrl

Interface : Ethernet1/12
DCBX Admin-state: Enabled
DCBX Version: DCBX IEEE 802.1Qaz (v2.5)
```

The following command displays CEE information for ethernet port 1/12:

```
Switch> display cee interface ethernet 1/12

ETS information for the interface Ethernet1/12:
ETS Global Admin Configuration:
PGID   BW%   COSq  Priorities      Description
=====
0      10    0     0 1 2
1      0     NA
2      40    2     4 5 6 7
3      50    3     3
4      0     4
5      0     5
6      0     6
7      0     7
15     NA    1

ETS Global Operational Configuration:
PGID   BW%   COSq  Priorities      Description
=====
0      10    0     0 1 2
1      0     NA
2      40    2     4 5 6 7
3      50    3     3
4      0     4
5      0     5
6      0     6
7      0     7
15     NA    1

Admin Configuration
-----
Advertise Willing
=====
On      Off

Operational Configuration
-----
Advertise Willing
=====
Off     Off

PFC information for the interface Ethernet1/12:
Admin Configuration
-----
Interface      State  Advertise Cap  Priorities
=====
Ethernet1/12   On     On             2    3
-----

Operational Configuration
-----
State Cap  Priorities
=====
On    2    3
```



---

## display cee app-proto

Displays the Data Center Bridging eXchange Capability (DCBX) application control configuration.

### Syntax

```
display cee app-proto
```

### Modes

User EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command displays DCBX application control configuration:

```
Switch> display cee app-proto

Admin Configuration:
Applicatoin Protocol Willing mode is not supported on the Switch.

Advertise  Protocol  ProtoId  Priorities  ConfigName
=====
On         UDP       RoCEv2   3           rocev2
```

### Restrictions

This command is not supported on the NE1032T and the NE1072T.

---

## display cee ets

Displays Enhanced Transmission Selection (ETS) information.

### Syntax

**display cee ets** [**information**|**priority-group** <*priority group ID*>]

where:

| Parameter                | Description  |
|--------------------------|--|
| <b>information</b>       | Displays ETS information.                                  |
| <b>priority</b>          | Displays priority group information.                       |
| <i>priority group ID</i> | The priority group ID (an integer between 0 and 7, or 15). |

### Modes

User EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Restrictions

This command is not supported on the NE1032T and the NE1072T.

## Example

The following command displays ETS information:

```
Switch> display cee ets

ETS Global Admin Configuration:
PGID   BW%   COSq  Priorities  Description
=====
0      10    0     0 1 2
1      0     NA
2      40    2     4 5 6 7
3      50    3     3
4      0     4
5      0     5
6      0     6
7      0     7
15     NA    1

ETS Global Operational Configuration:
-----
ETS Config is not Operational as CEE state is Off

ETS Interface Admin Configuration
-----
ETS Willing mode is not supported on the Switch.

Interface           Advertise
=====
Ethernet1/1         On
Ethernet1/2         On
Ethernet1/3         On
Ethernet1/4         On
...
```

The following command displays information for priority group 3:

```
Switch> display cee ets priority-group 3

Current Priority Group Configuration

PGID   BW%   COSq  Priorities
=====
2      40    2     4 5 6 7
```

---

## display cee pfc

Displays Priority Flow Control (PFC) information.

### Syntax

**display cee pfc** [**interface ethernet** <*chassis number/port number*>]

where:

| Parameter                         | Description   |
|-----------------------------------|---|
| <b>interface ethernet</b>         | Displays PFC information for the specified ethernet port.                             |
| <i>chassis number/port number</i> | The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |

### Modes

User EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Restrictions

This command is not supported on the NE1032T and the NE1072T.

## Example

The following command displays PFC information:

```
Switch> display cee pfc

Global Admin PFC State: On
Priority State Description
=====
 0      Dis
 1      Ena
 2      Dis
 3      Ena    PFC_priority_3
 4      Dis
 5      Dis
 6      Dis
 7      Dis
Admin Configuration:
-----
PFC Willing mode is not supported on the Switch.

Interface      State  Advertise Cap  Priorities
=====
Ethernet1/1    On     On           2    1 3
Ethernet1/2    On     On           2    1 3
Ethernet1/3    On     On           2    1 3
Ethernet1/4    On     On           2    1 3
...
Ethernet1/54   On     On           2    1 3
-----

Operational Configuration
-----
PFC Config is not Operational as CEE state is Off
```

The following command displays PFC information for ethernet port 1/12:

```
Switch> display cee pfc interface ethernet 1/12

Admin Configuration
-----
Interface      State  Advertise Cap  Priorities
=====
Ethernet1/12   On     On           2    1 3
-----

Operational Configuration
-----
PFC Config is not Operational as CEE state is Off
```

---

## display cee pfc counters

Displays Priority Flow Control (PFC) statistics.

### Syntax

**display cee pfc counters** [**interface ethernet** <*chassis number/port number*>]

where:

| Parameter                         | Description   |
|-----------------------------------|---|
| <b>interface ethernet</b>         | Displays PFC statistics for the specified ethernet port.                              |
| <i>chassis number/port number</i> | The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |

### Modes

User EXEC Mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command displays PFC statistics:

```
Switch> display cee pfc counters
```

The following command displays PFC statistics for ethernet port 1/12:

```
Switch> display cee pfc counters interface ethernet 1/12
```

### Restrictions

- This command is not supported on the NE1032T and the NE1072T.
- This command cannot display PFC statistics for a range of ethernet interfaces. It displays PFC statistics for all switch ports or for a specific port.

---

## display class-map

Displays the specified class maps.

### Syntax

**display class-map** [*<class map name>*]

where:

| Parameter             | Function                   |
|-----------------------|----------------------------|
| <i>class map name</i> | The name of the class map. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays class maps:

```
Switch> display class-map

Type qos class-maps
=====
  class-map type qos match-any class-default

Type queuing class-maps
=====
  class-map type queuing match-any 1p7q1t-out-q4
  class-map type queuing match-any 1p7q1t-out-q2
  class-map type queuing match-any 1p7q1t-out-pq1
    match cos 5-7
  class-map type queuing match-any 1p7q1t-out-q-default
    match qos-group 0-7
    match cos 0-4
  class-map type queuing match-any 1p7q1t-out-q3
  class-map type queuing match-any 1p7q1t-out-q6
  ...
```

---

## display class-map type

Displays class maps of the specified type.

### Syntax

**display class-map type {control-plane|qos|queuing} [<class map name>]**

where:

| Parameter             | Function   |
|-----------------------|--|
| control-plane         | Displays Control Plane Protection (CoPP) class maps. |
| qos                   | Displays Quality of Service (QoS) class maps.        |
| queuing               | Displays Class of Service queue (COSq) class maps.   |
| <i>class map name</i> | The name of the class map.                           |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays CoPP class maps:

```
Switch> display class-map type control-plane

Type control plane class-maps
=====
  class-map match-any copp-s-lacp

  class-map match-any copp-s-default

  class-map match-any copp-s-bfd

  class-map match-any copp-s-arpreponse

  class-map match-any copp-s-arprequest

  ...
```



---

## display cli

Displays the Command Line Interface (CLI) tree for the current command mode.

## Syntax

**display cli [history|list {all|cur} [number]]**

where:

| Parameter       | Function  |
|-----------------|---|
| <b>history</b>  | Displays the session command history.                                 |
| <b>list all</b> | Displays all the CLI commands available in all command modes.         |
| <b>list cur</b> | Displays only the CLI commands available in the current command mode. |
| <b>number</b>   | Displays only the number of CLI commands.                             |

## Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |
| 10.4    | Added <b>list</b> option.   |

## Example

The following command displays the CLI tree:

```
Switch> display cli

Exec mode:
+-clear
  +-aaa
    +-local
      +-user
        +-lockout
          +-username
            +-USERNAME [remove aaa local user lockout username USERNAME]
  +-access-list
    +-counters [remove access-list counters (WORD|)]
    +-WORD [remove access-list counters (WORD|)]
+-arp
  +-access-list
    +-counters [remove arp access-list counters(WORD|)]
    +-WORD [remove arp access-list counters(WORD|)]
```

The following command displays the session command history:

```
Switch> display cli history

 1 enable
 2 configure device
 3 vlan 130
 4 name VLAN-SEC
 5 display vlan
 6 exit
 7 disable
 8 display cli history
```

The following command displays the CLI commands available only in Interface Configuration mode:

```
Switch(config-if)# display cli list cur

MODE_16--Interface configuration mode:
aggregation-group <1-4096> mode (active|on|passive)
alias WORD LINE
auto-policy enable
bfd (ipv4|ipv6) authentication (simple | keyed-md5 |
meticulous-keyed-md5 | keyed-sha1 | meticulous-keyed-sha1) (key-id
<0-255> key WORD | key-chain WORD)
bfd (ipv4|ipv6) echo
bfd (ipv4|ipv6) interval <50-999> minrx <50-999> multiplier <3-50>
bfd (ipv4|ipv6)
bfd neighbor src-ip A.B.C.D dest-ip A.B.C.D (multihop|) (non-persistent|)
(admin-down|)
bfd neighbor src-ip X:X::X:X dest-ip X:X::X:X (multihop|)
(non-persistent|) (admin-down|)
bridge-port
...
```

The following command displays the number of CLI commands available in Interface Configuration mode:

```
Switch(config-if)# display cli list cur number

MODE_16--Interface configuration mode:
  commands number: 381
```

## Restrictions

The following command is available only in User EXEC and Privileged EXEC modes:

- **display cli history**

---

## display clock

Displays the current switch time and date.

### Syntax

**display clock**

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the current switch time:

```
Switch> display clock  
07:29:25 PM UTC Sun Dec 27 2015
```

---

## display cores

Displays the process core dumps of the switch.

### Syntax

**display cores**

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the process core dumps:

```
Switch# display cores

Process Name   PID      Datetime
-----
bgpd           gz       2015-09-10 17:05:26
hostmibd       gz       2015-09-10 17:05:31
l2mribd        gz       2015-09-10 17:05:28
lacpd          gz       2015-09-10 17:05:28
mstpd          gz       2015-09-10 17:05:28
nsm            gz       2015-09-10 17:04:18
ospfd          gz       2015-09-10 17:05:28
ribd           gz       2015-09-10 17:05:28
vrrpd         gz       2015-09-10 17:05:28
```

---

## display current

Displays the Multiple Spanning Tree (MST) configuration currently in use.

### Syntax

```
display current
```

### Modes

MST Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the currently used MST configuration:

```
Switch(config-mst)# display current
Current MST Configuration
Name      []
Revision 0 Instances configured 0
Instance  Vlans mapped
-----
0          1-4094
-----
Mars1(config-mst)#sho pending
Pending MST Configuration
Name      [region]
Revision 65535 Instances configured 3
Instance  Vlans mapped
-----
0          4-4094
1          1
2          2
3          3
-----
```

---

## display dbg

Displays the current debug settings.

### Syntax

```
display dbg [aaa|bfd|bgp|hsl|ip {arp|igmp snooping|ospf}|ipv6  
nd|lACP|lldp|npa|nsm|ntp|pki|radius|rib|slp|snmp|snmp-server|s  
panning-tree|ssh-server|syslog|tacacs+|telemetry|telnet-server  
|vlag|vlan|vrrp-engine]
```

where:

| Parameter               | Function  |
|-------------------------|---|
| <b>aaa</b>              | Displays the current Authentication, Authorization and Accounting (AAA) debug settings.         |
| <b>bfd</b>              | Displays the current Bidirectional Forwarding Detection (BFD) debug settings.                   |
| <b>bgp</b>              | Displays the current Border Gateway Protocol (BGP) debug settings.                              |
| <b>hsl</b>              | Displays the current Hardware Specific Layer (HSL) debug settings.                              |
| <b>ip arp</b>           | Displays the current Internet Protocol (IP) Address Resolution Protocol (ARP) debug settings.   |
| <b>ip igmp snooping</b> | Displays the current Internet Group Management Protocol (IGMP) Snooping debug settings.         |
| <b>ip ospf</b>          | Displays the current Open Shortest Path First (OSPF) debug settings.                            |
| <b>ipv6 nd</b>          | Displays the current Internet Protocol version 6 (IPv6) Neighbor Discovery (ND) debug settings. |
| <b>lACP</b>             | Displays the current Link Aggregation Control Protocol (LACP) debug settings.                   |
| <b>lldp</b>             | Displays the current Link Layer Discovery Protocol (LLDP) debug settings.                       |
| <b>npa</b>              | Displays the current Network Policy Agent (NPA) debug settings.                                 |
| <b>nsm</b>              | Displays the current Network Service Module (NSM) debug settings.                               |
| <b>ntp</b>              | Displays the current Network Time Protocol (NTP) debug settings.                                |
| <b>pki</b>              | Displays the current Private Key Infrastructure (PKI) debug settings.                           |

| <b>Parameter</b>     | <b>Function</b>  |
|----------------------|--|
| <b>radius</b>        | Displays the current Remote Authentication Dial-In User Service (RADIUS) debug settings.             |
| <b>rib</b>           | Displays the current Routing Information Base (RIB) debug settings.                                  |
| <b>slp</b>           | Display the current Service Location Protocol (SLP) debug settings.                                  |
| <b>snmp</b>          | Displays the current Simple Network Management Protocol (SNMP) debug settings.                       |
| <b>snmp-server</b>   | Displays the current Simple Network Management Protocol (SNMP) agent debug settings.                 |
| <b>spanning-tree</b> | Displays the current spanning tree debug settings.   |
| <b>ssh-server</b>    | Displays the current Secure Shell (SSH) server debug settings.                                       |
| <b>syslog</b>        | Displays the current system log debug settings.  |
| <b>tacacs+</b>       | Displays the current Terminal Access Controller Access-Control System Plus (TACACS+) debug settings. |
| <b>telemetry</b>     | Displays the current Telemetry service debug settings.   |
| <b>telnet-server</b> | Displays the current Telnet server debug settings.   |
| <b>vlag</b>          | Displays the current Virtual Link Aggregation (VLAG) debug settings.                                 |
| <b>vlan</b>          | Displays the current Virtual LAN (VLAN) debug settings.  |
| <b>vrrp-engine</b>   | Displays the current Virtual Router Redundancy Protocol (VRRP) engine debug settings.                |

## Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the current debug settings for LACP:

```
Switch> display dbg lacp

LACP debugging status:
LACP cli debugging is off
LACP sync debugging is off
LACP error debugging is off
LACP timer debugging is off
LACP event debugging is off
LACP trace debugging is off
LACP individual debugging is off
LACP packet(rx) debugging is off
LACP packet(tx) debugging is off
LACP message(recv) debugging is off
LACP message(send) debugging is off
LACP debugging on interface: all
```



---

## display dbg os

Displays operating system (OS) information.

### Syntax

```
display dbg os {arp|arpv6|interface|route|routev6} vrf  
{default|management}
```

where:

| Parameter             | Description  |
|-----------------------|--|
| <b>arp</b>            | Displays Address Resolution Protocol (ARP) IPv4 table entries.                         |
| <b>arpv6</b>          | Displays Address Resolution Protocol (ARP) IPv6 table entries.                         |
| <b>interface</b>      | Displays interface information.  |
| <b>route</b>          | Displays IPv4 routing table.   |
| <b>routev6</b>        | Display IPv6 routing table.  |
| <b>vrf default</b>    | Displays OS information for the default Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf management</b> | Displays OS information for the management VRF instance.                               |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command displays interface information for the management VRF instance:

```
Switch> display dbg os interface vrf management

eth0  Link encap:Ethernet  HWaddr a8:97:dc:de:3f:00
      inet addr:10.241.39.183  Bcast:10.241.39.255  Mask:255.255.255.128
      UP BROADCAST RUNNING ALLMULTI MULTICAST MTU:1500 Metric:1
      RX packets:290374 errors:0 dropped:0 overruns:0 frame:0
      TX packets:16477 errors:0 dropped:0 overruns:0 carrier:0
      collisions:0 txqueuelen:1000
      RX bytes:71517603 (68.2 MiB)  TX bytes:1851745 (1.7 MiB)
      Base address:0xa000

lo    Link encap:Local Loopback
      inet addr:127.0.0.1  Mask:255.0.0.0
      inet6 addr: ::1/128 Scope:Host
      UP LOOPBACK RUNNING MTU:65536 Metric:1
      RX packets:756149 errors:0 dropped:0 overruns:0 frame:0
      TX packets:756149 errors:0 dropped:0 overruns:0 carrier:0
      collisions:0 txqueuelen:0
      RX bytes:51383256 (49.0 MiB)  TX bytes:51383256 (49.0 MiB)
```

---

## display dot1q-tunnel

Displays current PVID Ingress Tagging settings.

### Syntax

```
display dot1q-tunnel [interface {ethernet <chassis number>/<port number>}|port-aggregation <LAG number>}]
```

where:

| Parameter  | Function   |
|--|--|
| <b>interface</b>   | Displays current PVID Ingress Tagging parameters for the specified interface.  |
| <b>ethernet</b> <i>chassis number</i> / <i>port number</i> | Displays current PVID Ingress Tagging parameters for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>port-aggregation</b> <i>LAG number</i>                  | Displays current PVID Ingress Tagging parameters for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.                         |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays PVID Ingress Tagging statistics:

```
Switch> display dot1q-tunnel interface ethernet 1/9
```

---

## display env

Displays hardware environment status information.

### Syntax

**display env {fan [detail]|power [input]|temperature}**

where:

| Parameter   | Function                                       |
|-------------|--|
| fan         | Displays fan environment information.          |
| detail      | Displays fan environment detailed information. |
| power       | Displays power environment information.        |
| input       | Displays power input environment information.  |
| temperature | Displays temperature environment information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays fan environment detailed information:

```
Switch> display env fan detail

Total Fan: 8
+-----+-----+-----+-----+-----+-----+
| Module | Fan | Name           | Air-Flow      | Speed | Speed |
| Number | ID  |                | Direction     | (%)   | (RPM) |
+-----+-----+-----+-----+-----+-----+
 01      01   Fan 1           Front-to-Back  0      4035
 01      02   Fan 2           Front-to-Back  25     4295
 02      03   Fan 3           Front-to-Back  0      4017
 02      04   Fan 4           Front-to-Back  26     4337
 03      05   Fan 5           Front-to-Back  0      4251
 03      06   Fan 6           Front-to-Back  24     4386
 04      07   Fan 7           Front-to-Back  0      4313
 04      08   Fan 8           Front-to-Back  25     4455
```

The following command displays power environment information:

```
Switch> display env power

Total Power Supplies: 2
+-----+
| ID | Name          | Manufacturer | Model          | State          |
+-----+-----+-----+-----+-----+
| 01 | Power Supply 1 |              |                | Normal ON     |
| 02 | Power Supply 2 |              |                | Alert Fault   |
```

The following command displays temperature environment information:

```
Switch> display env temperature

+-----+-----+-----+-----+
| ID | Name          | Temp      | State |
|   |               | (Celsius)|      |
+-----+-----+-----+-----+
| 01 | CPU Local    | 38        | OK   |
| 02 | Ambient      | 41        | OK   |
| 03 | Hot Spot     | 57        | OK   |
```

---

## display errdisable recovery

Displays error disable recovery information.

### Syntax

**display errdisable recovery**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays error disable recovery information:

```
Switch> display errdisable recovery
Global ErrDisable recovery enabled, timeout 45 sec

-----
Interface      Errdisable reason  Time left(sec)
-----
Ethernet1/48   bpduguard          40
```

---

## display hardware internal

Displays Peripheral Component Interconnect (PCI) configuration space hardware information.

### Syntax

**display hardware internal [pci]**

where:

| Parameter | Function   |
|-----------|--|
| pci       | Displays PCI configuration space for the device. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays PCI information:

```
Switch> display hardware internal

PCI Config Space for Device: 0
0000000 5719 7100 0601 1000 2100 200b 0800 0100
0000010 0000 f0df 0000 0000 0001 0100 0000 0000
0000020 00e0 f0ff f1ff 0100 0000 0000 0000 0000
0000030 0000 0000 4400 0000 0000 0000 0000 0000

PCI Config Space for Device: 1
0000000 e414 54b8 0600 1000 0300 0002 0800 0000
0000010 0400 00e0 0000 0000 0000 0000 0000 0000
0000020 0000 0000 0000 0000 0000 0000 0000 e414 54b8
0000030 0000 0000 4800 0000 0000 0000 0000 0001 0000
```

---

## display hardware internal buffer

Displays buffer information.

### Syntax

**display hardware internal buffer info {egress|ingress}**

where:

| Parameter | Function   |
|-----------|--|
| egress    | Displays egress information for each switch port.  |
| ingress   | Displays ingress information for each switch port. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays ingress buffer information:

```
Switch> display hardware internal buffer info ingress
-----
Instant ingress buffer utilization in terms of cells
One cell represents approximately 208 bytes
-----
Ethernet Port | Ingress Buffer Usage | XOFF
-----
Ethernet1/1   | 0 |
Ethernet1/2   | 0 |
Ethernet1/3   | 0 |
Ethernet1/4   | 0 |
Ethernet1/5   | 0 |
Ethernet1/6   | 0 |
Ethernet1/7   | 0 |
Ethernet1/8   | 0 |
Ethernet1/9   | 0 |
Ethernet1/10  | 0 |
Ethernet1/11  | 0 |
Ethernet1/12  | 0 |
...
-----
```



---

## display hardware internal cpu-mac

Displays hardware MAC information.

### Syntax

**display hardware internal cpu-mac [inband|mgmt] stats**

where:

| Parameter | Function                                      |
|-----------|---|
| inband    | Displays inband port related information.     |
| mgmt      | Displays management port related information. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays inband port related information:

```
Switch> display hardware internal cpu-mac inband stats
mgmt0      Link encap:Management Ethernet          inet
addr:10.241.41.21/25 Bca
st:10.241.41.127
           inet6 addr:fe80::aa97:dfff:fede:2500/64
           UP BROADCAST RUNNING ALLMULTI MULTICAST MTU:1500 Metric:1
           RX packets:0 errors:0 dropped:0 overruns:0 frame:0
           TX packets:0 errors:0 dropped:0 carrier:0
           collisions:0
           RX bytes:0 TX bytes:0
```

### Restrictions

The following command is available only in User EXEC and Privileged EXEC modes:

- **display hardware internal cpu-mac inband stats**

The following command is not available in User EXEC mode:

- **display hardware internal cpu-mac mgmt stats**

---

## display hostname

Displays the switch's network name.

### Syntax

```
display hostname
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the switch's network name:

```
Switch> display hostname  
G8272
```

---

## display hosts

Displays Domain Name Service (DNS) information.

### Syntax

**display hosts vrf {all|default|management}**

where:

| Parameter         | Description  |
|-------------------|--|
| <b>all</b>        | Displays DNS information for all Virtual Routing and Forwarding (VRF) instances. |
| <b>default</b>    | Displays DNS information for the default VRF instance.                           |
| <b>management</b> | Displays DNS information for the management VRF instance.                        |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays DNS information for all VRF instances:

```
Switch> display hosts vrf all
```

---

## display interface

Displays interface status and configuration information.

### Syntax

```
display interface [<interface name>] [brief|capabilities|  
description|flowcontrol|mac-address|snmp-ifindex|bridge-port  
transceiver]
```

where:

| Parameter             | Function  |
|-----------------------|---|
| <i>interface name</i> | The name of the interface.  |
| <b>brief</b>          | Displays a short interface configuration summary.                             |
| <b>capabilities</b>   | Displays interface capabilities (speed, duplex etc.).                         |
| <b>description</b>    | Displays interface description.   |
| <b>flowcontrol</b>    | Displays interface IEEE 802.3x flow control status.                           |
| <b>mac-address</b>    | Displays interface MAC address.   |
| <b>snmp-ifindex</b>   | Displays Simple Network Management Protocol (SNMP) interface index (ifindex). |
| <b>bridge-port</b>    | Displays interface bridging configuration.                                    |
| <b>transceiver</b>    | Displays interface transceiver information.                                   |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays a short summary of the interface configuration:

```
Switch> display interface brief
```

| Ethernet Interface | VLAN | Type | Mode   | Status | Reason             | Speed | Port Agg# |
|--------------------|------|------|--------|--------|--------------------|-------|-----------|
| Ethernet1/1        | 10   | eth  | trunk  | up     | none               | 10000 | 1000      |
| Ethernet1/2        | 10   | eth  | trunk  | up     | none               | 10000 | 1000      |
| Ethernet1/3        | 1    | eth  | access | down   | Link not connected | auto  | --        |
| Ethernet1/4        | 1    | eth  | access | down   | Link not connected | auto  | --        |
| Ethernet1/5        | 1    | eth  | access | down   | Link not connected | auto  | --        |
| Ethernet1/6        | 1    | eth  | access | down   | Link not connected | auto  | --        |
| Ethernet1/7        | 1    | eth  | access | down   | Link not connected | auto  | --        |
| Ethernet1/8        | 1    | eth  | access | down   | Link not connected | auto  | --        |
| Ethernet1/9        | 10   | eth  | trunk  | up     | none               | 10000 | 2000      |
| Ethernet1/10       | 10   | eth  | trunk  | up     | none               | 10000 | 2000      |
| ...                |      |      |        |        |                    |       |           |

The following command displays interface flow control status:

```
Switch> display interface flow control
```

| Port         | Send FlowControl admin | oper | Receive FlowControl admin | oper | RxPause | TxPause |
|--------------|------------------------|------|---------------------------|------|---------|---------|
| Ethernet1/1  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/2  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/3  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/4  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/5  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/6  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/7  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/8  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/9  | off                    | off  | on                        | on   | 0       | 0       |
| Ethernet1/10 | off                    | off  | on                        | on   | 0       | 0       |
| ...          |                        |      |                           |      |         |         |

The following command displays interface MAC address:

```
Switch> display interface mac-address
```

| Interface    | Mac-Address    | Burn-in Mac-Address |
|--------------|----------------|---------------------|
| Ethernet1/1  | a48c.db95.5702 | a48c.db95.5702      |
| Ethernet1/2  | a48c.db95.5703 | a48c.db95.5703      |
| Ethernet1/3  | a48c.db95.5704 | a48c.db95.5704      |
| Ethernet1/4  | a48c.db95.5705 | a48c.db95.5705      |
| Ethernet1/5  | a48c.db95.5706 | a48c.db95.5706      |
| Ethernet1/6  | a48c.db95.5707 | a48c.db95.5707      |
| Ethernet1/7  | a48c.db95.5708 | a48c.db95.5708      |
| Ethernet1/8  | a48c.db95.5709 | a48c.db95.5709      |
| Ethernet1/9  | a48c.db95.570a | a48c.db95.570a      |
| Ethernet1/10 | a48c.db95.570b | a48c.db95.570b      |
| ...          |                |                     |

---

## display interface ethernet

Displays ethernet interface configuration information.

### Syntax

**display interface ethernet** *<chassis number or range/port number or range>*  
**[brief|capabilities|description|flowcontrol|mac-address|**  
**bridge-port|transceiver]**

where:

| Parameter   | Function   |
|---|--|
| <i>chassis number or range/port number or range</i> | The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| brief   | Displays a short interface configuration summary.  |
| capabilities  | Displays interface capabilities (speed, duplex etc.).  |
| description   | Displays interface description.  |
| flowcontrol   | Displays interface IEEE 802.3x flow control status.  |
| mac-address   | Displays interface MAC address.  |
| bridge-port   | Displays interface bridging configuration.   |
| transceiver   | Displays interface transceiver information.  |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays configuration information for ethernet interface 1/12:

```
Switch> display interface ethernet 1/12

Interface Ethernet1/12
  Hardware is Ethernet Current HW addr: a897.dcde.250e
  Physical:a897.dcde.250e Logical:(not set)
  index 410120 metric 1 MTU 1500 Bandwidth 10000000 Kbit
  Port Mode is access
  <BROADCAST,MULTICAST>
  VRF Binding: Not bound
  Speed 10000 Mb/s Duplex full
  Last link flapped never
  Last clearing of "display interface" counters never
  30 seconds input rate 0 bits/sec, 0 bytes/sec, 0 packets/sec
  30 seconds output rate 0 bits/sec, 0 bytes/sec, 0 packets/sec
  Load-Interval #2: 5 minute (300 seconds)
    input rate 0 bps, 0 pps; output rate 0 bps, 0 pps
  RX
    0 unicast packets  0 multicast packets  0 broadcast packets
    0 input packets  0 bytes
    0 jumbo packets  0 storm suppression packets
    0 giants  0 input error  0 short frame  0 overrun  0 underrun
    0 watchdog  0 if down drop
    0 input with dribble  0 input discard(includes ACL drops)
    0 Rx pause
  TX
    0 unicast packets  0 multicast packets  0 broadcast packets
    0 output packets  0 bytes
    0 jumbo packets
    0 output errors  0 collision  0 deferred  0 late collision
    0 lost carrier  0 no carrier  0 babble
    0 Tx pause
  0 interface resets
Automatic policy provisioning is disabled on this interface
```

---

## display interface loopback

Displays loopback interface configuration information.

### Syntax

**display interface loopback** <loopback interface> [**brief|capabilities|description|flowcontrol|mac-address|transceiver**]

where:

| Parameter                 | Function  |
|---------------------------|---|
| <i>loopback interface</i> | The loopback interface number. Range is from 0 to 7.  |
| <b>brief</b>              | Displays a short interface configuration summary.     |
| <b>capabilities</b>       | Displays interface capabilities (speed, duplex etc.). |
| <b>description</b>        | Displays interface description.                       |
| <b>flowcontrol</b>        | Displays interface IEEE 802.3x flow control status.   |
| <b>mac-address</b>        | Displays interface MAC address.                       |
| <b>transceiver</b>        | Displays interface transceiver information.           |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |



## Example

The following command displays configuration information for loopback interface 0:

```
Switch> display interface loopback 0

Interface loopback0
  Hardware is Loopback
  index 8 metric 1 MTU 1500 Bandwidth 0 Kbit
  no bridge-port
  arp ageing timeout 1500
  <UP,LOOPBACK,RUNNING>
  VRF Binding: Not bound
  DHCP client is disabled.
  Encapsulation LOOPBACK
    0 packets input 0 bytes
    0 multicast frames 0 compressed
    0 input errors 0 frame 0 overrun 0 fifo
    0 packets output 0 bytes 0 underruns
    0 output errors 0 collisions 0 fifo
```

---

## display interface mgmt

Displays management interface configuration information.

### Syntax

**display interface mgmt** <management interface> [**brief|capabilities|description|flowcontrol|mac-address|transceiver**]

where:

| Parameter                   | Function  |
|-----------------------------|---|
| <i>management interface</i> | The management interface number. The number is 0.     |
| <b>brief</b>                | Displays a short interface configuration summary.     |
| <b>capabilities</b>         | Displays interface capabilities (speed, duplex etc.). |
| <b>description</b>          | Displays interface description.                       |
| <b>flowcontrol</b>          | Displays interface IEEE 802.3x flow control status.   |
| <b>mac-address</b>          | Displays interface MAC address.                       |
| <b>transceiver</b>          | Displays interface transceiver information.           |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays configuration information for the management interface:

```
Switch> display interface mgmt 0

Interface mgmt0
  Hardware is Management Ethernet  Current HW addr: a897.dcde.2500
  Physical:a897.dcde.2500  Logical:(not set)
  index 3 metric 1 MTU 1500 Bandwidth 1000000 Kbit
  no bridge-port
  arp ageing timeout 1500
  <UP,BROADCAST,RUNNING,ALLMULTI,MULTICAST>
  VRF Binding: Not bound
  Speed 1000 Mb/s Duplex full
  IPV6 DHCP IA-NA client is enabled.
  inet 10.241.41.21/25 broadcast 10.241.41.127
  inet6 fe80::aa97:dcff:fede:2500/64
  RX
    1604059 input packets 8 unicast packets 1504132 multicast packets
    99919 broadcast packets 316897210 bytes
  TX
    63636 output packets 182 unicast packets 63453 multicast packets
    1 broadcast packets 9846996 bytes
```

---

## display interface port-aggregation

Displays Link Aggregation Group (LAG) interface configuration information.

### Syntax

```
display interface port-aggregation <LAG number> [bridge-port |  
brief | capabilities | counters | description | flowcontrol |  
mac-address | status | transceiver ]
```

where:

| Parameter                  | Function  |
|----------------------------|---|
| <i>LAG number or range</i> | The LAG number. Range is from 1 to 4096.              |
| <b>bridge-port</b>         | Displays interface bridging configuration.            |
| <b>brief</b>               | Displays a short interface configuration summary.     |
| <b>capabilities</b>        | Displays interface capabilities (speed, duplex etc.). |
| <b>counters</b>            | Displays interface statistics.                        |
| <b>description</b>         | Displays interface description.                       |
| <b>flowcontrol</b>         | Displays interface IEEE 802.3x flow control status.   |
| <b>mac-address</b>         | Displays interface MAC address.                       |
| <b>status</b>              | Displays interface status.                            |
| <b>transceiver</b>         | Displays interface transceiver information.           |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays configuration information for LAG 12:

```
Switch> display interface port-aggregation 12

Interface po12
  Hardware is AGGREGATE  Current HW addr: 0e00.0000.0003
  Physical:(not set)  Logical:(not set)
  index 100012 metric 1 MTU 1500 Bandwidth 0 Kbit
  Port Mode is access
  <UP,BROADCAST,MULTICAST>
  VRF Binding: Not bound
  No members
  30 seconds input rate 0 bits/sec, 0 bytes/sec, 0 packets/sec
  30 seconds output rate 0 bits/sec, 0 bytes/sec, 0 packets/sec
  Load-Interval #2: 5 minute (300 seconds)
    input rate 0 bps, 0 pps; output rate 0 bps, 0 pps
  RX
    0 unicast packets  0 multicast packets  0 broadcast packets
    0 input packets  0 bytes
    0 jumbo packets  0 storm suppression packets
    0 giants  0 input error  0 short frame  0 overrun  0 underrun
    0 watchdog  0 if down drop
    0 input with dribble  0 input discard(includes ACL drops)
    0 Rx pause
  TX
    0 unicast packets  0 multicast packets  0 broadcast packets
    0 output packets  0 bytes
    0 jumbo packets
    0 output errors  0 collision  0 deferred  0 late collision
    0 lost carrier  0 no carrier  0 babble
    0 Tx pause
  0 interface resets
Automatic policy provisioning is disabled on this interface
```

---

## display interface vlan

Displays Virtual LAN (VLAN) interface configuration information.

### Syntax

```
display interface vlan {all|<VLAN number> [brief|capabilities|  
description|flowcontrol|mac-address|bridge-port|transceiver]}
```

where:

| Parameter           | Function  |
|---------------------|---|
| <b>all</b>          | Displays interface configuration information for all VLANs. |
| <i>VLAN number</i>  | The VLAN number. Range is from 1 to 4094.                   |
| <b>brief</b>        | Displays a short interface configuration summary.           |
| <b>capabilities</b> | Displays interface capabilities (speed, duplex etc.).       |
| <b>description</b>  | Displays interface description.                             |
| <b>flowcontrol</b>  | Displays interface IEEE 802.3x flow control status.         |
| <b>mac-address</b>  | Displays interface MAC address.                             |
| <b>transceiver</b>  | Displays interface transceiver information.                 |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays interface configuration information for VLAN 1:

```
Switch> display interface vlan 1

Interface Vlan1
  Hardware is VLAN Current HW addr: a897.dcde.2501
  Physical:(not set) Logical:(not set)
  index 9 metric 1 MTU 1500 Bandwidth 0 Kbit
  no bridge-port
  arp ageing timeout 1500
  <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  DHCP client is disabled.
```

---

## display interface counters

Displays interface traffic statistics.

### Syntax

```
display interface [<interface name> | ethernet <chassis number/port number> | loopback <loopback interface> | mgmt 0 | port-aggregation <LAG number> | vlan <VLAN ID>] counters [brief | detailed [all | snmp] | errors | snmp | storm-control | trunk]
```

where:

| Parameter   | Function  |
|---|---|
| <i>interface name</i>                             | Displays traffic statistics for the interface specified by its name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays traffic statistics for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays traffic statistics for the specified loopback interface. The <i>loopback interface</i> is an integer from 0 to 7.                              |
| <b>mgmt 0</b>                                     | Displays traffic statistics for the management interface.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays traffic statistics for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is an integer from 1 to 4096.                         |
| <b>vlan</b> <i>VLAN ID</i>                        | Displays traffic statistics for the specified VLAN. The <i>VLAN ID</i> is an integer from 1 to 4094.  |
| <b>brief</b>                                      | Displays interface input and output rates.  |
| <b>detailed</b>                                   | Displays non-zero interface statistics.   |
| <b>detailed all</b>                               | Displays all interface statistics.  |
| <b>detailed snmp</b>                              | Displays Simple Network Management Protocol (SNMP) Management Information Base (MIB) interface statistics.  |
| <b>errors</b>                                     | Displays interface error statistics.  |
| <b>snmp</b>                                       | Displays interface SNMP MIB statistics.   |
| <b>storm-control</b>                              | Displays interface storm-control statistics.  |
| <b>trunk</b>                                      | Displays trunk port statistics.   |

### Modes

All command modes



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays interface counter information:

```
Switch> display interface counters
```

| Port   | InOctets     | InUcastPkts  |
|--------|--------------|--------------|
| Eth1/1 | 0            | 0            |
| Eth1/2 | 0            | 0            |
| Eth1/3 | 0            | 0            |
| Eth1/4 | 0            | 0            |
| Eth1/5 | 0            | 0            |
| .....  |              |              |
| Port   | InMcastPkts  | InBcastPkts  |
| Eth1/1 | 0            | 0            |
| Eth1/2 | 0            | 0            |
| Eth1/3 | 0            | 0            |
| Eth1/4 | 0            | 0            |
| Eth1/5 | 0            | 0            |
| .....  |              |              |
| Port   | OutOctets    | OutUcastPkts |
| Eth1/1 | 0            | 0            |
| Eth1/2 | 0            | 0            |
| Eth1/3 | 0            | 0            |
| Eth1/4 | 0            | 0            |
| Eth1/5 | 0            | 0            |
| .....  |              |              |
| Port   | OutMcastPkts | OutBcastPkts |
| Eth1/1 | 0            | 0            |
| Eth1/2 | 0            | 0            |
| Eth1/3 | 0            | 0            |
| Eth1/4 | 0            | 0            |
| Eth1/5 | 0            | 0            |
| ...    |              |              |

---

## display interface status

Displays interface configuration information, including interface name and number, link status (up, down or error disabled), VLAN membership, duplex mode (half, full or auto), port speed and interface type.

### Syntax

```
display interface [<interface name> | ethernet <chassis number/port number> | loopback <loopback interface> | mgmt <management interface> | port-aggregation <LAG number or range> | vlan <VLAN number>] status [down | err-disabled | up]
```

where:

| Parameter  | Function  |
|--|---|
| <i>interface name</i>                              | The name of the interface.  |
| <b>ethernet</b> <i>chassis number/port number</i>  | Displays configuration information for the specified ethernet port. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>          | Displays configuration information for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.                                    |
| <b>mgmt</b> <i>management interface</i>            | Displays configuration information for the specified management interface. The <i>management interface</i> is 0.  |
| <b>port-aggregation</b> <i>LAG number or range</i> | Displays configuration information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                               |
| <b>vlan</b> <i>VLAN number</i>                     | Displays configuration information for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.  |
| <b>down</b>  | Displays only interfaces in the down state.   |
| <b>err-disabled</b>                                | Displays only interfaces in the error disabled state.   |
| <b>up</b>  | Displays only interfaces in the up state.   |

### Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays configuration information for all interfaces:

```
Switch> display interface status
```

| Port         | Name         | Status    | Vlan  | Duplex | Speed | Type |
|--------------|--------------|-----------|-------|--------|-------|------|
| Ethernet1/1  | ethernet 1/1 | notconnec | trunk | full   | 10000 | eth  |
| Ethernet1/2  | --           | notconnec | 2     | full   | 10000 | eth  |
| Ethernet1/3  | --           | notconnec | 3     | full   | 10000 | eth  |
| Ethernet1/4  | --           | notconnec | 4     | full   | 10000 | eth  |
| Ethernet1/5  | --           | notconnec | 5     | full   | 10000 | eth  |
| Ethernet1/6  | --           | notconnec | 6     | full   | 10000 | eth  |
| Ethernet1/7  | --           | disabled  | 7     | full   | 10000 | eth  |
| Ethernet1/8  | --           | disabled  | 8     | full   | 10000 | eth  |
| Ethernet1/9  | --           | disabled  | 9     | full   | 10000 | eth  |
| Ethernet1/10 | --           | disabled  | 10    | full   | 10000 | eth  |
| ...          |              |           |       |        |       |      |

---

## display interface trunk

Display switch trunk port information.

### Syntax

**display interface trunk** [**vlan** <VLAN range>]

where:

| Parameter              | Function  |
|------------------------|---|
| vlan <i>VLAN range</i> | Displays switch trunk port information associated to any Virtual LANs (VLANs) specified in the VLAN range. The <i>VLAN range</i> is from 1 to 3999. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays switch trunk port information:

```
Switch> display interface trunk
-----
Port          Native      Status      Port
              Vlan                Aggregation
-----
Ethernet1/1   10          trunk       1000
Ethernet1/2   10          trunk       1000
...
po1000        10          trunk       --
-----
Port          Vlans Allowed on Trunk
-----
Ethernet1/1   10-15
Ethernet1/2   10-15
Ethernet1/9   10-15
...
po4096        10-15
-----
Port          STP Forwarding
-----
Ethernet1/25  none
Ethernet1/33  10-15
Ethernet1/49/1 none
...
po4096        none
```

---

## display inventory

Displays the switch's physical inventory information, such as chassis, power supplies or fans.

### Syntax

**display inventory**

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays physical inventory information:

```
Switch> display inventory
+-----+-----+-----+-----+-----+-----+
| ID | Name          | Description | PID          | REV  | SN#          |
+-----+-----+-----+-----+-----+-----+
01  Chassis       | System Board | GSXXXX      | XXXX | Y052MV4CR026
02  Power Supply 1 | Power Supply
03  Power Supply 2 | Power Supply
04  Fan 1        | Fan Module
05  Fan 2        | Fan Module
06  Fan 3        | Fan Module
07  Fan 4        | Fan Module
08  Fan 5        | Fan Module
09  Fan 6        | Fan Module
10  Fan 7        | Fan Module
11  Fan 8        | Fan Module
```

---

## display ip access-lists

Displays all the configured IPv4 Access Control Lists (ACLs).

### Syntax

**display ip access-lists** [*<access-list name>*] [**expanded|summary**]

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>access-list name</i> | The name of the ACL.   |
| expanded                | Displays the contents of each ACE (Access Control Entry).  |
| summary                 | Displays a summary of each ACL, including the total number of configured ACEs and the interfaces on which the ACL is configured or active. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following commands display ACLs:

```
Switch> display ip access-lists

IP access list copp-system-acl-authentication
  10 permit tcp any eq 389 any
  20 permit udp any eq 1812 any
  30 permit udp any eq 1813 any
IP access list copp-system-acl-domain
  10 permit tcp any eq domain any
  20 permit udp any eq domain any
IP access list copp-system-acl-igmp
  10 permit igmp any any
IP access list copp-system-acl-igmp-query
  10 permit igmp any any 17
IP access list copp-system-acl-ntp
  10 permit udp any eq ntp any
IP access list copp-system-acl-pim
  10 permit pim any any
...
```

---

## display ip arp

Displays Address Resolution Protocol (ARP) entries.

### Syntax

```
display ip arp [<IPv4 address>|<interface name>|detail|ethernet <chassis number/port number>|mgmt 0|port-aggregation <LAG number>|static|vlan <VLAN number>] [vrf {all|default|management}]
```

where:

| Parameter  | Function   |
|--|--|
| <i>IPv4 address</i>                                | Displays ARP entries for the specified IPv4 address.   |
| <i>interface name</i>                              | Displays ARP entries for the specified interface.  |
| <b>detail</b>                                      | Displays detailed ARP information.   |
| <b>ethernet</b> <i>chassis number/port number</i>  | Displays ARP entries for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>mgmt 0</b>                                      | Displays ARP entries for the management interface.   |
| <b>port-aggregation</b> <i>LAG number or range</i> | Displays ARP entries for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>static</b>                                      | Displays static ARP entries.   |
| <b>vlan</b> <i>VLAN number</i>                     | Displays ARP entries for the specified VLAN. The <i>VLAN number</i> is from 1 to 4094.   |
| <b>vrf all</b>                                     | Displays ARP entries associated with any Virtual Routing and Forwarding (VRF) instance.  |
| <b>vrf default</b>                                 | Displays ARP entries associated with the default VRF instance.   |
| <b>vrf management</b>                              | Displays ARP entries associated with the management VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays all ARP entries:

```
Switch> display ip arp

Flags: D - Static Adjacencies attached to down interface
IP ARP Table for context default
Total number of entries: 6
Address      Age      MAC Address  Interface  State
5.0.0.2     00:00:35  0817.f462.6400  Ethernet1/9  REACHABLE
5.0.0.20    00:00:03  0000.0000.0001  Ethernet1/9  REACHABLE
5.0.0.21    00:00:03  0000.0000.0002  Ethernet1/9  REACHABLE
5.0.0.22    00:00:03  0000.0000.0003  Ethernet1/9  REACHABLE
5.0.0.23    00:01:22  0000.0000.0004  Ethernet1/9  STALE
5.0.0.200   -         0000.0000.0200  Ethernet1/9  PERMANENT
10.100.121.1 00:01:46  0022.00ad.4500  mgmt0       REACHABLE
```

The following command displays ARP entries for interface ethernet 1/12:

```
Switch> display ip arp ethernet 1/12
```

The following command displays all static ARP entries:

```
Switch> display ip arp static
```



---

## display ip arp inspection

Displays the current Dynamic ARP Inspection (DAI) configuration.

### Syntax

**display ip arp inspection** [**filter** *<ARP filter name>* | **vlan** *<VLAN number>*]

where:

| Parameter                                    | Function   |
|--|--|
| <b>filter</b> <i>&lt;ARP filter name&gt;</i> | Displays the current DAI configuration for the specified ARP filter.                                     |
| <b>vlan</b> <i>&lt;VLAN number&gt;</i>       | Displays the current DAI configuration for the specified VLAN. The <i>VLAN number</i> is from 1 to 4094. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays DAI configuration:

```
Switch> display ip arp inspection
```

---

## display ip arp statistics

Displays Address Resolution Protocol (ARP) statistics.

### Syntax

```
display ip arp statistics [<interface name>|ethernet <chassis number/port number>|interface-all|loopback <loopback interface>|mgmt <management interface>|port-aggregation <LAG number or range>|vlan <VLAN number>] [vrf {all|default|management}]
```

where:

| Parameter  | Function  |
|--|---|
| <i>interface name</i>                              | The name of the interface.  |
| <b>ethernet</b> <i>chassis number/port number</i>  | Displays ARP statistics for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>interface-all</b>                               | Displays ARP statistics for all interfaces.   |
| <b>loopback</b> <i>loopback interface</i>          | Displays ARP statistics for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>            | Displays ARP statistics for the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number or range</i> | Displays ARP statistics for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                     | Displays ARP statistics for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| <b>vrf all</b>                                     | Displays ARP statistics for entries associated with any Virtual Routing and Forwarding (VRF) instance.  |
| <b>vrf default</b>                                 | Displays ARP statistics for entries associated with the default VRF instance.   |
| <b>vrf management</b>                              | Displays ARP statistics for entries associated with the management VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays ARP statistics:

```
Switch> display ip arp statistics  
ARP statistics for context default  
ARP Adjacency statistics  
    Adds 5, Deletes 0, Timeouts 0
```

---

## display ip arp summary

Displays Address Resolution Protocol (ARP) adjacency summary.

### Syntax

```
display ip arp summary [<interface name> | ethernet <chassis number / port number> | loopback <loopback interface> | mgmt <management interface> | port-aggregation <LAG number or range> | vlan <VLAN number>] [vrf {all | default | management}]
```

where:

| Parameter   | Function   |
|---|--|
| <i>interface name</i>                               | The name of the interface.   |
| <b>ethernet</b> <i>chassis number / port number</i> | Displays ARP adjacency summary for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>           | Displays ARP adjacency summary for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>             | Displays ARP adjacency summary for the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number or range</i>  | Displays ARP adjacency summary for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                      | Displays ARP adjacency summary for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| <b>vrf all</b>                                      | Displays ARP adjacency summary for entries associated with any Virtual Routing and Forwarding (VRF) instance.  |
| <b>vrf default</b>                                  | Displays ARP adjacency summary for entries associated with the default VRF instance.   |
| <b>vrf management</b>                               | Displays ARP adjacency summary for entries associated with the management VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays ARP adjacency summary:

```
Switch> display ip arp summary  
  
IP ARP Table - Adjacency Summary  
Resolved : 2  
Incomplete : 0  
Unknown : 0  
Total : 2
```

---

## display ip as-path-access-list

Displays Autonomous System (AS) path access lists.

### Syntax

**display ip as-path-access-list** [*<AS path access list name>*]

where:

| Parameter                       | Function                             |
|---------------------------------|--------------------------------------|
| <i>AS path access list name</i> | The name of the AS path access list. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays AS path access lists:

```
Switch> display ip as-path-access-list
AS path access list as_acl_1
  permit ^1000$
  deny ^1500.+
  permit _100_200$
AS path access list as_acl_2
  deny _2000_
  permit .*
Switch#
```

---

## display ip bgp

Displays Border Gateway Protocol (BGP) route information.

### Syntax

```
display ip bgp [ipv4 unicast] [<IPv4 network address>[/<prefix length>]  
[longer-prefixes]] [vrf {all|default}]
```

where:

| Parameter                   | Function   |
|-----------------------------|--|
| ipv4 unicast                | Displays BGP information for the IPv4 unicast address family.  |
| <i>IPv4 network address</i> | The IPv4 network address.  |
| <i>prefix length</i>        | The IPv4 network mask length.  |
| longer-prefixes             | Displays BGP route information for the specified network and any subnetworks with a prefix length equal to or greater than the prefix specified. |
| vrf all                     | Displays BGP route associated with any Virtual Routing and Forwarding (VRF) instance.  |
| vrf default                 | Displays BGP route associated with the default VRF instance.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays BGP route information:

```
Switch> display ip bgp
BGP routing table information for VRF default address family IPV4 unicast
BGP table version is 226, local router ID is 20.211.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i -
internal,
l - labeled
                S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete, |- multipath

   Network          Next Hop          Metric      LocPrf   Weight   Path
*> 9.3.11.0/24      0.0.0.0
*>i 9.4.12.0/24     20.111.1.1        100         0        ?
* i|                20.111.2.1        100         0        ?
* i|                20.211.1.1        100         0        ?
* i|                20.211.2.1        100         0        ?
*>i 9.5.13.0/24    20.111.1.1        100         0        ?
* i|                20.111.2.1        100         0        ?
* i|                20.211.1.1        100         0        ?
* i|                20.211.2.1        100         0        ?
*>i 9.6.14.0/24    20.111.1.1        100         0        ?
* i|                20.111.2.1        100         0        ?
* i|                20.211.1.1        100         0        ?
* i|                20.211.2.1        100         0        ?
*>i 10.3.21.0/24   20.111.1.1        100         0        ?
...
```



---

## display ip bgp attribute-info

Displays Border Gateway Protocol (BGP) attribute information.

### Syntax

```
display ip bgp attribute-info
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP attribute information:

```
Switch> display ip bgp attribute-info
attr[5] nexthop 0.0.0.0
attr[1000] nexthop 20.111.2.1
attr[1000] nexthop 20.211.2.1
attr[1000] nexthop 20.111.2.1
attr[1000] nexthop 20.211.2.1
attr[1000] nexthop 20.111.2.1
attr[1000] nexthop 20.211.2.1
attr[1000] nexthop 20.111.2.1
attr[1000] nexthop 20.211.2.1
attr[5] nexthop 9.3.11.254
attr[5] nexthop 20.111.2.1
attr[5] nexthop 20.111.2.1
attr[5] nexthop 20.111.2.1
attr[5] nexthop 20.111.2.1
attr[5] nexthop 20.211.2.1
attr[5] nexthop 20.211.2.1
attr[5] nexthop 20.211.2.1
attr[5] nexthop 20.211.2.1
attr[5] nexthop 20.111.1.2
attr[5] nexthop 20.211.1.2
attr[2000] nexthop 20.111.1.1
attr[1000] nexthop 20.211.1.1
attr[2000] nexthop 20.111.1.1
...
```

---

## display ip bgp cidr-only

Displays Border Gateway Protocol (BGP) routes with Classless Interdomain Routing (CIDR).

### Syntax

**display ip bgp [ipv4 unicast] cidr-only**

where:

| Parameter    | Function  |
|--------------|---|
| ipv4 unicast | Displays BGP routes with CIDR only for the IPv4 unicast address family. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes with CIDR:

```
Switch> display ip bgp cidr-only
LP11#display ip bgp cidr-only
BGP routing table information for VRF default address family IPV4 unicast
BGP table version is 226, local router ID is 20.211.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i -
internal,
l - labeled
                S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete, |- multipath

   Network          Next Hop          Metric      LocPrf   Weight   Path
*> 9.3.11.0/24      0.0.0.0              32768      ?
*>i 9.4.12.0/24      20.111.1.1           100         0         ?
* i|                20.111.2.1           100         0         ?
* i|                20.211.1.1           100         0         ?
* i|                20.211.2.1           100         0         ?
*>i 9.5.13.0/24      20.111.1.1           100         0         ?
* i|                20.111.2.1           100         0         ?
* i|                20.211.1.1           100         0         ?
* i|                20.211.2.1           100         0         ?
*>i 9.6.14.0/24      20.111.1.1           100         0         ?
...
```

---

## display ip bgp community

Displays Border Gateway Protocol (BGP) routes that match the specified community.

### Syntax

```
display ip bgp [ipv4 unicast] community [<community number>
[exact-match]] [internet] [local-AS] [no-advertise]
[no-export]
```

where:

| Parameter               | Function  |
|-------------------------|---|
| ipv4 unicast            | Displays BGP information for the IPv4 unicast address family.   |
| <i>community number</i> | The number of the BGP community. The format for the community number is AA:NN (autonomous system number: community number). |
| exact-match             | Displays only an exact match for the specified community.   |
| internet                | Displays BGP routes that are part of the well-known internet community.   |
| local-AS                | Displays BGP routes not advertised outside the local autonomous system (AS).  |
| no-advertise            | Displays BGP routes not advertised to any peers (internal or external).   |
| no-export               | Displays BGP routes only advertised to peers in the same AS.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching any community:

```
Switch> display ip bgp community
```

---

## display ip bgp community vrf

Displays Border Gateway Protocol (BGP) routes that match any communities associated with the specified Virtual Routing and Forwarding (VRF) instance.

### Syntax

```
display ip bgp [ipv4 unicast] community vrf {all|default}
```

where:

| Parameter    | Function   |
|--------------|--|
| ipv4 unicast | Displays BGP information for the IPv4 unicast address family.                      |
| all          | Displays BGP routes matching communities associated with any VRF instance.         |
| default      | Displays BGP routes matching communities associated with the default VRF instance. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching communities associated with the default VRF instance:

```
Switch> display ip bgp community vrf all
```

---

## display ip bgp community-info

Display Border Gateway Protocol (BGP) community information.

### Syntax

```
display ip bgp community-info
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP community information:

```
Switch> display ip bgp community-info
```

---

## display ip bgp community-list

Displays Border Gateway Protocol (BGP) routes that match the specified community list.

### Syntax

```
display ip bgp [all | {ipv4 | ipv6} unicast] community-list  
<community list name> [exact-match]
```

where:

| Parameter                  | Function   |
|----------------------------|--|
| all                        | Displays BGP information for all IP address families.          |
| ipv4                       | Displays BGP information for the IPv4 address family.          |
| ipv6                       | Displays BGP information for the IPv6 address family.          |
| unicast                    | Displays BGP information for the unicast address family.       |
| <i>community list name</i> | The name of the BGP community list.                            |
| exact-match                | Displays only an exact match for the specified community list. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching community list 'comlist1':

```
Switch> display ip bgp community-list comlist1
```

---

## display ip bgp community-list vrf

Displays Border Gateway Protocol (BGP) routes that match the specified community list associated with the selected Virtual Routing and Forwarding (VRF) instance.

### Syntax

```
display ip bgp [all | {ipv4 | ipv6} unicast] community-list  
<community list name> vrf {all | default}
```

where:

| Parameter                  | Function  |
|----------------------------|---|
| all                        | Displays BGP information for all IP address families.                                     |
| ipv4                       | Displays BGP information for the IPv4 address family.                                     |
| ipv6                       | Displays BGP information for the IPv6 address family.                                     |
| unicast                    | Displays BGP information for the unicast address family.                                  |
| <i>community list name</i> | The name of the BGP community list.   |
| all                        | Displays BGP routes matching the community list associated with any VRF instance.         |
| default                    | Displays BGP routes matching the community list associated with the default VRF instance. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the community list 'comlist1' associated with any VRF instance:

```
Switch> display ip bgp community-list vrf all
```

---

## display ip bgp dampening

Displays Border Gateway Protocol (BGP) dampening information.

### Syntax

```
display ip bgp [all|{ipv4|ipv6} unicast] dampening  
{dampened-paths|flap-statistics|parameters} [vrf {all|  
|default}]
```

where:

| Parameter       | Function   |
|-----------------|--|
| all             | Displays BGP information for all IP address families.                                      |
| ipv4            | Displays BGP information for the IPv4 address family.                                      |
| ipv6            | Displays BGP information for the IPv6 address family.                                      |
| unicast         | Displays BGP information for the unicast address family.                                   |
| dampened-paths  | Displays all dampened paths.   |
| flap-statistics | Displays flap statistics for BGP routes.   |
| parameters      | Displays all dampening parameters.   |
| vrf all         | Displays BGP dampening information for all Virtual Routing and Forwarding (VRF) instances. |
| vrf default     | Displays BGP dampening information for the default VRF instance.                           |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays all dampened paths:

```
Switch> display ip bgp dampening dampened-paths
```



---

## display ip bgp extcommunity-list

Displays Border Gateway Protocol (BGP) routes matching the specified extended community list.

### Syntax

```
display ip bgp extcommunity-list <extended community list name>  
[exact-match] [vrf {<VRF instance name>|default}]
```

where:

| Parameter                           | Function  |
|-------------------------------------|---|
| <i>extended community list name</i> | The name of the extended community list.  |
| <code>exact-match</code>            | Displays BGP routes exactly matching the specified extended community list.   |
| <code>vrf VRF instance name</code>  | Displays BGP routes matching the extended community list associated with the specified Virtual Routing and Forwarding (VRF) instance. |
| <code>vrf default</code>            | Displays BGP routes matching the extended community list associated with the default VRF instance.                                    |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the extended community list 'extcomlist1':

```
Switch> display ip bgp extcommunity-list extcomlist1
```

---

## display ip bgp filter-list

Displays Border Gateway Protocol (BGP) routes matching a specified filter list.

### Syntax

```
display ip bgp [ipv4 unicast] filter-list <filter list name>  
[exact-match] [vrf {<VRF instance name>|all|default}]
```

where:

| Parameter                    | Function  |
|------------------------------|---|
| ipv4 unicast                 | Displays BGP information for the IPv4 address family.   |
| <i>filter list name</i>      | The name of the BGP filter list.  |
| exact-match                  | Displays BGP routes exactly matching the specified filter list.   |
| vrf <i>VRF instance name</i> | Displays BGP routes matching the filter list associated with the specified Virtual Routing and Forwarding (VRF) instance. |
| vrf all                      | Displays BGP routes matching the filter list associated with all VRF instances.   |
| vrf default                  | Displays BGP routes matching the filter list associated with the default VRF instance.                                    |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes that match filter list 'flist3':

```
Switch> display ip bgp filter-list flist3
```

---

## display ip bgp inconsistent-as

Displays Border Gateway Protocol (BGP) routes with inconsistent Autonomous System (AS) paths.

### Syntax

**display ip bgp [ipv4 unicast] inconsistent-as**

where:

| Parameter    | Function  |
|--------------|---|
| ipv4 unicast | Displays BGP information for the IPv4 unicast address family. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes with inconsistent AS paths:

```
Switch> display ip bgp inconsistent-as
```

---

## display ip bgp neighbors

Displays Border Gateway Protocol (BGP) neighbors.

### Syntax

```
display ip bgp [ipv4 unicast] neighbors [<IPv4 or IPv6 address>
[advertised-routes|connection-retrytime|hold-time|keepalive|
|keepalive-interval|notification|open|rcvd-msgs|
|received-routes|sent-msgs|update]]
```

where:

| Parameter                   | Function   |
|-----------------------------|--|
| ipv4 unicast                | Displays BGP information for the IPv4 unicast address family.  |
| <i>IPv4 or IPv6 address</i> | The IPv4 or IPv6 address of the BGP neighbor.  |
| advertised-routes           | Displays the BGP routes advertised for the specified neighbor.   |
| connection-retrytime        | Displays the time interval the switch waits until it tries to contact the BGP neighbor.  |
| hold-time                   | Displays the time interval the switch waits until it will transition the BGP neighbor to IDLE state, if the switch doesn't receive an update or keepalive message from the neighbor. |
| keepalive                   | Displays keepalive messages. Keepalive messages are sent to determine if a connection has failed or is unavailable.  |
| keepalive-interval          | Displays the time interval the switch waits until it sends another keepalive message to the BGP neighbor.  |
| notification                | Displays notification messages. Notification messages are sent when an error is detected.  |
| open                        | Displays open messages. Open Messages are sent to create a BGP session between neighbors.  |
| rcvd-msgs                   | Displays packets received from the BGP neighbor.   |
| received-routes             | Displays the BGP routes received from the specified neighbor.  |
| sent-msgs                   | Displays packets sent to the BGP neighbor.   |
| update                      | Displays update messages. Update messages are used to transfer routing information between BGP neighbors.  |

## Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays BGP neighbors:

```
Switch> display ip bgp neighbors

BGP neighbor is 9.9.9.1, remote AS 100, local AS 200, external link
BGP version 4, remote router ID 0.0.0.0
BGP state = Idle
Last read , hold time is 90, keepalive interval is 30 seconds
Received 11020 messages, 6234 notifications, 0 in queue
Sent 17226 messages, 9 notifications, 0 in queue
Route refresh request: received 4, sent 0
Minimum time between advertisement runs is 30 seconds
For address family: IPv4 Unicast
BGP table version 2308, neighbor version 0
Index 1, Offset 0, Mask 0x2
Community attribute sent to this neighbor (both)
0 accepted prefixes
0 announced prefixes

Connections established 12; dropped 13
External BGP neighbor may be up to 10 hops away.
Last Reset: 00:00:03, due to BGP Notification received
Notification Error Message: (OPEN Message Error/Bad Peer AS.)
```

The following command displays the connection retry timer for a BGP neighbor:

```
Switch> display ip bgp neighbors 10.243.2.54 connection-retrytime
```

The following command displays the hold timer for a BGP neighbor:

```
Switch> display ip bgp neighbors 10.243.2.54 hold-time
```

The following command displays the keepalive timer:

```
Switch> display ip bgp neighbors 10.243.2.54 keepalive-interval
```

The following command displays the BGP routes received from a neighbor:

```
Switch> display ip bgp neighbors 10.243.2.54 received-routes
```

The following command displays BGP packets sent to a neighbor:

```
Switch> display ip bgp neighbors 10.243.2.54 sent-msgs
```

## Restrictions

When using the parameter `ipv4 unicast`, the only available commands are:

- **display ip bgp ipv4 unicast neighbors**
- **display ip bgp ipv4 unicast neighbors** *<IPv4 or IPv6 address>*
- **display ip bgp ipv4 unicast neighbors** *<IPv4 or IPv6 address>*  
**advertised-routes**
- **display ip bgp ipv4 unicast neighbors** *<IPv4 or IPv6 address>*  
**received-routes**

---

## display ip bgp neighbors routes

Displays Border Gateway Protocol (BGP) routes received or advertised to or from the specified neighbor.

### Syntax

```
display ip bgp [ipv4 unicast] neighbors <IPv4 or IPv6 address>  
routes [advertised|received] [vrf all|default]
```

where:

| Parameter                   | Function   |
|-----------------------------|--|
| ipv4 unicast                | Displays BGP routes only for the IPv4 unicast address family.  |
| <i>IPv4 or IPv6 address</i> | The IPv4 or IPv6 address of the BGP neighbor.  |
| advertised                  | Displays BGP routes advertised to the neighbor.  |
| received                    | Displays BGP routes received from the neighbor.  |
| vrf all                     | Displays BGP routes for neighbors associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default                 | Displays BGP routes for neighbors associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays BGP routes received or advertised to or from the neighbor with IPv4 address 10.254.22.36:

```
Switch> display ip bgp neighbors 10.254.22.36 routes

BGP routing table information for VRF default address family IPV4 unicast
BGP table version is 228, local router ID is 20.211.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i -
internal,
l - labeled
                S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete, |- multipath

   Network          Next Hop      Metric      LocPrf   Weight   Path
*>i 50.11.0.1/32     9.3.11.1         0           0         0         i

Total number of prefixes 1
```

## Restrictions

When using the `ipv4 unicast` parameter, the only available command is:

**display ip bgp ipv4 unicast neighbors <IPv4 or IPv6 address> routes**



---

## display ip bgp neighbors vrf

Displays Border Gateway Protocol (BGP) neighbors associated with the specified Virtual Routing and Forwarding (VRF) instance.

### Syntax

**display ip bgp neighbors** [*<IPv4 or IPv6 address>*] **vrf {all|default}**

where:

| Parameter                   | Function   |
|-----------------------------|--|
| <i>IPv4 or IPv6 address</i> | The IPv4 or IPv6 address of the BGP neighbor.                    |
| all                         | Displays BGP neighbors associated with any VRF instance.         |
| default                     | Displays BGP neighbors associated with the default VRF instance. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP neighbors associated with the default VRF instance:

```
Switch> display ip bgp neighbors vrf default
```

---

## display ip bgp paths

Displays all the Border Gateway Protocol (BGP) paths stored in the database.

### Syntax

**display ip bgp [ipv4 unicast] paths**

where:

| Parameter    | Function  |
|--------------|---|
| ipv4 unicast | Displays BGP information for the IPv4 unicast address family. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP path information:

```
Switch> display ip bgp paths
Address      Refcnt Path
[0x10560fe8:0] (55305)
```

---

## display ip bgp prefix-list

Displays Border Gateway Protocol (BGP) routes matching the specified prefix list.

### Syntax

```
display ip bgp [ipv4 unicast] prefix-list <prefix list name>
[exact-match] [vrf {all|default}]
```

where:

| Parameter               | Function  |
|-------------------------|---|
| ipv4 unicast            | Displays BGP information for the IPv4 unicast address family.   |
| <i>prefix list name</i> | The name of the prefix list used to filter BGP routes.  |
| exact-match             | Displays BGP routes exactly matching the specified prefix list.   |
| vrf all                 | Displays BGP routes matching the prefix list associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default             | Displays BGP routes matching the prefix list associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the prefix list 'prelist1':

```
Switch> display ip bgp prefix-list prelist1
```

---

## display ip bgp quote-regexp

Displays Border Gateway Protocol (BGP) routes matching the autonomous system (AS) path regular expression.

### Syntax

**display ip bgp [ipv4 unicast] quote-regexp** *<regular expression>*

where:

| Parameter                 | Function  |
|---------------------------|---|
| ipv4 unicast              | Displays BGP information for the IPv4 unicast address family. |
| <i>regular expression</i> | The regular expression to match the AS path.                  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the AS path regular expression "65550":

```
Switch> display ip bgp quote-regexp "65550"
```

---

## display ip bgp received-paths

Displays Border Gateway Protocol (BGP) routes received from other neighbors.

### Syntax

```
display ip bgp received-paths [vrf {all|default}]
```

where:

| Parameter   | Function   |
|-------------|--|
| vrf all     | Displays BGP routes received from other neighbors associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default | Displays BGP routes received from other neighbors associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes received from other neighbors:

```
Switch> display ip bgp received-paths
```

---

## display ip bgp regexp

Displays Border Gateway Protocol (BGP) routes matching the autonomous system (AS) path regular expression.

### Syntax

**display ip bgp [ipv4 unicast] regexp** *<regular expression>*

where:

| Parameter                 | Function  |
|---------------------------|---|
| ipv4 unicast              | Displays BGP information for the IPv4 unicast address family. |
| <i>regular expression</i> | The regular expression to match the AS path.                  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes matching the AS path regular expression "172":

```
Switch> display ip bgp regexp 172
```

---

## display ip bgp route-map

Displays Border Gateway Protocol (BGP) route maps.

### Syntax

```
display ip bgp [ipv4 unicast] route-map <route map name> [vrf  
{all|default}]
```

where:

| Parameter      | Function   |
|----------------|--|
| ipv4 unicast   | Displays BGP information for the IPv4 unicast address family.                              |
| route map name | The name of the route map.   |
| vrf all        | Displays BGP route maps associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default    | Displays BGP route maps associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP route map 'path-34':

```
Switch> display ip bgp route-map path-34
```

---

## display ip bgp scan

Displays Border Gateway Protocol (BGP) scan statistics.

### Syntax

```
display ip bgp scan
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP scan statistics:

```
Switch> display ip bgp scan
BGP VRF: (Default) VRF_ID 0
BGP scan interval is 60
scan remain-time: 3
Current BGP nexthop cache:
 9.3.11.1 valid [IGP metric 0]
20.111.1.1 valid [IGP metric 0]
20.111.2.1 valid [IGP metric 0]
20.211.1.1 valid [IGP metric 0]
20.211.2.1 valid [IGP metric 0]
```



---

## display ip bgp statistic

Displays Border Gateway Protocol (BGP) traffic statistics.

### Syntax

```
display ip bgp statistic
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP traffic statistics:

```
Switch> display ip bgp statistic
Neighbor aggregated statistics (sent/received)
Msgs          Bytes          Opens          Updates          151/272
140275/140375 3518604/0      5/5
Keepalives Notifications Route-refresh Capabilities
140119/140098 0/0           0/0           0/0

RIB routes statistics for Default
Route additions sent: 48865
Route additions sent failed: 0
Route deletions sent: 1
Route deletions sent failed: 0
Redistributed routes received: 5
Redistributed routes additions: 5
- Routes additions failed: 0
- Routes matching route-maps: 0
Redistributed route deletions: 0
- Routes deletions failed: 0

BGP I/O Information
Active Open attempts          : 0
Passive Open attempts         : 0
BGP I/O Open loops           : 0
BGP I/O Open calls            : 0
...
BGP Yielded in packing        : 0
BGP No sendbuf for peer       : 0
BGP No withdraw buf for peer  : 0
BGP Yields in update peer loop : 0
No updates pending or no buffers: 0
No data to write               : 0
Msg queue recv errors         : 0
Sockets create/accept/close   : 2/4/5
Sockets create retries/failures : 0/0
Socket fd-close session       : 0
```

---

## display ip bgp summary

Displays the status of all Border Gateway Protocol (BGP) neighbors.

### Syntax

```
display ip bgp [ipv4 unicast] summary [vrf {all|default}]
```

where:

| Parameter    | Function  |
|--------------|---|
| ipv4 unicast | Displays BGP information for the IPv4 unicast address family.   |
| vrf all      | Displays BGP connection status for neighbors associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default  | Displays BGP connection status for neighbors associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the connection status for all BGP neighbors:

```
Switch> display ip bgp summary
BGP router identifier 20.211.2.2, local AS number 64800
BGP table version is 228
1 BGP AS-PATH entries
0 BGP community entries
1 Configured ebgp ECMP multipath: Currently set at 1
32 Configured ibgp ECMP multipath: Currently set at 32

Neighbor          V      AS MsgRcv MsgSen TblVer InQ OutQ Up/Down
State/PfxRcd
9.3.11.1          4  64800 28049 28279   225   0   0 3d05h54m
1
20.111.1.1        4  64800 28062 28027   227   0   0 3d05h54m
11055
20.111.2.1        4  64800 28061 28029   227   0   0 3d05h54m
11055
20.211.1.1        4  64800 28061 28030   227   0   0 3d05h54m
11055
20.211.2.1        4  64800 28061 28028   227   0   0 3d05h54m
11055

Total number of neighbors 5

Total number of Established sessions 5
```

---

## display ip bgp vrf

Displays Border Gateway Protocol (BGP) information for the specified Virtual Routing and Forwarding (VRF) instance.

### Syntax

```
display ip bgp vrf {all|default}
```

where:

| Parameter | Function   |
|-----------|--|
| all       | Displays BGP information for all VRF instances.        |
| default   | Displays BGP information for the default VRF instance. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP information for the default VRF instance:

```
Switch> display ip bgp vrf default
```

---

## display ip community-list

Displays Border Gateway Protocol (BGP) community lists.

### Syntax

```
display ip community-list
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP community lists:

```
Switch> display ip community-list
Named Community standard list commlist_1
  permit 100:200
  deny 30:40
  permit local-AS
Named Community expanded list commlist_2
  permit ^100:1_100:2$
  deny ^100:1$
  deny 200:100.200:200.+
  permit .*
```

---

## display ip dhcp relay

Displays Dynamic Host Configuration Protocol version 4 (DHCPv4) relay service configuration and statistics.

### Syntax

```
display ip dhcp relay [address [interface {ethernet [<chassis number/port number>]|vlan [<VLAN number>]}] [vrf {<VRF instance>|all|default}]
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| address                           | Displays configured DHCPv4 addresses.  |
| interface ethernet                | Displays configured DHCPv4 address on all ethernet interfaces.   |
| <i>chassis number/port number</i> | Displays configured DHCPv4 address on the specified ethernet interface. The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface vlan                    | Displays configured DHCPv4 addresses on all Virtual LAN (VLAN) interfaces.   |
| <i>VLAN number</i>                | Displays configured DHCPv4 addresses on the specified VLAN interface. The <i>VLAN number</i> is from 1 to 4094.  |
| vrf <i>VRF instance</i>           | Displays DHCPv4 information for the specified Virtual Routing and Forwarding (VRF) instance.   |
| vrf all                           | Displays DHCPv4 information for all the VRF instances.   |
| vrf default                       | Displays DHCPv4 information for the default VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the DHCPv4 configuration:

```
Switch> display ip dhcp relay
```

---

## display ip dhcp snooping

Displays Dynamic Host Configuration Protocol (DHCP) Snooping information.

### Syntax

**display ip dhcp snooping [binding|counters]**

where:

| Parameter       | Description                               |
|-----------------|---|
| <b>binding</b>  | Displays the DHCP Snooping binding table. |
| <b>counters</b> | Displays DHCP Snooping statistics.        |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays DHCP Snooping information:

```
Switch> display ip dhcp snooping
```

The following command displays the DHCP Snooping binding table:

```
Switch> display ip dhcp snooping binding
```

| Mac Address       | IP Address    | Lease(seconds) | Type    | VLAN | Interface     |
|-------------------|---------------|----------------|---------|------|---------------|
| 00:25:b3:18:1b:24 | 192.168.1.100 | 6662           | Dynamic | 100  | ethernet 1/24 |

Total number of bindings: 1



---

## display ip extcommunity-list

Displays Border Gateway Protocol (BGP) extended community lists.

### Syntax

**display ip extcommunity-list** <community name>

where:

| Parameter        | Function               |
|------------------|------------------------|
| <community name> | Name of the community. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP extended community lists:

```
Switch> display ip extcommunity-list

Named extended community standard list ecommlist_1
  permit 100000:2
  deny 200002:300
  permit 11000:30
Named extended community expanded list ecommlist_2
  permit ^50000:5_50000:6$
  deny ^50000:5.+
  permit .*
```

---

## display ip forwarding

Displays IPv4 forwarding status.

### Syntax

```
display ip forwarding
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IPv4 forwarding status:

```
Switch> display ip forwarding
IP forwarding is on.
```

---

## display ip igmp snooping

Displays Internet Group Management Protocol (IGMP) snooping information.

### Syntax

**display ip igmp snooping [vlan <VLAN number>]**

where:

| Parameter          | Function   |
|--------------------|--|
| vlan <VLAN number> | Displays IGMP Snooping information for the specified VLAN. The <i>VLAN number</i> is from 1 to 4094. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IGMP Snooping information:

```
Switch> display ip igmp snooping

Global IGMP Snooping information
IGMP Snooping Enabled
IGMP Snooping V1/V2 Report Suppression Enabled
General query transmission on TCN Enabled

IGMP Snooping information for Vlan1
IGMP Snooping enabled
IGMP Snooping Version: 3
Robustness: 2 (operational: 2)
Query Interval: 125 seconds (operational: 125 seconds)
Group Membership Interval: 260 seconds
Query Response Interval: 10 seconds
Last Member Query Count: 2
Last Member Query Interval: 1000 milliseconds
IGMPV2 fast-leave: disabled
IGMPv1/v2 Report suppression: enabled
IGMPv3 Report suppression: disabled
Router port detection using: IGMP Queries
Snooping Querier disabled
Querier timeout: 255 seconds (default, operational: 255 seconds)
Querier Startup Query Count: 2
Querier Startup Query Interval: 31 seconds
Number of router-ports: 0
Number of Groups: 0
Number of Joins: 0
Number of Leaves: 0
Active Ports:
Ethernet1/1
```

---

## display ip igmp snooping ecp

Displays Internet Group Management Protocol (IGMP) snooping Edge Control Protocol (ECP) information.

### Syntax

```
display ip igmp snooping ecp {channels|statistics|  
upper-layer-protocols}
```

where:

| Parameter             | Function  |
|-----------------------|---|
| channels              | Displays IGMP ECP channel information.              |
| statistics            | Displays IGMP ECP statistics.                       |
| upper-layer-protocols | Displays IGMP ECP upper layer protocol information. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays VRRP ECP channel information:

```
Switch> display ip igmp snooping ecp channels  
  
---- ECP CHANNELS ----  
Ifindex   Ena   State   NextSeq   LastAck   FreeWindow  
-----+-----+-----+-----+-----+-----
```

---

## display ip igmp snooping groups

Displays Internet Group Management Protocol (IGMP) snooping groups membership information.

### Syntax

```
display ip igmp snooping groups [[<multicast group IPv4 address>]  
[<source IPv4 address>] [vlan <VLAN number>] [detail]|interface  
{ethernet <chassis number/port number>|port-aggregation <LAG  
number>}]
```

where:

| Parameter   | Function  |
|---|---|
| <i>multicast group IPv4 address</i>                         | The group IPv4 address.   |
| <i>source IPv4 address</i>                                  | The source IPv4 address.  |
| <b>vlan</b> <VLAN number>                                   | Displays IGMP Snooping information for the specified VLAN. The <i>VLAN number</i> is from 1 to 4094.  |
| <b>detail</b>   | Displays detailed IGMP Snooping group membership information.   |
| <b>interface ethernet</b> <i>chassis number/port number</i> | Displays IGMP entries for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Displays IGMP entries for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IGMP Snooping group membership information:

```
Switch> display ip igmp snooping groups

Total entries: 100 Total IGMP groups: 100
Note: The <Total IGMP groups> number is computed as
      the number of unique (Group/Source, Vlan) entries.
IGMP Connected Group Membership
Flags: D - Dynamic, S - Static
Vlan  Grp/Src Addr      Interface      Flags  Expires  Version
10    237.1.1.1          Ethernet1/1    D      00:04:02 V2
10    237.1.1.2          Ethernet1/1    D      00:04:02 V2
10    237.1.1.3          Ethernet1/1    D      00:04:02 V2
10    237.1.1.4          Ethernet1/1    D      00:04:02 V2
10    237.1.1.5          Ethernet1/1    D      00:04:02 V2
10    237.1.1.6          Ethernet1/1    D      00:04:02 V2
10    237.1.1.7          Ethernet1/1    D      00:04:02 V2
10    237.1.1.8          Ethernet1/1    D      00:04:02 V2
10    237.1.1.9          Ethernet1/1    D      00:04:02 V2
10    237.1.1.10         Ethernet1/1    D      00:04:02 V2
```

---

## display ip igmp snooping mrouter

Displays multicast routers detected by Internet Group Management Protocol (IGMP) snooping.

### Syntax

```
display ip igmp snooping mrouter [interface {ethernet <chassis number/port number>|port-aggregation <LAG number>}|vlan <VLAN number>]
```

where:

| Parameter   | Function  |
|---|---|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Displays multicast routers detected by IGMP Snooping on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Displays multicast routers detected by IGMP Snooping on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> < <i>VLAN number</i> >                          | Displays multicast routers detected by IGMP Snooping on the specified VLAN. The <i>VLAN number</i> is from 1 to 4094.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays multicast routers detected by IGMP Snooping:

```
Switch> display ip igmp snooping mrouter
Total entries: 1 (0 static, 1 dynamic)
VLAN   Interface                IP-address    Expires
10     Ethernet1/1(dynamic)    77.88.99.111 00:04:00
```



---

## display ip igmp snooping querier

Displays Internet Group Management Protocol (IGMP) snooping querier information.

### Syntax

**display ip igmp snooping querier [vlan <VLAN number>] [detail]**

where:

| Parameter          | Function   |
|--------------------|--|
| vlan <VLAN number> | Displays IGMP Snooping querier information for the specified VLAN. The <i>VLAN number</i> is from 1 to 4094. |
| detail             | Displays detailed IGMP Snooping querier information.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IGMP Snooping querier information:

```
Switch> display ip igmp snooping querier
IGMP Querier Information
Vlan   IP Address      Version   Expires      Port
10     10.1.1.0        3         00:00:27    Querier
```

```
Switch> display ip igmp snooping querier detail
IGMP Querier Information
Vlan   IP Address      Version   Expires      Port
10     10.1.1.0        3         00:00:24    Querier

IGMP Snooping Querier configuration for Vlan10
Snooping Querier version      : 3 (operational: 3)
Robustness variable           : 2 (operational: 2)
Query Interval                 : 125 seconds (operational: 125 seconds)
Startup Query Count           : 2
Startup Query Interval        : 31 seconds
Last Member Query Count       : 2
Last Member Query Interval    : 1000 milliseconds
Query Response Interval       : 10 seconds
Querier timeout                : 255 seconds (default, operational: 255
seconds)
```

---

## display ip igmp snooping statistics

Displays Internet Groups Management Protocol (IGMP) snooping statistics.

### Syntax

```
display ip igmp snooping statistics [global|vlan <VLAN number>]
```

where:

| Parameter          | Function  |
|--------------------|---|
| global             | Displays IGMP Snooping global statistics.   |
| vlan <VLAN number> | Displays IGMP Snooping statistics for the specified VLAN. The <i>VLAN number</i> is from 1 to 4094. |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IGMP Snooping statistics:

```
Switch> display ip igmp snooping statistics vlan 10
Vlan10 IGMP snooping statistics, last reset: 00:00:32
  Packets received: 10
  IGMPv1 reports received: 0
  IGMPv2 reports received: 10
  IGMPv3 reports received: 0
  IGMPv1 queries received: 0
  IGMPv2 queries received: 0
    general queries received: 0
    group queries received: 0
  IGMPv3 queries received: 0
    general queries received: 0
    group queries received: 0
    group source queries received: 0
  IGMPv2 leaves received: 0
  Invalid reports received: 0
  Invalid queries received: 0
  IGMPv1 reports suppressed: 0
  IGMPv2 reports suppressed: 0
  IGMPv2 leaves suppressed: 0
  Queries originated: 0
  Packets sent to routers: 0
  STP TCN received: 0
  Report version mismatch: 0
  Unknown packets received: 0
  Checksum errors: 0, Packet length errors: 0
  Invalid v1 reports: 0, Invalid v2 reports: 0, Invalid v3 reports: 0
```

---

## display ip interface

Displays interface status and configuration settings.

### Syntax

```
display ip interface [<interface name> | ethernet <chassis number/port number> | loopback <loopback interface> | mgmt <management interface> | vlan <VLAN number>] [brief] [vrf {<VRF instance> | all | default}]
```

where:

| Parameter   | Function   |
|---|--|
| <i>interface name</i>                             | The name of the interface.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays ethernet interface configuration information. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays loopback interface configuration information. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>           | Displays management interface configuration information. The <i>management interface</i> is 0.   |
| <b>vlan</b> <i>VLAN number</i>                    | Displays Virtual LAN (VLAN) interface configuration information. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <b>brief</b>                                      | Displays a short interface configuration summary.  |
| <b>vrf</b> <i>VRF instance</i>                    | Displays configuration information for interfaces associated with the specified Virtual Routing and Forwarding (VRF) instance.               |
| <b>vrf all</b>                                    | Displays configuration information for interfaces associated with any VRF instance.  |
| <b>vrf default</b>                                | Displays configuration information for interfaces associated with the default VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays a short interface configuration summary:

```
Switch> display ip interface brief
```

| Interface    | IP-Address   | Admin-Status | Link-Status |
|--------------|--------------|--------------|-------------|
| Ethernet1/6  | 4.4.4.1      | up           | up          |
| Ethernet1/8  | 6.6.6.3      | up           | up          |
| Ethernet1/23 | 9.9.9.1      | up           | up          |
| Ethernet1/30 | 8.8.8.1      | up           | up          |
| Ethernet1/36 | 1.0.0.1      | up           | up          |
| Ethernet1/50 | 11.0.0.2     | up           | down        |
| mgmt0        | 10.241.37.40 | up           | up          |
| Vlan2        | 2.2.2.1      | up           | down        |
| Vlan10       | 182.124.0.10 | up           | down        |

The following command displays interface configuration for management interface 0:

```
Switch> display ip interface mgmt 0
```

```
IP Interface Status for VRF (default)
IP Interface Status for VRF (management)
mgmt0, Interface Status: link up/admin up
IP address: 10.241.41.21, IP subnet: 10.241.41.0/25
IP MTU:1500 bytes (using link MTU)
IP icmp redirects: enabled
IP icmp unreachable (except port): disabled
IP icmp port-unreachable: enabled
```

The following command displays configuration information for all interfaces associated with the default VRF instance:

```
Switch> display ip interface vrf default
```

```
IP Interface Status for VRF (default)
mgmt0, Interface Status: link up/admin up
IP address: 10.241.41.21, IP subnet: 10.241.41.0/25
IP MTU:1500 bytes (using link MTU)
IP icmp redirects: enabled
IP icmp unreachable (except port): disabled
IP icmp port-unreachable: enabled

loopback0, Interface Status: link up/admin up
IP MTU:1500 bytes (using link MTU)
IP icmp redirects: enabled
IP icmp unreachable (except port): disabled
IP icmp port-unreachable: enabled

Vlan1, Interface Status: link up/admin up
IP MTU:1500 bytes (using link MTU)
IP icmp redirects: enabled
IP icmp unreachable (except port): disabled
IP icmp port-unreachable: enabled
...
```

---

## display ip internal

Displays internal IP information.

### Syntax

```
display ip internal {arp|interface [<interface name>]|ethernet  
<chassis number/port number>|loopback <loopback interface>|mgmt <management  
interface>|port-aggregation <LAG number>|vlan <VLAN number>}]  
route}
```

where:

| Parameter  | Function   |
|--|--|
| arp  | Displays internal IP information for ARP entries.  |
| interface <i>interface name</i>                      | The name of the interface.   |
| interface ethernet <i>chassis number/port number</i> | Displays internal IP information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface loopback <i>loopback interface</i>         | Displays internal IP information for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| interface mgmt <i>management interface</i>           | Displays internal IP information for the specified management interface. The <i>management interface</i> is 0.   |
| interface port-aggregation <i>LAG number</i>         | Displays internal IP information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| interface vlan <i>VLAN number</i>                    | Displays internal IP information for the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |
| route  | Displays the IP routing table.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays internal IP information for all interfaces:

```
Switch> display ip internal interface

Vlan1      Link encap:Ethernet  HWaddr a8:97:dc:de:25:01
           inet6 addr: fe80::aa97:dcff:fede:2501/64 Scope:Link
           UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
           RX packets:0 errors:0 dropped:0 overruns:0 frame:0
           TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:0
           RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

internal0  Link encap:Ethernet  HWaddr 02:10:18:d1:34:aa
           inet6 addr: fe80::10:18ff:fed1:34aa/64 Scope:Link
           UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
           RX packets:0 errors:0 dropped:0 overruns:0 frame:0
           TX packets:6 errors:0 dropped:1 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:0 (0.0 B)  TX bytes:484 (484.0 B)

internal1  Link encap:Ethernet  HWaddr 02:10:18:d1:34:ab
           inet6 addr: fe80::10:18ff:fed1:34ab/64 Scope:Link
           UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
           RX packets:0 errors:0 dropped:0 overruns:0 frame:0
           TX packets:14 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:0 (0.0 B)  TX bytes:1548 (1.5 KiB)

...
```

---

## display ip load-sharing

Displays global IP load balancing information.

### Syntax

```
display ip load-sharing
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays global IP load balancing information:

```
Switch> display ip load-sharing

IP ECMP load sharing information:
universal-id (Random seed): 1431655765
Load-share mode: source-dest-ip source-dest-port
```



---

## display ip ospf

Displays general Open Shortest Path First (OSPF) information.

### Syntax

```
display ip ospf
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays general OSPF information:

```
Switch> display ip ospf

Routing Process "ospf 0" with ID 2.2.2.2
  Process uptime is 3 days 3 hours 31 minutes
  Process bound to VRF default
  Conforms to RFC2328, and RFC1583 Compatibility flag is disabled
  Supports only single TOS(TOS0) routes
  Supports opaque LSA
  Do not support Restarting
  SPF schedule delay initial 0 secs 500 msec
  SPF schedule delay min 0 secs 500 msec
  SPF schedule delay max 40 secs 0 msec
  Refresh timer 10 secs
  Number of incoming current DD exchange neighbors 0/4
  Number of outgoing current DD exchange neighbors 0/4
  Initial LSA throttle delay 0 secs 0 msec
  Minimum hold time for LSA throttle 5 secs 0 msec
  Maximum wait time for LSA throttle 5 secs 0 msec
  Minimum LSA arrival 1 secs 0 msec
  Number of external LSA 0. Checksum 0x000000
  Number of opaque AS LSA 0. Checksum 0x000000
  Number of non-default external LSA 0
  External LSA database is unlimited.
  Number of LSA originated 1
  Number of LSA received 1524
  Number of areas attached to this router: 1
    Area 0.0.0.0 (BACKBONE)
      Number of interfaces in this area is 100(100)
      Number of fully adjacent neighbors in this area is 4
      Area has no authentication
      SPF algorithm last executed 75:29:40.323 ago
      SPF algorithm executed 8 times
      Number of LSA 11. Checksum 0x04480a
```

---

## display ip ospf border-routers

Displays Open Shortest Path First (OSPF) routing table entries to an Area Border Router (ABR) and Autonomous System Boundary Router (ASBR).

### Syntax

```
display ip ospf border-routers
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays OSPF routing table entries to an ABR or ASBR:

```
Switch> display ip ospf border-routers

OSPF process 0 VRF (default) internal Routing Table

Codes: i - Intra-area route, I - Inter-area route

i 2.2.2.2 [1] via 5.0.0.2, Ethernet1/33, ABR, Area 0.0.0.1
I 1.1.1.1 [2] via 5.0.0.2, Ethernet1/33, ASBR, Area 0.0.0.1
```

---

## display ip ospf database

Displays the Open Shortest Path First (OSPF) database.

### Syntax

**display ip ospf** [*<OSPF instance>*] **database** [**detail**]

where:

| Parameter            | Function   |
|----------------------|--|
| <i>OSPF instance</i> | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |
| <b>detail</b>        | Displays detailed OSPF database information.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database:

```
Switch> display ip ospf database
OSPF Router with ID (2.2.2.2) (Process ID 0 VRF default)

          Router Link States (Area 0.0.0.0)

Link ID        ADV Router      Age Seq#          CkSum Link count
2.2.2.2        2.2.2.2         129 0x8000009e 0xe528 100
3.3.3.3        3.3.3.3         1241 0x8000009c 0xc093 100
4.4.4.4        4.4.4.4         1126 0x8000009f 0x1d0d 8

          Net Link States (Area 0.0.0.0)

Link ID        ADV Router      Age Seq#          CkSum
21.0.0.4       4.4.4.4         306 0x80000098 0x8cf4
22.0.0.4       4.4.4.4         1317 0x80000098 0x7f01
23.0.0.4       4.4.4.4         406 0x80000098 0x720d
...
34.0.0.4       4.4.4.4         1527 0x80000098 0x155b

          Summary Link States (Area 0.0.0.0)

Link ID        ADV Router      Age Seq#          CkSum Route
4.0.0.0        2.2.2.2         129 0x80000001 0x054b 4.0.0.0/24
```

---

## display ip ospf database <link-state ID>

Displays the Open Shortest Path First (OSPF) database entries for a specified LSA.

### Syntax

```
display ip ospf [<OSPF instance>] database <link-state ID>  
[adv-router <advertising router ID>|self-originated] [detail]
```

where:

| Parameter   | Function   |
|---|--|
| <i>OSPF instance</i>                              | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <i>link-state ID</i>                              | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b><br><i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address.   |
| <b>self-originated</b>                            | Displays LSAs originated from the local router.  |
| <b>detail</b>                                     | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for the OSPF router with link-state ID 10.243.79.34:

```
Switch> display ip ospf database 10.243.79.34
```

---

## display ip ospf database adv-router

Displays the Open Shortest Path First (OSPF) database for an advertising router.

### Syntax

**display ip ospf** [*<OSPF instance>*] **database adv-router** *<advertising router ID>* [**detail**]

where:

| Parameter                    | Function   |
|------------------------------|--|
| <i>OSPF instance</i>         | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |
| <i>advertising router ID</i> | The advertising router ID in IPv4 address format.  |
| <b>detail</b>                | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for the advertising router with ID 10.156.36.11:

```
Switch> display ip ospf database 10.156.36.11
```

---

## display ip ospf database area

Displays the Open Shortest Path First (OSPF) database for a specified OSPF area.

### Syntax

```
display ip ospf [<OSPF instance>] database area {<area ID>|  
<area IPv4 address>} [<link-state ID>] [adv-router <advertising router ID>|  
self-originated] [detail]
```

where:

| Parameter   | Function   |
|---|--|
| <i>OSPF instance</i>                              | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <i>area ID</i>                                    | The ID of the OSPF area in decimal format. The <i>area ID</i> is from 1 to 4294967295.   |
| <i>area IPv4 address</i>                          | The ID of the OSPF area in IPv4 address format.  |
| <i>link-state ID</i>                              | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b><br><i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                            | Displays LSAs originated from the local router.  |
| <b>detail</b>                                     | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for OSPF area '230':

```
Switch> display ip ospf database area 230
```

---

## display ip ospf database asbr-summary

Displays a summary of the Open Shortest Path First (OSPF) database for Autonomous System Boundary Routers (ASBRs).

### Syntax

```
display ip ospf [<OSPF instance>] database asbr-summary [area {<area ID>|<area IPv4 address>}] [<link-state ID>] [adv-router <advertising router ID>]|self-originated] [detail]
```

where:

| Parameter                               | Function   |
|---|--|
| <i>OSPF instance</i>                    | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <i>area area ID</i>                     | Displays OSPF database information for the OSPF area specified in decimal format. The <i>area ID</i> is from 1 to 4294967295.  |
| <i>area area IPv4 address</i>           | Displays OSPF database information for the OSPF area specified in IPv4 address format.   |
| <i>link-state ID</i>                    | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <i>adv-router advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <i>self-originated</i>                  | Displays LSAs originated from the local router.  |
| <i>detail</i>                           | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays a summary of the OSPF database for all ASBRs:

```
Switch> display ip ospf database asbr-summary
```

---

## display ip ospf database database-summary

Displays a summary of the Open Shortest Path First (OSPF) database, including the types of link-state advertisements (LSAs) in each OSPF area and their total number.

### Syntax

**display ip ospf** [*<OSPF instance>*] **database database-summary**

where:

| Parameter            | Function   |
|----------------------|--|
| <i>OSPF instance</i> | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays a summary of the OSPF database:

```
Switch> display ip ospf database database-summary
```



---

## display ip ospf database external

Displays the Open Shortest Path First (OSPF) database for external link-state advertisements (LSAs).

### Syntax

```
display ip ospf [<OSPF instance>] database external [ext-tag <external tag number>] [<link-state ID>] [adv-router <advertising router ID>] [self-originated] [detail]
```

where:

| Parameter                                      | Function   |
|--|--|
| <i>OSPF instance</i>                           | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>ext-tag</b> <i>external tag number</i>      | Displays OSPF information for the specified external tag. The <i>external tag number</i> is from 1 to 4294967295.  |
| <i>link-state ID</i>                           | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b> <i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                         | Displays LSAs originated from the local router.  |
| <b>detail</b>                                  | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for external LSAs:

```
Switch> display ip ospf database external
```

---

## display ip ospf database network

Displays the Open Shortest Path First (OSPF) database for network link-state advertisements (LSAs).

### Syntax

```
display ip ospf [<OSPF instance>] database network [area {<area ID>|<area IPv4 address>}] [<link-state ID>] [adv-router <advertising router ID>]|self-originated [detail]
```

where:

| Parameter                                      | Function   |
|--|--|
| <i>OSPF instance</i>                           | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>area</b> <i>area ID</i>                     | Displays OSPF database information for the OSPF area specified in decimal format. The <i>area ID</i> is from 1 to 4294967295.  |
| <b>area</b> <i>area IPv4 address</i>           | Displays OSPF database information for the OSPF area specified in IPv4 address format.   |
| <i>link-state ID</i>                           | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b> <i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                         | Displays LSAs originated from the local router.  |
| <b>detail</b>                                  | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for network LSAs:

```
Switch> display ip ospf database network
```

---

## display ip ospf database nssa-external

Displays the Open Shortest Path First (OSPF) database for not-so-stubby area (NSSA) external link-state advertisements (LSAs).

### Syntax

```
display ip ospf [<OSPF instance>] database network [area {<area ID> | <area IPv4 address>}] [<link-state ID>] [adv-router <advertising router ID>] [self-originated] [detail]
```

where:

| Parameter                                      | Function   |
|--|--|
| <i>OSPF instance</i>                           | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>area</b> <i>area ID</i>                     | Displays OSPF database information for the OSPF area specified in decimal format. The <i>area ID</i> is from 1 to 4294967295.  |
| <b>area</b> <i>area IPv4 address</i>           | Displays OSPF database information for the OSPF area specified in IPv4 address format.   |
| <i>link-state ID</i>                           | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b> <i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                         | Displays LSAs originated from the local router.  |
| <b>detail</b>                                  | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for NSSA external LSAs:

```
Switch> display ip ospf database nssa-external
```

---

## display ip ospf database opaque-area

Displays the Open Shortest Path First (OSPF) database for link area opaque link-state advertisements (LSAs).

### Syntax

```
display ip ospf [<OSPF instance>] database opaque-area [area {<area ID>|<area IPv4 address>}] [<link-state ID>] [adv-router <advertising router ID>]|self-originated] [detail]
```

where:

| Parameter                                      | Function   |
|--|--|
| <i>OSPF instance</i>                           | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>area</b> <i>area ID</i>                     | Displays OSPF database information for the OSPF area specified in decimal format. The <i>area ID</i> is from 1 to 4294967295.  |
| <b>area</b> <i>area IPv4 address</i>           | Displays OSPF database information for the OSPF area specified in IPv4 address format.   |
| <i>link-state ID</i>                           | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b> <i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                         | Displays LSAs originated from the local router.  |
| <b>detail</b>                                  | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for link area opaque LSAs:

```
Switch> display ip ospf database opaque-area
```

---

## display ip ospf database opaque-as

Displays the Open Shortest Path First (OSPF) database for link autonomous system (AS) opaque link-state advertisements (LSAs).

### Syntax

```
display ip ospf [<OSPF instance>] database opaque-as [area {<area ID>|<area IPv4 address>}] [<link-state ID>] [adv-router <advertising router ID>]self-originated [detail]
```

where:

| Parameter                                      | Function   |
|--|--|
| <i>OSPF instance</i>                           | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>area</b> <i>area ID</i>                     | Displays OSPF database information for the OSPF area specified in decimal format. The <i>area ID</i> is from 1 to 4294967295.  |
| <b>area</b> <i>area IPv4 address</i>           | Displays OSPF database information for the OSPF area specified in IPv4 address format.   |
| <i>link-state ID</i>                           | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b> <i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                         | Displays LSAs originated from the local router.  |
| <b>detail</b>                                  | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for link AS opaque LSAs:

```
Switch> display ip ospf database opaque-as
```

---

## display ip ospf database opaque-link

Displays the Open Shortest Path First (OSPF) database for link local opaque link-state advertisements (LSAs).

### Syntax

```
display ip ospf [<OSPF instance>] database opaque-link [area {<area ID>|<area IPv4 address>}] [<link-state ID>] [adv-router <advertising router ID>]self-originated [detail]
```

where:

| Parameter                                      | Function   |
|--|--|
| <i>OSPF instance</i>                           | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>area</b> <i>area ID</i>                     | Displays OSPF database information for the OSPF area specified in decimal format. The <i>area ID</i> is from 1 to 4294967295.  |
| <b>area</b> <i>area IPv4 address</i>           | Displays OSPF database information for the OSPF area specified in IPv4 address format.   |
| <i>link-state ID</i>                           | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b> <i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                         | Displays LSAs originated from the local router.  |
| <b>detail</b>                                  | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for link local opaque LSAs:

```
Switch> display ip ospf database opaque-link
```

---

## display ip ospf database router

Displays the Open Shortest Path First (OSPF) database for router link-state advertisements (LSAs).

### Syntax

```
display ip ospf [<OSPF instance>] database router [area {<area ID> | <area IPv4 address>}] [<link-state ID>] [adv-router <advertising router ID> | self-originated] [detail]
```

where:

| Parameter                                      | Function   |
|--|--|
| <i>OSPF instance</i>                           | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>area</b> <i>area ID</i>                     | Displays OSPF database information for the OSPF area specified in decimal format. The <i>area ID</i> is from 1 to 4294967295.  |
| <b>area</b> <i>area IPv4 address</i>           | Displays OSPF database information for the OSPF area specified in IPv4 address format.   |
| <i>link-state ID</i>                           | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b> <i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                         | Displays LSAs originated from the local router.  |
| <b>detail</b>                                  | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for router LSAs:

```
Switch> display ip ospf database router
```

---

## display ip ospf database self-originated

Displays the Open Shortest Path First (OSPF) database for link-state advertisements (LSAs) originated from the local router.

### Syntax

**display ip ospf** [*<OSPF instance>*] **database self-originated**  
**[detail]**

where:

| Parameter            | Function   |
|----------------------|--|
| <i>OSPF instance</i> | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |
| detail               | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for LSAs originated from the local router:

```
Switch> display ip ospf database self-originated
```



---

## display ip ospf database summary

Displays the Open Shortest Path First (OSPF) database for network summary link-state advertisements (LSAs).

### Syntax

```
display ip ospf [<OSPF instance>] database summary [area {<area ID>|<area IPv4 address>}] [<link-state ID>] [adv-router <advertising router ID>]self-originated [detail]
```

where:

| Parameter                                      | Function   |
|--|--|
| <i>OSPF instance</i>                           | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>area</b> <i>area ID</i>                     | Displays OSPF database information for the OSPF area specified in decimal format. The <i>area ID</i> is from 1 to 4294967295.  |
| <b>area</b> <i>area IPv4 address</i>           | Displays OSPF database information for the OSPF area specified in IPv4 address format.   |
| <i>link-state ID</i>                           | Link-state advertisement (LSA) communicates the router's local routing topology to all other routers in the local OSPF area. The value depends on the LSA type and must be entered in IPv4 address format. |
| <b>adv-router</b> <i>advertising router ID</i> | Displays all LSAs for the specified advertising router ID in IPv4 address format.  |
| <b>self-originated</b>                         | Displays LSAs originated from the local router.  |
| <b>detail</b>                                  | Displays detailed database information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the OSPF database for summary LSAs:

```
Switch> display ip ospf database router
```

---

## display ip ospf interface

Displays Open Shortest Path First (OSPF) interface related information.

### Syntax

```
display ip ospf interface [<interface name> | ethernet <chassis number/port number> | loopback <loopback interface> | vlan <VLAN number>] [brief] [vrf {all | default}]
```

where:

| Parameter   | Function  |
|---|---|
| <i>interface name</i>                             | The name of the interface.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays OSPF information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays OSPF information for the specified loopback interface. The <i>loopback interface</i> is an integer from 0 to 7.                              |
| <b>vlan</b> <i>VLAN number</i>                    | Displays OSPF information for the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <b>brief</b>                                      | Displays a short interface information summary.   |
| <b>vrf all</b>                                    | Displays OSPF information for interfaces on all Virtual Routing and Forwarding (VRF) instances.   |
| <b>vrf default</b>                                | Displays OSPF information for interfaces on the default VRF instance.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays OSPF interface related information:

```
Switch> display ip ospf interface ethernet 1/50
Ethernet1/50 is up, line protocol is up
  Internet Address 4.0.0.2/24, Area 0.0.0.1, MTU 1500
  Process ID 0, VRF (default), Router ID 2.2.2.2, Network Type BROADCAST,
Cost:
1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 2.2.2.2, Interface Address 4.0.0.2
  Backup Designated Router (ID) 1.1.1.1, Interface Address 4.0.0.1
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:10
  Neighbor Count is 1, Adjacent neighbor count is 1
  Hello received 18 sent 19, DD received 10 sent 5
  LS-Req received 2 sent 1, LS-Upd received 3 sent 8
  LS-Ack received 4 sent 2, Discarded 0
  No authentication

Switch#display ip ospf interface vlan 101
Vlan101 is up, line protocol is up
  Internet Address 45.0.1.2/24, Area 0.0.0.0, MTU 1500
  Process ID 0, VRF (default), Router ID 2.2.2.2, Network Type BROADCAST,
Cost:
1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 2.2.2.2, Interface Address 45.0.1.2
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:02
  Neighbor Count is 0, Adjacent neighbor count is 0
  Hello received 0 sent 27181, DD received 0 sent 0
  LS-Req received 0 sent 0, LS-Upd received 0 sent 0
  LS-Ack received 0 sent 0, Discarded 0
  No authentication
```

---

## display ip ospf multi-area-adjacencies

Displays Open Shortest Path First (OSPF) multiple area link adjacencies.

### Syntax

**display ip ospf** [*<OSPF instance>*] **multi-area-adjacencies**

where:

| Parameter            | Function   |
|----------------------|--|
| <i>OSPF instance</i> | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays OSPF multiple area link adjacencies:

```
Switch> display ip ospf multi-area-adjacencies
Multi-area-adjacency link on interface Ethernet1/50 to neighbor 4.0.0.2
  Internet Address 4.0.0.1/24, Area 0.0.0.1, MTU 1500
  Process ID 0, Router ID 1.1.1.1, Network Type Point-To-Point, Cost: 1
  Transmit Delay is 1 sec, State Point-To-Point
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:10
  Neighbor Count is 1, Adjacent neighbor count is 1
  Hello received 2 sent 3, DD received 3 sent 4
  LS-Req received 1 sent 1, LS-Upd received 4 sent 3
  LS-Ack received 2 sent 3, Discarded 0
  No authentication
Multi-area-adjacency link on interface Ethernet1/50 to neighbor 4.0.0.2
  Internet Address 4.0.0.1/24, Area 0.0.0.2, MTU 1500
  Process ID 0, Router ID 1.1.1.1, Network Type Point-To-Point, Cost: 1
  Transmit Delay is 1 sec, State Point-To-Point
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:03
  Neighbor Count is 1, Adjacent neighbor count is 1
  Hello received 2 sent 2, DD received 3 sent 4
  LS-Req received 1 sent 1, LS-Upd received 3 sent 2
  LS-Ack received 1 sent 1, Discarded 0
  No authentication
```

---

## display ip ospf neighbors

Displays Open Shortest Path First (OSPF) neighbor information.

### Syntax

```
display ip ospf [<OSPF instance>] neighbors [interface <interface IPv4 address> | <interface name> | ethernet <chassis number/port number> | loopback <loopback interface> | mgmt <management interface> | port-aggregation <LAG number> | vlan <VLAN number>] [<neighbor ID>] [all | detail [all] | summary]
```

where:

| Parameter   | Function   |
|---|--|
| <i>OSPF instance</i>  | Displays OSPF information only for the specified OSPF instance. The <i>OSPF instance</i> is 0.   |
| <b>interface</b> <i>interface IPv4 address</i>              | Displays OSPF neighbor information for the specified interface in IPv4 address format.   |
| <b>interface</b> <i>interface name</i>                      | Displays OSPF neighbor information for the specified interface by name.  |
| <b>interface ethernet</b> <i>chassis number/port number</i> | Displays OSPF neighbor information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>interface loopback</b> <i>loopback interface</i>         | Displays OSPF neighbor information for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>interface mgmt</b> <i>management interface</i>           | Displays OSPF neighbor information for the specified management interface. The <i>management interface</i> is 0.   |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Displays OSPF neighbor information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>interface vlan</b> <i>VLAN number</i>                    | Displays OSPF neighbor information for the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <i>neighbor ID</i>  | The router ID of the neighbor in IPv4 address format.  |
| <b>all</b>  | Displays OSPF neighbor information, including neighbors that are in the DOWN link state.   |
| <b>detail</b>   | Displays detailed OSPF neighbor information.   |
| <b>summary</b>  | Displays a summary of the OSPF neighbors.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays OSPF neighbor information:

```
Switch> display ip ospf neighbors
Total number of full neighbors: 5

OSPF process 0 VRF(default):
Neighbor ID    Pri  State           Dead Time   Address
Interface
1.1.1.1        1   Full/Backup     00:00:33   4.0.0.1
Ethernet1/50

4.4.4.4        1   Full/DR         00:00:36   21.0.0.4   Vlan201
4.4.4.4        1   Full/DR         00:00:29   22.0.0.4   Vlan202
4.4.4.4        1   Full/DR         00:00:36   23.0.0.4   Vlan203
4.4.4.4        1   Full/DR         00:00:32   24.0.0.4   Vlan204
```

---

## display ip ospf policy statistics redistribute

Displays Open Shortest Path First (OSPF) policy redistribution statistics.

### Syntax

```
display ip ospf statistics redistribute {all|bgp|direct|static}
```

where:

| Parameter | Function  |
|-----------|---|
| all       | Displays OSPF policy redistribution statistics for all processes and protocols.   |
| bgp       | Displays OSPF policy redistribution statistics for Border Gateway Protocol (BGP). |
| direct    | Displays OSPF policy redistribution statistics for directly connected routes.     |
| static    | Displays OSPF policy redistribution statistics for IP static routes.              |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays all OSPF policy redistribution statistics:

```
Switch> display ip ospf policy statistics redistribute all
OSPF process 0: Redistribute: direct
  Total compared count : 8
  Total matched count: 8
```

---

## display ip ospf retransmission-list

Displays a list of all link-state advertisements (LSAs) that are waiting to be resent to the specified Open Shortest Path First (OSPF) neighbor.

### Syntax

```
display ip ospf retransmission-list <neighbor ID> {<interface name>|  
ethernet <chassis number/port number>|loopback <loopback interface>|  
port-aggregation <LAG number>|vlan <VLAN number>}
```

where:

| Parameter   | Function   |
|---|--|
| <i>neighbor ID</i>                                | The router ID of the neighbor in IPv4 address format.  |
| <i>interface name</i>                             | Displays LSAs waiting to be resent to the OSPF neighbor on the specified interface by name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays LSAs waiting to be resent to the OSPF neighbor on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays LSAs waiting to be resent to the OSPF neighbor on the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays LSAs waiting to be resent to the OSPF neighbor on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                    | Displays LSAs waiting to be resent to the OSPF neighbor on the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the LSAs waiting to be resent to the OSPF neighbor with router ID 10.80.135.6 on the ethernet interface 1/12:

```
Switch> display ip ospf retransmission-list 10.80.135.6 ethernet 1/12
```



---

## display ip ospf rib counters

Displays Open Shortest Path First (OSPF) Routing Information Base (RIB) statistics.

### Syntax

```
display ip ospf rib counters
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays RIB statistics:

```
Switch> display ip ospf rib counters
Global
  Routes received from RIB with invalid VR-Id: 0
  Routes received from RIB with invalid VRF-Id: 0

OSPF VRF default
  Route ADDs sent to RIB: 104
  Failed while sending route ADDs to RIB: 0
  Route DELETES sent to RIB: 0
  Failed while sending route DELETES to RIB: 0
  Route ADDs received from RIB: 0
  Failed to process route ADDs received from RIB: 0
  Route DELETES received from RIB: 0
  Failed to process route DELETES received from RIB: 0
```

---

## display ip ospf route

Displays the Open Shortest Path First (OSPF) topology table.

### Syntax

**display ip ospf route** [*<OSPF instance>*] [*<route IPv4 address>*]/*<prefix length>*] **summary**

where:

| Parameter                 | Function  |
|---------------------------|---|
| <i>OSPF instance</i>      | Displays the OSPF topology table only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |
| <i>route IPv4 address</i> | The IPv4 address of the route.  |
| <i>prefix length</i>      | The length of the IPv4 network mask.  |
| <b>summary</b>            | Displays a summary of all routes.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the OSPF topology table:

```
Switch> display ip ospf route

OSPF process 0:
Codes: C - connected, D - Discard, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2

C 4.0.0.0/24 [1] is directly connected, Ethernet1/50, Area 0.0.0.1
C 21.0.0.0/24 [1] is directly connected, Vlan201, Area 0.0.0.0
C 22.0.0.0/24 [1] is directly connected, Vlan202, Area 0.0.0.0
C 23.0.0.0/24 [1] is directly connected, Vlan203, Area 0.0.0.0
C 24.0.0.0/24 [1] is directly connected, Vlan204, Area 0.0.0.0
O 31.0.0.0/24 [2] via 22.0.0.4, Vlan202, Area 0.0.0.0
                  via 23.0.0.4, Vlan203, Area 0.0.0.0
                  via 24.0.0.4, Vlan204, Area 0.0.0.0
                  via 21.0.0.4, Vlan201, Area 0.0.0.0
O 32.0.0.0/24 [2] via 22.0.0.4, Vlan202, Area 0.0.0.0
                  via 23.0.0.4, Vlan203, Area 0.0.0.0
                  via 24.0.0.4, Vlan204, Area 0.0.0.0
                  via 21.0.0.4, Vlan201, Area 0.0.0.0
O 33.0.0.0/24 [2] via 22.0.0.4, Vlan202, Area 0.0.0.0
                  via 23.0.0.4, Vlan203, Area 0.0.0.0
                  via 24.0.0.4, Vlan204, Area 0.0.0.0
                  via 21.0.0.4, Vlan201, Area 0.0.0.0
O 34.0.0.0/24 [2] via 22.0.0.4, Vlan202, Area 0.0.0.0
                  via 23.0.0.4, Vlan203, Area 0.0.0.0
                  via 24.0.0.4, Vlan204, Area 0.0.0.0
                  via 21.0.0.4, Vlan201, Area 0.0.0.0
C 45.0.1.0/24 [1] is directly connected, Vlan101, Area 0.0.0.0
```

---

## display ip ospf statistics

Displays Open Shortest Path First (OSPF) statistics.

### Syntax

**display ip ospf** [*<OSPF instance>*] **statistics**

where:

| Parameter            | Function  |
|----------------------|---|
| <i>OSPF instance</i> | Displays OSPF statistics only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays OSPF statistics:

```
Switch> display ip ospf statistics

OSPF Process ID 0 VRF default, Event statistics (cleared 75:38:55 ago)
Router ID changes: 1
DR elections: 101
Older LSAs received: 1
Neighbor state changes: 33
Neighbor dead interval expirations: 0
Neighbor bad lsreqs: 0
Neighbor sequence number mismatches: 0
SPF computations: 13 full, 0 summary, 0 external

      LSA Type  Generated  Refreshed  Flushed  Aged out
      Router-LSA      2         160         0         0
      Network-LSA     1          0          0         0
      Summary-LSA    201          0          0         0
      ASBR-summary-LSA  0          0          0         0
      AS-external-LSA  0          0          0         0
      AS-NSSA-LSA     0          0          0         0
      Type-8 LSA      0          0          0         0
      Link-Local Opaque-LSA  0          0          0         0
      Area-Local Opaque-LSA  0          0          0         0
      AS-external Opaque-LSA  0          0          0         0

Following counters can not be reset:
Packet SEND buffer: 2048 bytes
LSA buffer: 2048 bytes
Packet unused list: 6/200 packets
LSA unused list: 9/200 LSAs
DD packets in Q 0
ACK packets in Q 0
LSU packets in Q 0
```

---

## display ip ospf summary-address

Displays Open Shortest Path First (OSPF) summary address redistribution information.

### Syntax

**display ip ospf** [*<OSPF instance>*] **summary-address**

where:

| Parameter            | Function  |
|----------------------|---|
| <i>OSPF instance</i> | Displays OSPF summary address redistribution information only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays OSPF summary address redistribution information:

```
Switch> display ip ospf summary-address
OSPF Router with ID (2.2.2.2) (Process ID 0 VRF default)

Configured summary-address

55.0.1.0/24 Metric -1, tag 0
```

---

## display ip ospf traffic

Displays Open Shortest Path First (OSPF) traffic statistics.

### Syntax

```
display ip ospf [<OSPF instance>] traffic [<interface name>|  
ethernet <chassis number/port number>|loopback <loopback interface>|  
port-aggregation <LAG number>|vlan <VLAN number>] [vrf {all|  
default}]
```

where:

| Parameter   | Function   |
|---|--|
| <i>OSPF instance</i>                              | Displays OSPF traffic statistics only for the specified OSPF instance. The <i>OSPF instance</i> is 0.  |
| <i>interface name</i>                             | Displays OSPF traffic statistics for the specified interface by name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays OSPF traffic statistics for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays OSPF traffic statistics for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays OSPF traffic statistics for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                    | Displays OSPF traffic statistics for the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <b>vrf</b> <b>all</b>                             | Displays OSPF traffic statistics for all Virtual Routing and Forwarding (VRF) instances.   |
| <b>vrf</b> <b>default</b>                         | Displays OSPF traffic statistics for the default VRF instance.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays OSPF traffic statistics:

```
Switch> display ip ospf traffic

OSPF Process ID 0 VRF default, Packet Counters (cleared 75:39:36 ago)
Total: 115536 in, 2729928 out
Errors: drops in      0, drops out      0, hellos in      0,
         dbds in       0, lsreq in       0, lsu in         0,
         lsacks in    0, unknown in    0, unknown out   0,
         bad version  0, bad crc       0, invalid src   0,
         invalid dst  0, no nbr       0, passive      0,
         wrong area   0, pkt length   0, bad auth     0,

         hello      dbds      lsreq      lsus      acks
In      108946      25         3         5943      619
Out     2723349     22         5         626      5926
```



---

## display ip ospf virtual-links

Displays Open Shortest Path First (OSPF) virtual links information.

### Syntax

```
display ip ospf [<OSPF instance>] virtual-links [brief]
```

where:

| Parameter            | Function   |
|----------------------|--|
| <i>OSPF instance</i> | Displays OSPF virtual links information only for the specified OSPF instance. The <i>OSPF instance</i> is 0. |
| brief                | Displays a short summary of the OSPF virtual links.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays OSPF virtual links information:

```
Switch> display ip ospf virtual-links
```

---

## display ip prefix-list

Displays IPv4 prefix list information and statistics.

### Syntax

```
display ip prefix-list [detail <prefix list name>|summary <prefix list name>|<prefix list name> [<IPv4 address/prefix length> [first-match |longer]|seq <sequence number>]]
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <i>prefix list name</i>           | The name of the prefix list.   |
| <i>IPv4 address/prefix length</i> | Displays the entries of the prefix list that match the specified IPv4 address and network mask length.                                   |
| <i>first-match</i>                | Displays the first entry of the prefix list that match the specified IPv4 address and network mask length.                               |
| <i>longer</i>                     | Displays all entries of the prefix list that are more specific than the selected IPv4 address and network mask length.                   |
| <i>seq sequence number</i>        | Displays the entry with the specified sequence number from the selected prefix list. The <i>sequence number</i> is from 1 to 4294967295. |
| <i>detail</i>                     | Displays detailed IPv4 prefix list information.  |
| <i>summary</i>                    | Displays a summary of all IPv4 prefix lists.   |

### Modes

Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv4 prefix list information and statistics:

```
Switch# display ip prefix-list
ip prefix-list pf_1: 4 entries
  seq 5 permit 111.0.0.0/24
  seq 10 deny 100.45.0.0/16
  seq 15 deny 156.2.0.0/24 eq 25
  seq 20 permit any
ip prefix-list pf_2: 3 entries
  seq 5 deny 50.0.0.0/24 le 28
  seq 10 permit 80.0.0.0/24 ge 25
  seq 15 permit 85.0.0.64/24 ge 25 le 28
ip prefix-list pf_3: 1 entries
  Description: permit all
  seq 5 permit 0.0.0.0/0 le 32
```

---

## display ip protocols

Displays parameters and statistics for the active routing protocol process.

### Syntax

**display ip protocols [bgp|ospf]**

where:

| Parameter | Function  |
|-----------|---|
| bgp       | Displays Border Gateway Protocol (BGP) parameters and statistics.   |
| ospf      | Displays Open Shortest Path First (OSPF) parameters and statistics. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays parameters and statistics for the active routing protocol process:

```
Switch> display ip protocols
Routing Protocol is "ospf 0"
  Redistributing: direct 0
  Routing for Networks:
    23.1.1.0/24
  Distance: (default is 110)

Routing Protocol is "bgp 3000"
  IGP synchronization is disabled
  Automatic route summarization is disabled
  Default local-preference applied to incoming route is 100
  Redistributing: static, ospf
  Neighbor(s):
    Address          AddressFamily  FiltIn  FiltOut  DistIn  DistOut
  RouteMapIn  RouteMapOut  Weight
  23.1.1.2          unicast      as_acl_1
  rmap_1
  24.1.1.2          unicast                        as_acl_2
  113.0.0.100      unicast
  rmap_2                                50
  Incoming Route Filter:
```

---

## display ip route

Displays the IPv4 routing table.

### Syntax

```
display ip route [vrf {all|default|management}] [<route address>  
[/<prefix length>]|all|bgp|connected|next-hop <next-hop address>|ospf|  
static]
```

where:

| Parameter                 | Function   |
|---------------------------|--|
| vrf all                   | Displays the IPv4 routing table associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default               | Displays the IPv4 routing table associated with the default VRF instance.                          |
| vrf management            | Displays the IPv4 routing table associated with the management VRF instance.                       |
| route address             | The IPv4 address of the route.   |
| prefix length             | The length of the IPv4 network mask.   |
| all                       | Displays all IPv4 routes.  |
| bgp                       | Displays only Border Gateway Protocol (BGP) routes.  |
| connected                 | Displays only directly connected routes.   |
| next-hop next-hop address | Displays only routes with the specified next hop address in IPv4 address format.                   |
| ospf                      | Displays only Open Shortest Path First (OSPF) routes.  |
| static                    | Displays only static routes.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the IPv4 routing table:

```
Switch> display ip route
Codes: C - connected, S - static, R - RIP, B - BGP
       O - OSPF, IA - OSPF inter area, D - DHCP
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       * - candidate default

IP Route Table for VRF "default"
C      23.1.1.0/24 is directly connected, Vlan23
C      24.1.1.0/24 is directly connected, Vlan24
S      45.0.0.0/8 [1/0] via 113.0.0.105, Vlan113
        [1/0] via 24.1.1.2, Vlan24
O E1   57.61.0.0/24 [110/125] via 23.1.1.2, Vlan23, 00:02:20
B      100.0.0.0/24 [20/0] via 113.0.0.100, Vlan113, 00:05:54
B      100.0.1.0/24 [20/0] via 113.0.0.100, Vlan113, 00:05:54
C      113.0.0.0/24 is directly connected, Vlan113
O      116.0.0.0/24 [110/124] via 23.1.1.2, Vlan23, 00:09:21
O IA   117.1.1.1/32 [110/124] via 23.1.1.2, Vlan23, 00:09:11
B      145.45.0.0/16 [200/0] via 23.1.1.2, Vlan23, 00:03:29
O E2   190.20.20.20/32 [110/20] via 23.1.1.2, Vlan23, 00:05:07
C      192.168.1.2/32 is directly connected, loopback0

Gateway of last resort is not set
```

---

## display ip route database

Displays the IPv4 routing table database.

### Syntax

```
display ip route [vrf {all|default|management}] database  
[all|bgp|connected|ospf|static]
```

where:

| Parameter      | Function  |
|----------------|---|
| vrf all        | Displays the IPv4 routing table database associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default    | Displays the IPv4 routing table database associated with the default VRF instance.                          |
| vrf management | Displays the IPv4 routing table database associated with the management VRF instance.                       |
| all            | Displays all IPv4 routes.   |
| bgp            | Displays only Border Gateway Protocol (BGP) routes.   |
| connected      | Displays only directly connected routes.  |
| ospf           | Displays only Open Shortest Path First (OSPF) routes.   |
| static         | Displays only static routes.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv4 routing table database:

```
Switch> display ip route database
Codes: C - connected, S - static, R - RIP, B - BGP
       O - OSPF, IA - OSPF inter area, D - DHCP
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       > - selected route, * - FIB route, p - stale info

IP Route Table for VRF "default"
C    *> 23.1.1.0/24 is directly connected, Vlan23
C    *> 24.1.1.0/24 is directly connected, Vlan24
S    *> 45.0.0.0/8 [1/0] via 113.0.0.105, Vlan113
     *>                                     [1/0] via 24.1.1.2, Vlan24
B    45.0.0.0/8 [200/0] via 24.1.1.2, Vlan24, 00:00:01
O E1 *> 57.61.0.0/24 [110/125] via 23.1.1.2, Vlan23, 00:08:58
S    *> 100.0.0.0/24 [5/0] via 24.1.1.2, Vlan24
O    100.0.0.0/24 [110/124] via 23.1.1.2, Vlan23, 00:01:21
B    100.0.0.0/24 [20/0] via 113.0.0.100, Vlan113, 00:12:32
B    *> 100.0.1.0/24 [20/0] via 113.0.0.100, Vlan113, 00:12:32
C    *> 113.0.0.0/24 is directly connected, Vlan113
O    *> 116.0.0.0/24 [110/124] via 23.1.1.2, Vlan23, 00:15:59
O IA *> 117.1.1.1/32 [110/124] via 23.1.1.2, Vlan23, 00:15:49
O E2 *> 145.45.0.0/16 [110/20] via 23.1.1.2, Vlan23, 00:03:44
B    145.45.0.0/16 [200/0] via 23.1.1.2, Vlan23, 00:12:27
O E2 *> 190.20.20.20/32 [110/20] via 23.1.1.2, Vlan23, 00:11:45
C    *> 192.168.1.2/32 is directly connected, loopback0

Gateway of last resort is not set
```



---

## display ip route interface

Displays IPv4 routing table for the specified interface.

### Syntax

```
display ip route [vrf {all|default|management}] interface
{<interface name>|ethernet <chassis number/port number>|loopback <loopback
interface>|mgmt <management interface>|port-aggregation <LAG number>|
vlan <VLAN number>}
```

where:

| Parameter                           | Function   |
|-------------------------------------|--|
| vrf all                             | Displays the IPv4 routing table associated with any Virtual Routing and Forwarding (VRF) instance.   |
| vrf default                         | Displays the IPv4 routing table associated with the default VRF instance.  |
| vrf management                      | Displays the IPv4 routing table associated with the management VRF instance.   |
| interface name                      | Displays IPv4 routes for the specified interface by name.  |
| ethernet chassis number/port number | Displays IPv4 routes for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| loopback loopback interface         | Displays IPv4 routes for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| mgmt management interface           | Displays IPv4 routes for the specified management interface. The <i>management interface</i> is 0.   |
| port-aggregation LAG number         | Displays IPv4 routes for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| vlan VLAN number                    | Displays IPv4 routes for the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the IPv4 routing table for ethernet interface 1/12:

```
Switch> display ip route interface ethernet 1/12
```

---

## display ip route summary

Displays a summary of all IPv4 routes.

### Syntax

**display ip route summary [vrf {all|default|management}]**

where:

| Parameter      | Function   |
|----------------|--|
| vrf all        | Displays a summary of IPv4 routes associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default    | Displays a summary of IPv4 routes associated with the default VRF instance.                          |
| vrf management | Displays a summary of IPv4 routes associated with the management VRF instance.                       |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays a summary of all IPv4 routes:

```
Switch> display ip route summary
IPv4 routing table name is Default-IPv4-Routing-Table
IPv4 routing table maximum-paths : 32
Total number of IPv4 routes      : 12
Total number of IPv4 paths       : 13
Route Source   Networks
connected      4
static         1
ospf           5
bgp            2
Total          12
FIB            12

ECMP statistics (active in ASIC):
-----
Maximum IPv4 ECMP routes supported : 15872
Total number of IPv4 ECMP routes   : 1
Total number of IPv4 ECMP paths    : 2
Number of routes with 2 ECMP paths: 1
```

---

## display ip router-id vrf all

Displays the router ID.

### Syntax

**display ip router-id vrf all**

where:

| Parameter | Function  |
|-----------|---|
| vrf all   | Displays the router ID associated with all existing Virtual Routing and Forwarding (VRF) instances. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the router ID:

```
Switch> display ip router-id vrf all

VRF management
IP Router ID 10.241.41.21 (automatic)
```

---

## display ip static-route

Displays static IPv4 route information.

### Syntax

```
display ip static-route [[vrf {all|default|management}]  
database]
```

where:

| Parameter      | Function  |
|----------------|---|
| vrf all        | Displays static routes associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default    | Displays static routes associated with the default VRF instance.                          |
| vrf management | Displays static routes associated with the management VRF instance.                       |
| database       | Displays static routes stored in the IP routing table.                                    |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays static IPv4 routes:

```
Switch> display ip static-route  
IP Route Table for VRF "default"  
S      122.0.0.0/24 [1/0] via 11.0.0.10, Ethernet1/38  
  
Gateway of last resort is not set
```

---

## display ip slp information

Displays Service Location Protocol (SLP) information.

### Syntax

```
display ip slp information
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays SLP information:

```
Switch> display ip slp information
Protocol Version: 2
  SLP State: enabled
  SLP Listening Port: 427
  SLP listening on interface: 3, IP address: 10.240.157.48
```

---

## display ip slp user-agents

Displays the list of SLP known user agents.

**Note:** Up to eight known user agents can be configured.

### Syntax

```
display ip slp user-agents
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays SLP user agents information:

```
Switch> display ip slp user-agents
List of UAs:
    IP Address: 10.0.0.7 on port Ethernet1/11, updated 00:05:33 seconds
ago
```

---

## display ip slp counters

Displays Service Location Protocol (SLP) traffic statistics.

### Syntax

```
display ip slp counters
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays SLP traffic statistics:

```
Switch> display ip slp counters
SLP Send Counters      :      unicast      multicast
  SLP Da Adverts       :          0          0
  SLP Service Requests :          0          0
  SLP Service Replies  :          0          0
  SLP Service Ack      :          0          0
  SLP Attribute Requests :        0          0
  SLP Attribute Replies :          0          0
  SLP SrvType Requests :          0          0
  SLP Service Replies  :          0          0
  SLP Srv Registrations :          0          0
  SLP Srv Deregistrations:        0          0
  SLP SA Adverts       :          0          0
  SLP Unknown          :          0          0

  SLP Receive Counters :      unicast      multicast
  SLP Da Adverts       :          0          0
  SLP Service Requests :        448        698
  SLP Service Replies  :          0          0
  SLP Service Ack      :          0          0
  SLP Attribute Requests :          0          0
  SLP Attribute Replies :          0          0
  SLP SrvType Requests :          0          0
  SLP Service Replies  :          0          0
  SLP Srv Registrations :          0          0
  SLP Srv Deregistrations:        0          0
  SLP SA Adverts       :          0          0
  SLP Unknown          :          0          0

  Scopes mismatch      :          0          0
  Wrong destination    :          0          0
  Invalid packets      :          0          0
```



---

## display ip traffic

Displays IPv4 traffic statistics.

### Syntax

```
display ip traffic
```

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IPv4 traffic statistics:

```
Switch> display ip traffic
IP Software Processed Traffic Statistics
-----
Transmission and reception:
  Packets received:495983 sent:495545 forward:0      deliver:495983
  IpInHdrErrors      :0
  IpInAddrErrors    :0
  IpInUnknownProtos :0
  IpInDiscards      :0
  IpOutDiscards     :0
  IpOutNoRoutes     :62152

Fragmentation and reassembly
  Packets FragCreates :0      FragOKs :0      FragFails :0
  Packets ReasmRequests:0      ReasmOKs:0      ReasmFails:0

ICMP Software Processed Traffic Statistics
-----
Transmission:
  Packets sent      :16      echo:3      reply:5      error:0
Reception:
  Packets received:16      echo:5      reply:3      error:0
```

---

## display ip vrf

Displays Virtual Routing and Forwarding (VRF) instance information.

### Syntax

**display ip vrf** [*<VRF name>*]

where:

| Parameter       | Function                      |
|-----------------|-------------------------------|
| <i>VRF name</i> | The name of the VRF instance. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VRF instance information:

```
Switch> display ip vrf
VRF management, FIB ID 1
Router ID: 10.241.40.101 (automatic)
Interfaces:
  mgmt0
!
no VRF is defined.
```

---

## display ipv6 adjacency

Displays IPv6 adjacency information.

### Syntax

```
display ipv6 adjacency [<interface name>] <source IPv6 address> | detail |  
ethernet <chassis number/port number> | loopback <loopback interface> | mgmt  
<management interface> | port-aggregation <LAG number> | static | vlan  
<VLAN number> } [vrf {all | default | management}]
```

where:

| Parameter   | Function  |
|---|---|
| <i>interface name</i>                             | Displays IPv6 adjacency information for the specified interface by name.  |
| <i>source IPv6 address</i>                        | Displays IPv6 adjacency information for the specified IPv6 source address.  |
| <b>detail</b>                                     | Displays detailed IPv6 adjacency information.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays IPv6 adjacency information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays IPv6 adjacency information for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>           | Displays IPv6 adjacency information for the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays IPv6 adjacency information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>static</b>                                     | Displays IPv6 adjacency information for static routes.  |
| <b>vlan</b> <i>VLAN number</i>                    | Displays IPv6 adjacency information for the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <b>vrf all</b>                                    | Displays IPv6 adjacency information associated with any Virtual Routing and Forwarding (VRF) instance.  |
| <b>vrf default</b>                                | Displays IPv6 adjacency information associated with the default VRF instance.   |
| <b>vrf management</b>                             | Displays IPv6 adjacency information associated with the management VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv6 adjacency information:

```
Switch> display ipv6 adjacency
```

---

## display ipv6 adjacency summary

Displays a summary of IPv6 adjacencies.

### Syntax

```
display ipv6 adjacency summary [<interface name> | ethernet <chassis number/port number> | loopback <loopback interface> | mgmt <management interface> | port-aggregation <LAG number> | vlan <VLAN number>] [vrf {all | default | management}]
```

where:

| Parameter   | Function  |
|---|---|
| <i>interface name</i>                             | Displays IPv6 adjacency information for the specified interface by name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays IPv6 adjacency information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays IPv6 adjacency information for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>           | Displays IPv6 adjacency information for the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays IPv6 adjacency information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                    | Displays IPv6 adjacency information for the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <b>vrf all</b>                                    | Displays IPv6 adjacency information associated with any Virtual Routing and Forwarding (VRF) instance.  |
| <b>vrf default</b>                                | Displays IPv6 adjacency information associated with the default VRF instance.   |
| <b>vrf management</b>                             | Displays IPv6 adjacency information associated with the management VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays a summary of IPv6 adjacencies:

```
Switch> display ipv6 adjacency summary
```

---

## display ipv6 bgp

Displays IPv6 Border Gateway Protocol (BGP) route information.

### Syntax

```
display ipv6 bgp [<IPv6 network address>[/<prefix length>  
[longer-prefixes]]] [vrf {all|default}]
```

where:

| Parameter                   | Function  |
|-----------------------------|---|
| <i>IPv6 network address</i> | The IPv6 network address.   |
| <i>prefix length</i>        | The IPv6 network mask length.   |
| longer-prefixes             | Displays IPv6 BGP route information for the specified network and any subnetworks with a prefix length equal to or greater than the prefix specified. |
| vrf all                     | Displays IPv6 BGP route associated with any Virtual Routing and Forwarding (VRF) instance.  |
| vrf default                 | Displays IPv6 BGP route associated with the default VRF instance.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv6 BGP route information:

```
Switch> display ipv6 bgp

BGP routing table information for VRF default address family IPV6 unicast
BGP table version is 24, local router ID is 1.1.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i -
internal,
l - labeled
                S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete, |- multipath

   Network          Next Hop          Metric    LocPrf  Weight  Path
*> 3333::/64        ::
32768              ?
*> aaa1::/64        9000::2          100       0
300e
*> aaa2::/64        9000::2          1234           0
300i
*> 6666::/64        9000::2          0
300 {123}e

Total number of prefixes 4
MA_05#
```



---

## display ipv6 bgp dampening

Displays IPv6 Border Gateway Protocol (BGP) dampening information.

### Syntax

```
display ipv6 bgp dampening {dampened-paths|flap-statistics|
parameters}
```

where:

| Parameter       | Function                                      |
|-----------------|---|
| dampened-paths  | Displays all dampened paths.                  |
| flap-statistics | Displays flap statistics for IPv6 BGP routes. |
| parameters      | Displays all dampening parameters.            |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays all dampened paths:

```
Switch> display ipv6 bgp dampening dampened-paths
BGP routing table information for VRF default address family IPV6 unicast
BGP table version is 7, local router ID is 1.1.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i -
internal,
l - labeled
                S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete, |- multipath

   Network          Next Hop          Metric      LocPrf  Weight   Path
*d 6666::/64        9000::2
0          300e

Total number of prefixes 1
```

---

## display ipv6 bgp neighbors

Displays IPv6 Border Gateway Protocol (BGP) neighbors.

### Syntax

**display ipv6 bgp neighbors** <neighbor address>

where:

| Parameter               | Function                                      |
|-------------------------|---|
| <i>neighbor address</i> | The IPv4 or IPv6 address of the BGP neighbor. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IPv6 BGP neighbors:

```
Switch> display ipv6 bgp neighbors 9000::2

BGP neighbor is 9000::2, remote AS 300, local AS 400, external link
BGP version 4, remote router ID 7.5.0.16
BGP state = Established, up for 00:13:01
Last read 00:00:02, hold time is 90, keepalive interval is 30 seconds
Configured hold time is 15, keepalive interval is 5 seconds
Neighbor capabilities:
  Route refresh: advertised and received (new)
  4-Octet ASN Capability: advertised
  Address family IPv4 Unicast: received
  Address family IPv4 Multicast: received
  Address family IPv6 Unicast: advertised and received
Received 17010 messages, 0 notifications, 0 in queue
Sent 16965 messages, 8 notifications, 0 in queue
Route refresh request: received 0, sent 0
Minimum time between advertisement runs is 30 seconds
For address family: IPv6 Unicast
BGP table version 13, neighbor version 13
Index 2, Offset 0, Mask 0x4
Inbound path policy configured
Route map for incoming advertisements is *a
  1 accepted prefixes, maximum limit 6144
Threshold for warning message 75(%)
  0 announced prefixes
...
```

---

## display ipv6 bgp received-paths

Displays IPv6 Border Gateway Protocol (BGP) routes received from other neighbors.

### Syntax

```
display ipv6 bgp received-paths
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IPv6 BGP routes received from other neighbors:

```
Switch> display ipv6 bgp received-paths
BGP table version is 3, local router ID is 1.1.1.2
Status codes: s suppressed, d damped, h history, * valid, > best, i -
internal
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop          Metric      LocPrf   Weight   Path
*>i 6666::/64      9000::2           0           100      0       300i

Total number of prefixes 1
```

---

## display ipv6 bgp summary

Displays the status of all IPv6 Border Gateway Protocol (BGP) neighbors.

### Syntax

**display ipv6 bgp summary [vrf {all|default}]**

where:

| Parameter   | Function  |
|-------------|---|
| vrf all     | Displays BGP connection status for neighbors associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default | Displays BGP connection status for neighbors associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the connection status for all IPv6 BGP neighbors:

```
Switch> display ipv6 bgp summary
BGP router identifier 1.1.1.1, local AS number 400
BGP table version is 2
0 BGP AS-PATH entries
0 BGP community entries

Neighbor                               V    AS MsgRcv MsgSen
TblVer InQ 0
utQ Up/Down State/PfxRcd
2001::2                               4   400   70    72    2
0
  0 01:09:28      0
2020::2                               4   400    0     2    0
0
  0 00:00:41 OpenSent
9000::2                               4   400  142   140    2
0
  0 01:09:26      1

Total number of neighbors 3

Total number of Established sessions 2
```

---

## display ipv6 bgp unicast neighbors

Displays IPv6 unicast Border Gateway Protocol (BGP) neighbors.

### Syntax

```
display ipv6 bgp unicast neighbors [<neighbor address>
[advertised-routes|flap-statistics|received-routes]]
[vrf {all|default}]
```

where:

| Parameter               | Function  |
|-------------------------|---|
| <i>neighbor address</i> | The IPv4 or IPv6 address of the BGP neighbor.   |
| advertised-routes       | Displays BGP routes advertised to the specified neighbor.                                 |
| flap-statistics         | Displays flap statistics for the BGP routes received from the specified neighbor.         |
| received-routes         | Displays BGP routes received from the specified neighbor.                                 |
| vrf all                 | Displays BGP neighbors associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default             | Displays BGP neighbors associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv6 unicast BGP neighbors:

```
Switch> display ipv6 unicast bgp neighbors

BGP neighbor is 2001::2, remote AS 400, local AS 400, internal link
  BGP version 4, remote router ID 0.0.0.0
  BGP state = Active
  Last read 00:02:28, hold time is 180, keepalive interval is 60 seconds
  Received 71 messages, 1 notifications, 0 in queue
  Sent 73 messages, 0 notifications, 0 in queue
  Route refresh request: received 0, sent 0
  Minimum time between advertisement runs is 5 seconds
  Update source is loopback1
  For address family: IPv6 Unicast
  BGP table version 3, neighbor version 0
  Index 4, Offset 0, Mask 0x10
  Route-Reflector Client
  0 accepted prefixes, maximum limit 6144
  Threshold for warning message 75(%)
  0 announced prefixes

Connections established 1; dropped 1
  TTL: 255, TTL Security hops: 0
Next connect timer due in 12 seconds
Last Reset: 00:02:28, due to BGP Notification received
Notification Error Message: (Hold Timer Expired/Unspecified Error
Subcode)

Update packets: 0
Update packets dropped: 0
- Decode error drops: 0
- Internal error drops: 0

  For address family: IPv6 Unicast
Withdraw prefixes: 0
Withdraw prefixes dropped: 0
- Decode error drops: 0
- Internal error drops: 0
NLRI prefixes: 0
NLRI prefixes dropped: 0
- Decode error drops: 0
- Internal error drops: 0
- Route-map drops: 0
- Filter drops: 0
- AS-path loop drops: 0
- Route reflector drops: 0
- Next-hop drops: 0
- Other drops: 0
...
```

```
...
BGP neighbor is 2020::2, remote AS 400, local AS 400, internal link
  BGP version 4, remote router ID 1.1.1.2
  BGP state = OpenConfirm
  Last read 00:03:34, hold time is 180, keepalive interval is 60 seconds
  Received 1 messages, 0 notifications, 0 in queue
  Sent 5 messages, 0 notifications, 0 in queue
  Route refresh request: received 0, sent 0
  Minimum time between advertisement runs is 5 seconds
For address family: IPv6 Unicast
  BGP table version 3, neighbor version 0
  Index 10, Offset 1, Mask 0x4
  0 accepted prefixes, maximum limit 6144
  Threshold for warning message 75(%)
  0 announced prefixes

Connections established 0; dropped 0
  TTL: 255, TTL Security hops: 0
Local host: 2020::1, Local port: 43349
Foreign host: 2020::2, Foreign port: 179
Nexthop: 1.1.1.1
Nexthop global: 2020::1
Nexthop local: fe80::3a41:45ff:fe53:eeef
BGP connection: shared network

Update packets: 0
Update packets dropped: 0
  - Decode error drops: 0
  - Internal error drops: 0

For address family: IPv6 Unicast
Withdraw prefixes: 0
Withdraw prefixes dropped: 0
  - Decode error drops: 0
  - Internal error drops: 0
NLRI prefixes: 0
NLRI prefixes dropped: 0
  - Decode error drops: 0
  - Internal error drops: 0
  - Route-map drops: 0
  - Filter drops: 0
  - AS-path loop drops: 0
  - Route reflector drops: 0
  - Next-hop drops: 0
  - Other drops: 0
```

---

## display ipv6 bgp unicast neighbors routes

Displays IPv6 unicast Border Gateway Protocol (BGP) routes received or advertised to or from the specified neighbor.

### Syntax

```
display ipv6 bgp unicast neighbors <neighbor address> routes  
[advertised|dampened|received] [vrf {all|default}]
```

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>neighbor address</i> | The IPv4 or IPv6 address of the BGP neighbor.  |
| advertised              | Displays BGP routes advertised to the neighbor.  |
| dampened                | Displays dampened BGP routes received from the neighbor.   |
| received                | Displays BGP routes received from the neighbor.  |
| vrf all                 | Displays BGP routes for neighbors associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default             | Displays BGP routes for neighbors associated with the default VRF instance.                          |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays BGP routes received or advertised to or from the neighbor with IPv4 address 10.254.22.36:

```
Switch> display ipv6 bgp neighbors 10.254.22.36 routes
```



---

## display ipv6 dhcp relay

Displays Dynamic Host Configuration Protocol version 6 (DHCPv6) relay service configuration and statistics.

### Syntax

```
display ipv6 dhcp relay [address [interface {ethernet [<chassis number/port number>]}|vlan [<VLAN number>]}] [vrf {<VRF instance>|all|default}]
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| address                           | Displays configured DHCPv6 addresses.  |
| interface ethernet                | Displays configured DHCPv6 address on all ethernet interfaces.   |
| <i>chassis number/port number</i> | Displays configured DHCPv6 address on the specified ethernet interface. The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface vlan                    | Displays configured DHCPv6 addresses on all Virtual LAN (VLAN) interfaces.   |
| <i>VLAN number</i>                | Displays configured DHCPv6 addresses on the specified VLAN interface. The <i>VLAN number</i> is from 1 to 4094.  |
| vrf <i>VRF instance</i>           | Displays DHCPv6 information for the specified Virtual Routing and Forwarding (VRF) instance.   |
| vrf all                           | Displays DHCPv6 information for all the VRF instances.   |
| vrf default                       | Displays DHCPv6 information for the default VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the DHCPv6 configuration:

```
Switch> display ipv6 dhcp relay

DHCPv6 relay service is Enabled.
Helper addresses are configured on the following interfaces:
Interface          Relay Address          Output Interface
-----          -
Ethernet1/20      2004::101
Ethernet1/20      2005::4
Ethernet1/20      fe80::1234
Ethernet1/20      fe80::124              Vlan1
```

---

## display ipv6 forwarding

Displays IPv6 forwarding status.

### Syntax

```
display ipv6 forwarding
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IPv6 forwarding status:

```
Switch> display ipv6 forwarding  
IPv6 forwarding is on.
```

---

## display ipv6 interface

Displays IPv6 interface status and configuration settings.

### Syntax

**display ipv6 interface** {<interface name>|**ethernet** <chassis number/port number>|**loopback** <loopback interface>|**mgmt** <management interface>|**vlan** <VLAN number>} **brief**

where:

| Parameter   | Function   |
|---|--|
| <i>interface name</i>                             | The name of the interface.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays ethernet interface configuration information. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays loopback interface configuration information. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>           | Displays management interface configuration information. The <i>management interface</i> is 0.   |
| <b>vlan</b> <i>VLAN number</i>                    | Displays Virtual LAN (VLAN) interface configuration information. The <i>VLAN number</i> is from 1 to 4094.                                   |
| <b>brief</b>                                      | Displays a short interface configuration summary.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays interface configuration for management interface 0:

```
Switch> display ipv6 interface mgmt 0 brief

mgmt0                               [up/up]
fe80::aa97:dcff:fede:2500
```

---

## display ipv6 nd interface

Displays IPv6 neighbor discovery (ND) information for the specified interface.

### Syntax

```
display ipv6 nd interface [<interface name> | ethernet <chassis number/port number> | loopback <loopback interface> | mgmt <management interface> | port-aggregation <LAG number> | vlan <VLAN number>]
```

where:

| Parameter   | Function   |
|---|--|
| <i>interface name</i>                             | The name of the interface.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays neighbor discovery (ND) information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays neighbor discovery (ND) information for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>           | Displays neighbor discovery (ND) information for the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays neighbor discovery (ND) information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 0 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                    | Displays neighbor discovery (ND) information for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv6 ND information for all interfaces:

```
Switch> display ipv6 nd interface

Interface mgmt0, Interface status: protocol-up/link-up/admin-up
IPv6 address: fe80::aa97:dcff:fede:2500
IPv6 interface DAD attempts: 1
ICMPv6 active timers:
  Last Router-Advertisement sent: never
  Next Router-Advertisement sent in: 0 secs
Router-Advertisement parameters:
  Suppress RAs: true
  Periodic interval: 0 secs
  Minimum interval: 198 secs
  Maximum interval: 600 secs
  Send 'Managed Address Configuration' flag: false
  Send 'Other Configuration' flag: false
  Send 'Current Hop Limit' field: 64 hops
  Send 'MTU' option value: 1500 bytes
  Send 'Router Lifetime' field: 1800 secs
  Send 'Reachable Time' field: 0 ms
  Send 'Retrans Timer' field: 0 ms
Prefix parameters:
  Valid-lifetime: 2592000, preferred-lifetime: 604800
  Off-link flag: false, no-autoconf flag: false
  Advertised prefixes:
Neighbor-Solicitation parameters:
  NS retransmit interval: 1 sec
ICMPv6 error message parameters:
  Send redirects: true
```

---

## display ipv6 neighbor

Displays IPv6 neighbor information.

### Syntax

```
display ipv6 neighbor [<interface name> | <neighbor address> | detail |  
ethernet <chassis number/port number> | loopback <loopback interface> |  
mgmt <management interface> | port-aggregation <LAG number> | static |  
vlan <VLAN number>] [vrf {all | default | management}]
```

where:

| Parameter   | Function   |
|---|--|
| <i>interface name</i>                             | Displays information for IPv6 neighbors on the specified interface by name.  |
| <i>neighbor address</i>                           | Displays IPv6 information for the specified neighbor in IPv6 address format.   |
| <b>detail</b>                                     | Displays detailed IPv6 neighbor information.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays information about IPv6 neighbors on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays information about IPv6 neighbors on the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>           | Displays information about IPv6 neighbors on the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays information about IPv6 neighbors on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 0 to 4096.                                    |
| <b>static</b>                                     | Displays information for static IPv6 neighbors.  |
| <b>vlan</b> <i>VLAN number</i>                    | Displays information about IPv6 neighbors on the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| <b>vrf all</b>                                    | Displays information for IPv6 neighbors associated with any Virtual Routing and Forwarding (VRF) instance.   |
| <b>vrf default</b>                                | Displays information for IPv6 neighbors associated with the default VRF instance.  |
| <b>vrf management</b>                             | Displays information for IPv6 neighbors associated with the management VRF instance.   |

## Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv6 neighbor information:

```
Switch> display ipv6 neighbor

R - Reachable, I - Incomplete, S - Stale, F - Failed, P - Probe,
D - Delay, PR - Permanent

Flags: (D) - Static neighbors attached to down interface
Flags: (N) - Static neighbors with null phy interface

IPv6 Neighbor Table for context default
Total number of entries:2
Address                Age          MAC Address      Source  Interface  State
2004::101              00:00:06    0000.34b0.73ec  icmpv6  Ethernet1/20  R
fe80::200:34ff:feb0:73ec 00:00:01    0000.34b0.73ec  icmpv6  Ethernet1/20  D
```



---

## display ipv6 neighbor summary

Displays summary adjacency information about the specified IPv6 neighbor.

### Syntax

```
display ipv6 neighbor summary [<interface name> | ethernet <chassis number/port number> | loopback <loopback interface> | mgmt <management interface> | port-aggregation <LAG number> | vlan <VLAN number>] [vrf {all | default | management}]
```

where:

| Parameter   | Function   |
|---|--|
| <i>interface name</i>                             | Displays summary adjacency information about IPv6 neighbors on the specified interface by name.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays summary adjacency information about IPv6 neighbors on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays summary adjacency information about IPv6 neighbors on the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>           | Displays summary adjacency information about IPv6 neighbors on the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays summary adjacency information about IPv6 neighbors on the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 0 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                    | Displays summary adjacency information about IPv6 neighbors on the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| <b>vrf all</b>                                    | Displays summary adjacency information for neighbors associated with any Virtual Routing and Forwarding (VRF) instance.  |
| <b>vrf default</b>                                | Displays summary adjacency information for neighbors associated with the default VRF instance.   |
| <b>vrf management</b>                             | Displays summary adjacency information for neighbors associated with the management VRF instance.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays summary IPv6 neighbor adjacency information:

```
Switch> display ipv6 neighbor summary

IPv6 Neighbors Table - Adjacency Summary

Resolved   : 2
Incomplete : 0
Unknown    : 0
Total      : 2
```

---

## display ipv6 prefix-list

Displays IPv6 prefix list information and statistics.

### Syntax

```
display ipv6 prefix-list [detail <prefix list name>|summary <prefix list name>|<prefix list name> [<IPv6 address/prefix length> [first-match |longer]|seq <sequence number>]]
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <i>prefix list name</i>           | The name of the prefix list.   |
| <i>IPv6 address/prefix length</i> | Displays the entries of the prefix list that match the specified IPv6 address and network mask length.                                   |
| <b>first-match</b>                | Displays the first entry of the prefix list that match the specified IPv6 address and network mask length.                               |
| <b>longer</b>                     | Displays all entries of the prefix list that are more specific than the selected IPv6 address and network mask length.                   |
| <b>seq</b> <i>sequence number</i> | Displays the entry with the specified sequence number from the selected prefix list. The <i>sequence number</i> is from 1 to 4294967295. |
| <b>detail</b>                     | Displays detailed IPv6 prefix list information.  |
| <b>summary</b>                    | Displays a summary of all IPv6 prefix lists.   |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IPv6 prefix list information and statistics:

```
Switch# display ipv6 prefix-list  
  
ipv6 prefix-list aaaa: 1 entries  
    seq 5 deny 2003::/64 le 128
```

---

## display ipv6 route

Displays the IPv6 routing table.

### Syntax

```
display ipv6 route [vrf {all|default|management}] [<route address> [<prefix length>] |all|bgp|connected|next-hop <next-hop address> |static]
```

where:

| Parameter                        | Function   |
|----------------------------------|--|
| vrf all                          | Displays the IPv6 routing table associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default                      | Displays the IPv6 routing table associated with the default VRF instance.                          |
| vrf management                   | Displays the IPv6 routing table associated with the management VRF instance.                       |
| <i>route address</i>             | The IPv6 address of the route.   |
| <i>prefix length</i>             | The length of the IPv6 network mask.   |
| all                              | Displays all IPv6 routes.  |
| bgp                              | Displays only Border Gateway Protocol (BGP) routes.  |
| connected                        | Displays only directly connected routes.   |
| next-hop <i>next-hop address</i> | Displays only routes with the specified next hop address in IPv6 address format.                   |
| static                           | Displays only static routes.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the IPv6 routing table:

```
Switch> display ipv6 route

IPv6 Routing Table
Codes: C - connected, S - static, R - RIP, O - OSPF
       IA - OSPF inter area, E1 - OSPF external type 1,
       E2 - OSPF external type 2, B - BGP
Timers: Uptime

IP Route Table for VRF "default"
C      2001::/64 via ::, Vlan1, 01:14:21
C      2004::/64 via ::, Ethernet1/20, 01:53:25
C      fe80::/64 via ::, Vlan1, 02:01:50
C      fe80::/64 via ::, Ethernet1/20, 02:01:50
```

---

## display ipv6 route database

Displays the IPv6 routing table database.

### Syntax

```
display ipv6 route [vrf {all|default|management}] database  
[all|bgp|connected|static]
```

where:

| Parameter      | Function  |
|----------------|---|
| vrf all        | Displays the IPv6 routing table database associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default    | Displays the IPv6 routing table database associated with the default VRF instance.                          |
| vrf management | Displays the IPv6 routing table database associated with the management VRF instance.                       |
| all            | Displays all IPv6 routes.   |
| bgp            | Displays only Border Gateway Protocol (BGP) routes.   |
| connected      | Displays only directly connected routes.  |
| static         | Displays only static routes.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv6 routing table database:

```
Switch> display ipv6 route database

IPv6 Routing Table
Codes: C - connected, S - static, R - RIP, O - OSPF,
      IA - OSPF inter area, E1 - OSPF external type 1,
      E2 - OSPF external type 2, B - BGP
      > - selected route, * - FIB route, p - stale info
Timers: Uptime

IP Route Table for VRF "default"
C   *> 2001::/64 via ::, Vlan1, 01:14:29
C   *> 2004::/64 via ::, Ethernet1/20, 01:53:33
C   *> fe80::/64 via ::, Vlan1, 01:14:29
C   *> fe80::/64 via ::, Ethernet1/20, 01:53:33
```

---

## display ipv6 route interface

Displays IP routing table for the specified interface.

### Syntax

```
display ipv6 route [vrf {all|default|management}] interface
{<interface name>|ethernet <chassis number/port number>|loopback <loopback
interface>|mgmt <management interface>|port-aggregation <LAG number>|
vlan <VLAN number>}
```

where:

| Parameter                           | Function   |
|-------------------------------------|--|
| vrf all                             | Displays the IPv6 routing table associated with any Virtual Routing and Forwarding (VRF) instance.   |
| vrf default                         | Displays the IPv6 routing table associated with the default VRF instance.  |
| vrf management                      | Displays the IPv6 routing table associated with the management VRF instance.   |
| interface name                      | Displays IPv6 routes for the specified interface by name.  |
| ethernet chassis number/port number | Displays IPv6 routes for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| loopback loopback interface         | Displays IPv6 routes for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| mgmt management interface           | Displays IPv6 routes for the specified management interface. The <i>management interface</i> is 0.   |
| port-aggregation LAG number         | Displays IPv6 routes for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| vlan VLAN number                    | Displays IPv6 routes for the specified Virtual LAN (VLAN) interface. The <i>VLAN number</i> is from 1 to 4094.                                   |

### Modes

- User EXEC mode
- Privileged EXEC mode



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the IPv6 routing table for ethernet interface 1/12:

```
Switch> display ipv6 route interface ethernet 1/12
```

---

## display ipv6 route summary

Displays a summary of all IPv6 routes.

### Syntax

**display ipv6 route summary [vrf {all|default|management}]**

where:

| Parameter      | Function   |
|----------------|--|
| vrf all        | Displays a summary of IPv6 routes associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default    | Displays a summary of IPv6 routes associated with the default VRF instance.                          |
| vrf management | Displays a summary of IPv6 routes associated with the management VRF instance.                       |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays a summary of all IPv6 routes:

```
Switch> display ipv6 route summary

IPv6 routing table name is Default-IPv6-Routing-Table
IPv6 routing table maximum-paths   : 32
Total number of IPv6 routes        : 2
Total number of IPv6 paths         : 2
Route Source   Networks
connected      2
Total          2
FIB            2

ECMP statistics (active in ASIC):
-----
Maximum IPv6 ECMP routes supported : 6144
Total number of IPv6 ECMP routes   : 0
Total number of IPv6 ECMP paths    : 0
```

---

## display ipv6 static-route

Displays static IPv6 route information.

### Syntax

```
display ipv6 static-route [[vrf {all|default|management}]  
database]
```

where:

| Parameter      | Function   |
|----------------|--|
| vrf all        | Displays static IPv6 routes associated with any Virtual Routing and Forwarding (VRF) instance. |
| vrf default    | Displays static IPv6 routes associated with the default VRF instance.                          |
| vrf management | Displays static IPv6 routes associated with the management VRF instance.                       |
| database       | Displays static IPv6 routes stored in the IPv6 routing table.                                  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays static IPv6 routes:

```
Switch> display ipv6 static-route  
  
IP Route Table for VRF "default"  
S      4000::/64 [1/0] via 2004::101, Ethernet1/20, 00:00:03
```

---

## display ipv6 traffic

Displays IPv6 traffic statistics.

### Syntax

```
display ipv6 traffic
```

### Modes

- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IPv6 traffic statistics:

```
Switch# display ipv6 traffic
```

---

## display lacp counters

Displays Link Aggregation Control Protocol (LACP) statistics.

### Syntax

**display lacp counters** [**interface port-aggregation** <LAG number>]

where:

| Parameter  | Function   |
|--|--|
| interface<br>port-aggregation<br>LAG number or range | Displays LACP statistics for the specified Link Aggregation Group (LAG). The LAG number is from 1 to 4096. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LACP statistics:

```
Switch> display lacp counters
```

| Port         | LACPDUs |      | Marker |      | Marker Response |      | LACPDUs |     |
|--------------|---------|------|--------|------|-----------------|------|---------|-----|
|              | Sent    | Recv | Sent   | Recv | Sent            | Recv | Pkts    | Err |
| -----        |         |      |        |      |                 |      |         |     |
| po1000       |         |      |        |      |                 |      |         |     |
| Ethernet1/1  | 31      | 31   | 0      | 0    | 0               | 0    | 0       | 0   |
| Ethernet1/2  | 32      | 31   | 0      | 0    | 0               | 0    | 0       | 0   |
| po2000       |         |      |        |      |                 |      |         |     |
| Ethernet1/9  | 35      | 36   | 0      | 0    | 0               | 0    | 0       | 0   |
| Ethernet1/10 | 36      | 34   | 0      | 0    | 0               | 0    | 0       | 0   |
| Ethernet1/11 | 42      | 37   | 0      | 0    | 0               | 0    | 0       | 0   |
| Ethernet1/12 | 41      | 36   | 0      | 0    | 0               | 0    | 0       | 0   |

---

## display lacp interface ethernet

Displays Link Aggregation Control Protocol (LACP) interface configuration.

### Syntax

**display lacp interface ethernet** <*chassis number/port number*>

where:

| Parameter                         | Function  |
|-----------------------------------|---|
| <i>chassis number/port number</i> | Displays LACP information for the specified ethernet interface. The <i>chassis number</i> is 1. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays LACP configuration for ethernet interface 1/12:

```
Switch> display lacp interface ethernet 1/9

% Interface Ethernet1/9 is up
% Aggregation-group is 2000 port-aggregation is po2000
% PDUs sent: 374
% PDUs rcvd: 375
% Markers sent: 0
% Markers rcvd: 0
% Markers response sent: 0
% Markers response rcvd: 0
% Unknown packets rcvd: 0
% Lag Id: [(8000, a8-97-dc-f7-d5-00, 07d0, 8000, 005a),(8000,
08-17-f4-c3-df-00,
0040, 8000, 005a)]
% Local Port: Ethernet1/9 MAC Address=a8-97-dc-f7-d5-00
% System Identifier=0x8000, a8-97-dc-f7-d5-00
% Port Identifier=0x8000, 0x005a
% Operational key=2000
% LACP_Activity=Active
% LACP_Timeout=Long Timeout (30s)
% Synchronization=IN_SYNC
% Collecting=True
% Distributing=True
% Actor Admin State=(ACT:1 TIM:0 AGG:1 SYN:0 COL:0 DIS:0 DEF:1 EXP:0)
% Actor Oper State=(ACT:1 TIM:0 AGG:1 SYN:1 COL:1 DIS:1 DEF:0 EXP:0)
% Neighbor: 90 MAC Address=08-17-f4-c3-df-00
% System Identifier=0x8000, 08-17-f4-c3-df-00
% Port Identifier=0x8000, 0x005a
% Operational key=64
% LACP_Activity=Active
% LACP_Timeout=Long Timeout (30s)
% Synchronization=IN_SYNC
% Collecting=True
% Distributing=True
% Partner Admin State=(ACT:0 TIM:0 AGG:1 SYN:0 COL:0 DIS:0 DEF:1 EXP:0)
% Partner Oper State=(ACT:1 TIM:0 AGG:1 SYN:1 COL:1 DIS:1 DEF:0 EXP:0)
```

---

## display lacp internal event-history

Displays Link Aggregation Control Protocol (LACP) event logs.

### Syntax

```
display lacp internal event-history {buffer-size all|errors|  
interface {ethernet <chassis number/port number>|port-aggregation  
<LAG number or range>}|msgs}
```

where:

| Parameter   | Function   |
|---|--|
| buffer-size all   | Displays the buffer size for all types of LACP events.   |
| errors  | Displays LACP error logs.  |
| interface ethernet<br><i>chassis number/port<br/>number</i> | Displays LACP event logs for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface<br>port-aggregation<br><i>LAG number or range</i> | Displays LACP event logs for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| msgs  | Displays LACP message logs.  |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |



## Example

The following command displays LACP message logs:

```
Switch> display lacp internal event-history msgs

Event: MESSAGES, length:77, at 884329 usecs after Fri Jan 8 04:58:39 2016
[mgmt0] @ lacp_nsm_rcv_interface_add(79):
[MSG_RECV]: Add interface mgmt0

Event: MESSAGES, length:77, at 884558 usecs after Fri Jan 8 04:58:39 2016
[Vlan1] @ lacp_nsm_rcv_interface_add(79):
[MSG_RECV]: Add interface Vlan1

Event: MESSAGES, length:89, at 884654 usecs after Fri Jan 8 04:58:39 2016
[Ethernet1/1] @ lacp_nsm_rcv_interface_add(79):
[MSG_RECV]: Add interface Ethernet1/1

Event: MESSAGES, length:89, at 884768 usecs after Fri Jan 8 04:58:39 2016
[Ethernet1/2] @ lacp_nsm_rcv_interface_add(79):
[MSG_RECV]: Add interface Ethernet1/2

Event: MESSAGES, length:89, at 884871 usecs after Fri Jan 8 04:58:39 2016
[Ethernet1/3] @ lacp_nsm_rcv_interface_add(79):
[MSG_RECV]: Add interface Ethernet1/3

Event: MESSAGES, length:89, at 884972 usecs after Fri Jan 8 04:58:39 2016
[Ethernet1/4] @ lacp_nsm_rcv_interface_add(79):
[MSG_RECV]: Add interface Ethernet1/4
...
```

The following command displays LACP buffer size:

```
Switch> display lacp internal event-history buffer-size all

Name      Current      Max
ERRORS    0            8388608
MESSAGES  17589       8388608
EVENT_SM  0            8388608
```

---

## display lacp internal info

Displays Link Aggregation Control Protocol (LACP) internal information.

### Syntax

```
display lacp internal info {aggregator|all|interface  
{ethernet <chassis number/port number>|port-aggregation <LAG number or  
range> [detail fsmlog|mem-dump]}}
```

where:

| Parameter   | Function   |
|---|--|
| aggregator  | Displays information about the LACP aggregator.  |
| all   | Displays all LACP internal information.  |
| interface ethernet<br><i>chassis number/port<br/>number</i> | Displays LACP internal information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface<br>port-aggregation<br><i>LAG number or range</i> | Displays LACP internal information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| detail fsmlog   | Displays detailed LACP state-machine information.  |
| mem-dump  | Displays LACP memory dump information.   |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays LACP internal aggregator information:

```
Switch> display lacp internal info aggregator

Static and None Aggregator:
  Aggregator po100, member num 2
    Member interface Ethernet1/49 ,locates at 0.
    Member interface Ethernet1/50 ,locates at 1.
  Aggregate po100's vLAG configuration
    vLAG global enable = True
    vLAG instance id = 0
    vLAG instance enable = False
    vLAG tier id = 0
    vLAG's LACP actor system mac = 0x00:00:00:00:00:00
    vLAG's LACP partner key = 0x0
    vLAG's LACP partner priority = 0x0
    vLAG's LACP partner system mac = 0x00:00:00:00:00:00
    vLAG's LACP actor priority = 0x0

  Aggregator po1000, member num 2
    Member interface Ethernet1/1 ,locates at 0.
    Member interface Ethernet1/2 ,locates at 1.
  Aggregate po1000's vLAG configuration
    vLAG global enable = True
    vLAG instance id = 1
    vLAG instance enable = True
    vLAG tier id = 1
    vLAG's LACP actor system mac = 0x08:17:f4:c3:dd:01
    vLAG's LACP partner key = 0x0
    vLAG's LACP partner priority = 0x0
    vLAG's LACP partner system mac = 0x00:00:00:00:00:00
    vLAG's LACP actor priority = 0x0

  Aggregator po2000, member num 4
    Member interface Ethernet1/9 ,locates at 0.
    Member interface Ethernet1/10 ,locates at 1.
    Member interface Ethernet1/11 ,locates at 2.
    Member interface Ethernet1/12 ,locates at 3.
  Aggregate po2000's vLAG configuration
    vLAG global enable = True
    vLAG instance id = 64
    vLAG instance enable = True
    vLAG tier id = 1
    vLAG's LACP actor system mac = 0x08:17:f4:c3:dd:01
    vLAG's LACP partner key = 0x0
    vLAG's LACP partner priority = 0x0
    vLAG's LACP partner system mac = 0x00:00:00:00:00:00
    vLAG's LACP actor priority = 0x0

LACP Aggregator:
```

---

## display lacp min-links

Displays Link Aggregation Control Protocol (LACP) minimum links information.

### Syntax

**display lacp min-links** [**interface port-aggregation** <LAG number>]

where:

| Parameter                         | Description   |
|-----------------------------------|---|
| <b>interface port-aggregation</b> | Displays LACP minimum links information for the specified Link Aggregation Group (LAG). |
| <i>LAG number</i>                 | The <i>LAG number</i> is an integer from 1 to 4096.                                     |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command LACP minimum links information:

```
Switch> display lacp min-links
```

---

## display lacp neighbor

Displays Link Aggregation Control Protocol (LACP) neighbor information.

### Syntax

```
display lacp neighbor [interface port-aggregation <LAG number>]
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <b>interface port-aggregation</b> | Displays LACP neighbor information for the specified Link Aggregation Group (LAG). |
| <i>LAG number</i>                 | The <i>LAG number</i> is an integer from 1 to 4096.                                |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LACP neighbor information:

```
Switch> display lacp neighbor

Flags: S - Device is sending Slow LACPDUs F - Device is sending Fast LACPDUs
       A - Device is in Active mode       P - Device is in Passive mode
po1000 neighbors
Partner's information
  Partner          Partner          Partner          Partner
Port   System ID   Port Number   Age   Flags
Ethernet1/1 32768,74-99-75-d3-ce-00 0x1         453   SA

          LACP Partner          Partner          Partner
          Port Priority          Oper Key          Port State
          32768                  0x3e8             0x3d

Partner's information
  Partner          Partner          Partner          Partner
Port   System ID   Port Number   Age   Flags
Ethernet1/2 32768,74-99-75-d3-ce-00 0x2         453   SA

          LACP Partner          Partner          Partner
          Port Priority          Oper Key          Port State
          32768                  0x3e8             0x3d

...
```

---

## display lacp nsm internal info

Displays Link Aggregation Control Protocol (LACP) Network Service Module (NSM) information.

### Syntax

```
display lacp nsm internal info {global|interface {ethernet  
<chassis number/port number>|port-aggregation <LAG number or range>}  
{aggregation|nsm [mem-dump]}}
```

where:

| Parameter   | Function   |
|---|--|
| global  | Displays LACP NSM global information.  |
| interface ethernet<br><i>chassis number/port<br/>number</i> | Displays LACP NSM information for the specified ethernet interface. The <i>chassis number</i> is 1.                    |
| interface<br>port-aggregation<br><i>LAG number or range</i> | Displays LACP NSM information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096. |
| aggregation   | Displays LACP aggregation information.   |
| nsm   | Displays LACP NSM information.   |
| mem-dump  | Displays LACP NSM memory dump information.   |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LACP NSM information:

```
Switch> display lacp nsm internal info global  
  
System allows the maximum number is 72 for aggregator  
Aggregator allows the largest member number is 32  
System has 1 aggregator(s)
```

**Note:** The command display output differs depending on the switch type.

---

## display lacp port-aggregation

Displays Link Aggregation Control Protocol (LACP) Link Aggregation Groups (LAGs) information.

### Syntax

**display lacp port-aggregation [interface port-aggregation <LAG number or range>]**

where:

| Parameter  | Function   |
|--|--|
| interface port-aggregation<br><i>LAG number or range</i> | Displays LACP information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LACP LAG information:

```
Switch> display lacp port-aggregation

po1000
  System Mac=a8-97-dc-dd-ed-00
  Local System Identifier=0x8000,a8-97-dc-dd-ed-00
  Admin key=0x3e8
  Operational key=0x3e8
  Partner System Identifier=0x8000,74-99-75-d3-ce-00
  Operational key=0x3e8
  Max delay=5
  Aggregate or individual=0(aggregate)
  Member Port List=1,2
po2000
  System Mac=a8-97-dc-dd-ed-00
  Local System Identifier=0x8000,a8-97-dc-dd-ed-00
  Admin key=0x7d0
  Operational key=0x7d0
  Partner System Identifier=0x8000,08-17-f4-c3-df-00
  Operational key=0x40
  Max delay=5
  Aggregate or individual=0(aggregate)
  Member Port List=9,10,11,12
```

---

## display lacp system-identifier

Displays the switch Link Aggregation Control Protocol (LACP) system identifier.

### Syntax

```
display lacp system-identifier
```

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the switch LACP system identifier:

```
Switch> display lacp system-identifier
% System 32768, a8-97-dc-de-25-00
```



---

## display license

Displays information about Feature on Demand (FoD) license files.

### Syntax

**display license** {<FoD license>|**brief**|**host-id**}

where:

| Parameter          | Function  |
|--------------------|---|
| <i>FoD license</i> | The name of the FoD license file.               |
| <b>brief</b>       | Displays a short FoD license summary.           |
| <b>host-id</b>     | Displays the host ID for the FoD license files. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the host ID for the FoD license files:

```
Switch> display license host-id  
System serial number: Y052MV4CR026
```

---

## display lldp interface

Displays Link Layer Discovery Protocol (LLDP) interface configuration.

### Syntax

```
display lldp interface {all|ethernet <chassis number/port number>|mgmt <management interface>}
```

where:

| Parameter                                  | Function  |
|--|---|
| all  | Displays LLDP configuration for all interfaces.   |
| ethernet <i>chassis number/port number</i> | Displays LLDP configuration for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| mgmt <i>management interface</i>           | Displays LLDP configuration for the specified management interface. The <i>management interface</i> is 0.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LLDP configuration for management interface 0:

```
Switch> display lldp interface mgmt 0  
  
Interface Name: mgmt0  
-----  
Interface Information  
Enable (tx/rx/trap): Y/Y/N   Port Mac address: a8:97:dc:de:25:00
```

---

## display lldp internal event-history

Displays Link Layer Discovery Protocol (LLDP) event logs.

### Syntax

```
display lldp internal event-history {buffer-size all|{errors|event|msgs|trace} interface ethernet <chassis number/port number>}
```

where:

| Parameter   | Function   |
|---|--|
| buffer-size all   | Displays the LLDP buffer size for all types of events.   |
| errors  | Displays the LLDP error logs.  |
| event   | Displays the LLDP event logs.  |
| msgs  | Displays the LLDP message logs.  |
| trace   | Displays the LLDP trace logs.  |
| interface ethernet<br><i>chassis number/port<br/>number</i> | Displays LLDP logs for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LLDP buffer size:

```
Switch> display lldp internal event-history buffer-size all
```

| Name   | Current | Max    |
|--------|---------|--------|
| errors | 279     | 16384  |
| msgs   | 16374   | 16384  |
| trace  | 130943  | 131072 |
| event  | 16367   | 16384  |

The following command displays LLDP error logs for ethernet interface 1/12:

```
Switch> display lldp internal event-history errors interface ethernet  
1/12  
  
Event: errors, length:66, at 234001 usecs after Fri Jan 8 04:58:40 2016  
[GLOBAL] @{{lldp_mgmt_rcv:711}  
receive failed (-1) on 0x3(mgmt0)  
  
Event: errors, length:66, at 93092 usecs after Fri Jan 8 09:39:43 2016  
[GLOBAL] @{{lldp_mgmt_rcv:711}  
receive failed (-1) on 0x3(mgmt0)
```

---

## display lldp internal info

Displays Link Layer Discovery Protocol (LLDP) internal information.

### Syntax

```
display lldp internal info {global|interface {all|ethernet  
<chassis number/port number>}|mgmt <management interface>}|neighbors}
```

where:

| Parameter   | Function   |
|---|--|
| global  | Displays global LLDP internal information.   |
| interface all   | Displays LLDP internal information for all interfaces.   |
| interface ethernet<br><i>chassis number/port number</i> | Displays LLDP internal information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface mgmt<br><i>management interface</i>           | Displays LLDP internal information for the specified management interface. The <i>management interface</i> is 0.   |
| neighbors   | Displays LLDP internal neighbor information.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays global LLDP internal information:

```
Switch> display lldp internal info global

sockfd                               :10
lldp_rcv_thread                       :0x10347ff0
lldp_if_list                          :0x1033b4f0
lldp_mgmt_if_list                     :0x1033b6d8
if_cnt                                :0
syscap                                :0x7
sys_cap_enabled                       :0x14
lldp_stats_rem_drops                  :0
lldp_stats_rem_inserts                :1
lldp_stats_rem_deletes                :0
sys_name                              :LENOVO G8272
sys_descr                             :LENOVO RackSwitch G8272, LENOVO
Networking
  OS version 10.1.1.0
lldp_stats_rem_last_change_time       :69
lldp_dest_addr                        :0180-c200-000e
lldp_ntfy_interval                    :5
mgmt_addr                             :0.0.0.0
conf_flag                             :0
```

---

## display lldp neighbors

Displays Link Layer Discovery Protocol (LLDP) neighbor information.

### Syntax

**display lldp neighbors** [**interface {ethernet** *<chassis number/port number>* | **mgmt** *<management interface>*}] [**detail**]

where:

| Parameter   | Function   |
|---|--|
| <b>interface ethernet</b> <i>chassis number/port number</i> | Displays LLDP information for neighbors on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>interface mgmt</b> <i>management interface</i>           | Displays LLDP information for neighbors on the specified management interface. The <i>management interface</i> is 0.   |
| <b>detail</b>   | Displays detailed LLDP neighbor information.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LLDP neighbor information:

```
Switch> display lldp neighbors
```

---

## display lldp timers

Displays Link Layer Discovery Protocol (LLDP) timer information.

### Syntax

```
display lldp timers
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LLDP timers:

```
Switch> display lldp timers

LLDP Timers:

Holdtime in seconds: 120
Reinit-time in seconds: 2
Transmit interval in seconds: 30
Transmit delay in seconds: 2
Trap interval in seconds: 5
```



---

## display lldp tlv-select

Displays the selected Link Layer Discovery Protocol (LLDP) type-length-value (TLV) structures.

### Syntax

```
display lldp tlv-select [interface {ethernet <chassis number/port number>|mgmt <management interface>}]
```

where:

| Parameter  | Function   |
|--|--|
| <code>interface ethernet</code><br><i>chassis number/port number</i> | Displays the selected LLDP TLVs on the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <code>interface mgmt</code><br><i>management interface</i>           | Displays the selected LLDP TLVs on the specified management interface. The <i>management interface</i> is 0.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the selected LLDP TLVs on management interface 0:

```
Switch> display lldp tlv-select interface mgmt 0

Interface information: mgmt0
  management-address
  port-description
  port-vlan
  system-capabilities
  system-description
  system-name
```

---

## display lldp traffic

Displays Link Layer Discovery Protocol (LLDP) traffic statistics, including the number of transmitted or discarded messages.

### Syntax

**display lldp traffic** [**interface** {**ethernet** <*chassis number/port number*>|**mgmt** <*management interface*>}]

where:

| Parameter  | Function   |
|--|--|
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Displays LLDP traffic statistics for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>interface mgmt</b><br><i>management interface</i>           | Displays LLDP traffic statistics for the specified management interface. The <i>management interface</i> is 0.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LLDP traffic statistics:

```
Switch> display lldp traffic

LLDP traffic statistics:

Total frames transmitted: 80816
Total entries aged: 0
Total frames received: 80797
Total frames received in error: 0
Total frames discarded: 0
Total unrecognized TLVs: 0
```

---

## display logging console

Displays the console logging configuration, including the administrative status (enabled/disabled), the severity level and console flood control operational status. The flood control can be enabled, or disabled, by the user by typing CTRL-C consecutively three within a 3 seconds time window. When flood control is enabled, logging to the console is suspended.

### Syntax

**display logging console**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the console logging configuration:

```
Switch> display logging console

Logging console:           enabled (Severity: informational)
Console flood control:     disabled
```

---

## display logging info

Displays logging configuration, including console, monitor, server, log file, time stamp and severity levels configured for each facility.

### Syntax

**display logging info**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays logging information:

```
Switch> display logging info

Logging console:           enabled (Severity: debugging)
Console flood control:    disabled
Logging monitor:         enabled (Severity: notifications)
Logging monitor session:  0 session disabled, 1 sessions enabled
Logging timestamp:       seconds
Logging throttling:      disabled
Logging logfile:         enabled
                        Name - messages: Severity - information Size - 10485760
Logging server:          disabled

Facility      Default Severity      Current Session Severity
-----
aaa           5                       5
bgp           5                       7
chassisd     5                       5
clid         5                       5
dhcp-snp     5                       5
ecp          6                       6
hostmib      6                       6
hostp        5                       5
hsl          3                       3
imi          6                       6
imish        6                       6
khs1         6                       6
l2mrib       5                       5
lACP         5                       5
lldp         5                       5
memmon       6                       6
...
```

---

## display logging last

Displays the most recent lines in the logging file.

### Syntax

**display logging last** <number of lines> [**tail**]

where:

| Parameter              | Function   |
|------------------------|--|
| <i>number of lines</i> | The number of lines to be displayed. The <i>number of lines</i> is from 1 to 9999.   |
| <b>tail</b>            | The display will be updated as new lines are added to the logging file. Press <b>&lt;CTRL + C&gt;</b> to quit the display. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the most recent 10 lines in the logging file:

```
Switch> display logging last 10

79844 2017-05-18T18:07:16+00:00 V0_31(cnos:data) %BGP-5-STATE_CHANGE:
100.0.0.1- [FSM] State Change: Idle(1)

79845 2017-05-18T18:07:21+00:00 V0_31(cnos:data) %BGP-5-STATE_CHANGE:
100.0.0.1- [FSM] State Change: Established(6)

79846 2017-05-19T10:56:16+00:00 V0_31(cnos:data) %IMI-5-USER_LOGIN: User
admin logged in with /dev/pts/0 from 10.72.97.162 via telnet,
authenticated by LOCAL

79847 2017-05-19T11:13:13+00:00 V0_31(cnos:data) %IMI-5-USER_LOGOUT: User
admin logged out with /dev/pts/0 from 10.72.97.162. session telnet,
authentication LOCAL

79848 2017-05-19T11:28:36+00:00 V0_31(cnos:data) %IMI-5-USER_LOGIN: User
admin logged in with /dev/pts/0 from 10.72.97.162 via telnet,
authenticated by LOCAL
```

---

## display logging level

Displays the logging level for each facility in the system. Each facility corresponds to an application, process, protocol, or module.

### Syntax

**display logging level** [*<facility>*]

where:

| Parameter       | Function   |
|-----------------|--|
| <i>facility</i> | Displays the severity level configured for the specified facility. A facility is a keyword used to identify the application, process, protocol, or module that logs a message. The list of supported facilities is shown after this table. |

You can display the severity level of the following *facilities*:

- **aaa** - Authentication, Authorization and Accounting (AAA)
- **bfd** - Bidirectional Forwarding Detection (BFD)
- **bgp** - Border Gateway Protocol (BGP)
- **chassisd** - Chassis Daemon
- **clid** - Command Line Interface (CLI) Daemon
- **dhcp-snp** - Dynamic Host Configuration Protocol (DHCP) Snooping
- **ecp** - Edge Control Protocol (ECP)
- **hostmib** - Host Management Information Base (MIB)
- **hostp** - Host Protocols
- **hsl** - Hardware Services Layer (HSL)
- **imi** - Integrated Management Interface (IMI)
- **imish** - Integrated Management Interface Shell (IMISH)
- **khsl** - Kernel Hardware Services Layer (KHSL) module
- **l2mr ib** - Layer 2 Multicast Routing Information Base (MRIB)
- **lACP** - Link Aggregation Control Protocol (LACP)
- **lldp** - Link Layer Discovery Protocol (LLDP)
- **memmon** - Memory Monitor
- **ndd** - Neighbor Discovery Daemon (NDD)
- **nlog** - Logging Control Daemon (NLOG)
- **npa** - Network Policy Agent (NPA)
- **nsm** - Network Service Module (NSM)
- **nTP** - Network Time Protocol (NTP)

- `onm` - Network Management
- `ospf` - Open Shortest Path First (OSPF)
- `pam` - Linux Pluggable Authentication Modules (PAM)
- `pki` - Private Key Infrastructure (PKI)
- `platform-mgr` - Platform Manager
- `pubsub` - Publisher/Subscriber Inter Process Communication Module
- `pyrun` - Python Runtime Environment
- `pysched` - Python Scheduler
- `rest` - REpresentational State Transfer (REST)
- `rib` - Routing Information Base (RIB)
- `service-mgr` - Service Manager
- `slp` - Service Location Protocol (SLP)
- `smiac12mrib` - Simple Management Interface (SMI) API Client (AC) Layer 2 Multicast Routing Information Base (MRIB)
- `smi-ac-lacp` - SMI AC Link Aggregation Control Protocol (LACP)
- `smi-ac-mstp` - SMI AC Multiple Spanning Tree Protocol (MSTP)
- `smi-ac-ndd` - SMI AC Neighbor Discovery Daemon (NDD)
- `smi-ac-nsm` - SMI AC Network Service Module (NSM)
- `smi-ac-onm` - SMI AC Open Network Management (ONM)
- `smi-ac-rib` - SMI AC Routing Information Base (RIB)
- `smi-ac-telemetry` - SMI AC Telemetry service
- `smi-ac-vrrp` - SMI AC Virtual Router Redundancy Protocol (VRRP)
- `snmp` - Simple Network Management Protocol (SNMP)
- `ssh` - Secure Shell (SSH)
- `stp` - Spanning Tree Protocol (STP)
- `syslog` - System Log Host Protocol
- `sysmgmt` - System Management Host Protocol
- `sysmgr` - System Manager
- `tacacs` - Terminal Access Controller Access-Control System Plus (TACACS+)
- `telemetry` - Telemetry service
- `telnet` - Telnet Control Host Protocol
- `um` - User Management
- `vlag` - Virtual Link Aggregation Group (VLAG)
- `vlan` - Virtual Local Area Network (VLAN)
- `vrrp` - Virtual Router Redundancy Protocol (VRRP)
- `ztp` - Zero Touch Provisioning

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays severity levels configured for each feature:

```
Switch> display logging level
```

| Facility       | Default Severity | Current Session Severity |
|----------------|------------------|--------------------------|
| aaa            | 5                | 5                        |
| bgp            | 5                | 5                        |
| ecp            | 6                | 6                        |
| hostmib        | 6                | 6                        |
| hostp          | 5                | 5                        |
| hsl            | 3                | 3                        |
| imi            | 6                | 6                        |
| imish          | 6                | 6                        |
| khs1           | 6                | 6                        |
| l2mrib         | 5                | 3                        |
| lACP           | 5                | 5                        |
| lldp           | 5                | 5                        |
| ...            |                  |                          |
| um             | 5                | 5                        |
| vlan           | 5                | 5                        |
| vrrp           | 6                | 6                        |
| vlag           | 6                | 6                        |
| ztp            | 6                | 6                        |
| 0(emergencies) | 1(alerts)        | 2(critical)              |
| 3(errors)      | 4(warnings)      | 5(notifications)         |
| 6(information) | 7(debugging)     |                          |



---

## display logging library

Displays the severity level configured for system library facilities.

### Syntax

```
display logging library [hsl-nos-ipcc|hsl-nos-ipcs|lli|log|  
mcast|sal-pdp|secureimg|sysinfo] [facility <facility>]
```

where:

| Parameter                       | Function  |
|---------------------------------|---|
| <b>hsl-nos-ipcc</b>             | Displays the severity level configured for the HSL Inter-Process-Communication Client library.  |
| <b>hsl-nos-ipcs</b>             | Displays the severity level configured for the HSL Inter-Process-Communication Server library.  |
| <b>lli</b>                      | Displays the severity level configured for the low level drivers interface library.   |
| <b>log</b>                      | Displays the severity level configured for the log logging library.   |
| <b>mcast</b>                    | Displays the severity level configured for the multicast logging library.   |
| <b>sal-pdp</b>                  | Displays the severity level configured for the SDK Abstraction Layer (SAL) logging library.   |
| <b>secureimg</b>                | Displays the severity level configured for the secure image logging library.  |
| <b>sysinfo</b>                  | Displays the severity level configured for the system information library.  |
| <b>facility</b> <i>facility</i> | Displays the severity level configured for the specified application process facility and selected system library facility. The list of supported facilities is shown after this table. |

You can display the severity level of the following *facilities*:

- **bfd** - Bidirectional Forwarding Detection (BFD)
- **bgp** - Border Gateway Protocol (BGP)
- **chassisd** - Chassis Daemon
- **clid** - Command Line Interface (CLI) Daemon
- **dhcp-snp** - Dynamic Host Configuration Protocol (DHCP) Snooping
- **ecp** - Edge Control Protocol (ECP)
- **hostmib** - Host Management Information Base (MIB)
- **hostp** - Host Protocols

- `hsl` - Hardware Services Layer (HSL)
- `imi` - Integrated Management Interface (IMI)
- `imish` - Integrated Management Interface Shell (IMISH)
- `l2mr ib` - Layer 2 Multicast Routing Information Base (MRIB)
- `lACP` - Link Aggregation Control Protocol (LACP)
- `memmon` - Memory Monitor
- `ndd` - Neighbor Discovery Daemon (NDD)
- `nlog` - Logging Control Daemon (NLOG)
- `npa` - Network Policy Agent (NPA)
- `nsm` - Network Service Module (NSM)
- `onm` - Network Management
- `ospf` - Open Shortest Path First (OSPF)
- `pam` - Linux Pluggable Authentication Modules (PAM)
- `platform-mgr` - Platform Manager
- `pubsub` - Publisher/Subscriber Inter Process Communication Module
- `pyrun` - Python Runtime Environment
- `pysched` - Python Scheduler
- `rest` - REpresentational State Transfer (REST)
- `rib` - Routing Information Base (RIB)
- `service-mgr` - Service Manager
- `stp` - Spanning Tree Protocol (STP)
- `sysmgr` - System Manager
- `telemetry` - Telemetry service
- `vlag` - Virtual Link Aggregation Group (VLAG)
- `vrrp` - Virtual Router Redundancy Protocol (VRRP)
- `ztp` - Zero Touch Provisioning

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the severity level configured for libraries:

```
Switch> display logging library
```

| Library      | Client-Facility | Default Severity | Current Session Severity |
|--------------|-----------------|------------------|--------------------------|
| hsl-nos-ipcc | bgp             | 3                | 3                        |
| hsl-nos-ipcc | chassisd        | 3                | 3                        |
| hsl-nos-ipcc | clid            | 3                | 3                        |
| hsl-nos-ipcc | dhcp-snp        | 3                | 3                        |
| hsl-nos-ipcc | ecp             | 3                | 3                        |
| hsl-nos-ipcc | hostmib         | 3                | 3                        |
| hsl-nos-ipcc | hostp           | 3                | 3                        |
| hsl-nos-ipcc | hsl             | 3                | 3                        |
| hsl-nos-ipcc | imi             | 3                | 3                        |
| hsl-nos-ipcc | imish           | 3                | 3                        |
| hsl-nos-ipcc | l2mrib          | 3                | 3                        |
| hsl-nos-ipcc | lacp            | 3                | 3                        |
| hsl-nos-ipcc | memmon          | 3                | 3                        |
| hsl-nos-ipcc | stp             | 3                | 3                        |
| hsl-nos-ipcc | ndd             | 3                | 3                        |
| hsl-nos-ipcc | nlog            | 3                | 3                        |
| hsl-nos-ipcc | nsm             | 3                | 3                        |
| hsl-nos-ipcc | bfd             | 3                | 3                        |
| hsl-nos-ipcc | onm             | 3                | 3                        |
| hsl-nos-ipcc | ospf            | 3                | 3                        |
| hsl-nos-ipcc | platform-mgr    | 3                | 3                        |
| hsl-nos-ipcc | pubsub          | 3                | 3                        |
| ...          |                 |                  |                          |

---

## display logging logfile

Displays the messages stored in the log file.

### Syntax

```
display logging logfile [last-index|start-seqn <sequence number>  
[end-seqn <sequence number>]]start-time <year> <month> <day>  
<hour>:<minute>:<seconds> [end-time <year> <month> <day> <hour>:<minute>:  
<seconds>]]
```

where:

| Parameter              | Function   |
|------------------------|--|
| last-index             | Displays the sequence number of the most recent message stored in the log file.  |
| start-seqn             | Displays messages from log file from a given start-sequence-number.  |
| <i>sequence number</i> | The sequence number associated to each syslog message stored in the log file. The <i>sequence number</i> is from 0 to 2,147,483,647. |
| end-seqn               | Displays messages from log file up to a given end-sequence-number.   |
| start-time             | Displays messages from log file from a given start-time.   |
| end-time               | Displays messages from log file up to a given end-time.  |
| <i>year</i>            | Time-stamp year using 4-digit representation e.g. 2016.  |
| <i>month</i>           | The month of the start or end time-stamp in the range Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec.                    |
| <i>day</i>             | Time-stamp day number in the range from 1 to 31.   |
| <i>hour</i>            | Time-stamp hour in the range from 00 to 23.  |
| <i>minute</i>          | Time-stamp minute in the range from 0 to 59.   |
| <i>seconds</i>         | Time-stamp second in the range from 0 to 59.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the messages stored in the log file:

```
Switch> display logging logfile

Logging logfile:                enabled
      Name - messages:Severity - informational Size - 10485760

2015-08-01T18:39:59+00:00 G8272 %PLATFORM_MGR-3-LLI_PROCESS_EVENT: Event
process
ed (event=5, unit=0, state=0->0)
2015-08-01T18:40:04+00:00 G8272 %PLATFORM_MGR-3-LLI_PROCESS_EVENT: Event
process
ed (event=5, unit=0, state=0->0)
2015-08-01T18:40:09+00:00 G8272 %PLATFORM_MGR-3-LLI_PROCESS_EVENT: Event
process
ed (event=5, unit=0, state=0->0)
2015-08-01T18:40:14+00:00 G8272 %PLATFORM_MGR-3-LLI_PROCESS_EVENT: Event
process
ed (event=5, unit=0, state=0->0)
2015-08-01T18:40:19+00:00 G8272 %PLATFORM_MGR-3-LLI_PROCESS_EVENT: Event
process
ed (event=5, unit=0, state=0->0)
2015-08-01T18:40:24+00:00 G8272 %PLATFORM_MGR-3-LLI_PROCESS_EVENT: Event
process
ed (event=5, unit=0, state=0->0)
2015-08-01T18:40:29+00:00 G8272 %PLATFORM_MGR-3-LLI_PROCESS_EVENT: Event
process
ed (event=5, unit=0, state=0->0)
...
```

The following command displays the sequence number of the most recent log message stored in the log file:

```
Switch> display logging logfile last-index

logfile last-index : 82678
```

The following command displays log messages whose sequence numbers are within the range 100 and 105:

```
Switch>display logging logfile start-seqn 100 end-seqn 105

Last Log cleared/wrapped time is : None
100 2016-01-29T22:02:23+00:00 MarsSQA %VRRP-5-STARTED: VRRP service
started
101 2016-01-29T22:02:27+00:00 MarsSQA %UM-5-ROOT_DISABLE: Root login
disabled
102 2016-01-29T22:02:28+00:00 MarsSQA %VLOG-6-STARTUP_CONFIG: Startup
configuration processed
103 2016-01-29T22:02:28+00:00 MarsSQA %LLILIB-5-DEVICE_ENABLE:
[PLATFORM_MGR] PasDAC 1.0m inserted at port Ethernet1/8 is Approved.
104 2016-01-29T22:02:32+00:00 MarsSQA %NSM-5-IFM_LINK_UP: Link up on
interface Ethernet1/8
```

The following command displays log messages whose time-stamps are within the range 2016 Jan 29 22:02:28 and 2016 Jan 31 10:25:30:

```
Switch>display logging logfile start-time 2016 Jan 29 22:02:28 end-time
2016 Jan 31 10:25:30

2016-01-29T22:02:28+00:00 MarsSQA %LLILIB-5-DEVICE_ENABLE: [PLATFORM_MGR]
PasDAC 1.0m inserted at port Ethernet1/7 is Approved.
2016-01-29T22:02:28+00:00 MarsSQA %VLOG-6-STARTUP_CONFIG: Startup
configuration processed
2016-01-29T22:02:32+00:00 MarsSQA %NSM-5-IFM_LINK_UP: Link up on
interface Ethernet1/7
2016-01-29T22:02:35+00:00 MarsSQA %NSM-5-IFM_LINK_UP: Link up on
interface mgmt0
2016-01-29T22:03:42+00:00 MarsSQA %IMISH-5-USER_LOGIN: User admin logged
in
```

---

## display logging mnemonics

Displays a list of all mnemonic strings related to a given facility or all facilities. This command also displays the syslog IDs associated with the specified facility.

### Syntax

**display logging mnemonics** [*<facility>*]

where:

| Parameter       | Function   |
|-----------------|--|
| <i>facility</i> | Displays the list of all mnemonic strings related to the specified facility. A facility is a keyword used to identify the application, process, protocol, system library, or module that logs a message. The list of supported facilities is shown after this table. |

You can display the severity level of the following *facilities*:

- `bfd` - Bidirectional Forwarding Detection (BFD)
- `bgp` - Border Gateway Protocol (BGP)
- `chassisd` - Chassis Daemon
- `clid` - Command Line Interface (CLI) Daemon
- `dhcp-snp` - Dynamic Host Configuration Protocol (DHCP) Snooping
- `ecp` - Edge Control Protocol (ECP)
- `hostmib` - Host Management Information Base (MIB)
- `hostp` - Host Protocols
- `hsl` - Hardware Services Layer (HSL)
- `hsl-nos-ipcc` - HSL Inter-Process-Communication Client library.
- `hsl-nos-ipcs` - HSL Inter-Process-Communication Server library.
- `imi` - Integrated Management Interface (IMI)
- `imish` - Integrated Management Interface Shell (IMISH)
- `khs1` - Kernel Hardware Services Layer (KHSL) module
- `l2mr ib` - Layer 2 Multicast Routing Information Base (MRIB)
- `lACP` - Link Aggregation Control Protocol (LACP)
- `lldp` - Link Layer Discovery Protocol (LLDP)
- `log` - Logging Management Interface Library
- `mcast` - Multicast Services Library
- `memmon` - Memory Monitor
- `ndd` - Neighbor Discovery Daemon (NDD)
- `nlog` - Logging Control Daemon (NLOG)

- npa - Network Policy Agent (NPA)
- nsm - Network Service Module (NSM)
- ntp - Network Time Protocol (NTP)
- onm - Network Management
- ospf - Open Shortest Path First (OSPF)
- pam - Linux Pluggable Authentication Modules (PAM)
- platform-mgr - Platform Manager
- pubsub - Publisher/Subscriber Inter Process Communication Module
- pyrun - Python Runtime Environment
- pysched - Python Scheduler
- rest - REpresentational State Transfer (REST)
- rib - Routing Information Base (RIB)
- sal-pdp - SDK Abstraction Layer (SAL)
- secureimg - Secure Image Validation Library
- service-mgr - Service Manager
- slp - Service Location Protocol
- stp - Spanning Tree Protocol (STP)
- sysinfo - System Information
- sysmgmt - System Management Host Protocol
- sysmgr - System Manager
- telemetry - Telemetry service
- um - User Management
- vlag - Virtual Link Aggregation Group (VLAG)
- vlan - Virtual Local Area Network (VLAN)
- vrrp - Virtual Router Redundancy Protocol (VRRP)
- ztp - Zero Touch Provisioning

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays mnemonic strings related to the BGP facility:

```
Switch> display logging mnemonics bgp

[BGP Application Messages]
-----
BGP-3-ADV_INVALID_ROUTE: [chars]- Prefix: [chars] has null/bad info, ignoring route
BGP-3-BAD_HOLD_TIME: [chars]- Open: Bad Hold-time ([dec])
BGP-3-BAD_REMOTE_AS: neighbor [chars] - bad remote-as, expecting [dec] received [dec]
BGP-3-BAD_VERSION: [chars]- Open: Bad protocol version [dec]
BGP-3-CONNECT_ERROR: Connect error
BGP-3-OPT_AUTH_NOT_SUP: [chars]- Open Opt: Auth not supported
BGP-3-OPT_STRICT_CAP_MISMATCH: [chars]- Open Opt: Strict, Cap mis-match
BGP-3-SMGR_CLIENT_INIT_ERROR: Service manager client initialization failed
BGP-3-SOCKET_ERROR: Socket error
BGP-3-STRICT_CAP_MISMATCH: [chars]- Open Opt: Strict, Cap mis-match
BGP-3-UNACCEPTABLE_HOLD_TIME: [chars]- Open: Unacceptable Hold-time ([dec])
BGP-3-VRF_ADD_NO_REPLY_SAVE_VRF: VRF Add unable to replay save cli for vrf
BGP-3-VRF_SAVE_CMD: Cannot save vrf command to imi
BGP-3-WRITE_ERROR: Write error
BGP-6-ADJ_CHANGE: Neighbor [chars] [chars] [chars]
BGP-6-BFD_SESSION_DWN_RCVD: Session down received FLAG = [dec]
BGP-6-BFD_SESSION_UP_RCVD: Session up set FLAG = [dec]
BGP-6-STARTING_BGPD: BGPd [chars] starting: vty@[dec], bgp@[dec]
BGP-6-SYSLOG_INIT: Syslog service initialized
BGP-5-MAX_PEER_INGRP_EXCEED: Peer-group [chars] has maximum peers [dec],ignoring peer [chars]
BGP-5-STATE_CHANGE: [chars]- [FSM] State Change: [chars]([dec])
BGP-5-UNCONFIGURED_PEER: No matching peer or peer-group configured,ignoring peer [chars]
BGP-4-MAXPFXEXCEED: No. of prefix received from [chars] (afi-safi [dec]-[dec]): [dec] exceed
maximum prefix limit [dec]
BGP-4-MAXPFX: No. of prefix received from [chars] (afi-safi [dec]-[dec]): reaches [dec], max
[dec]
BGP-4-SAME_ROUTER_ID: neighbor [chars] uses same routerid [chars] as us
BGP-4-UPD_AGGR_NO_ASVAL: [chars]- Attr Aggregator: AS value error([dec]), Ignoring error...
BGP-4-UPD_SAME_ORIGID: [chars]- Attr OrigID: OrigID([chars]) same as Self, Ignoring UPDATE...
```

---

## display logging monitor

Displays the monitor (Telnet and Secure Shell (SSH) sessions) logging configuration including the administrative status (enabled/disabled) and the severity level.

### Syntax

```
display logging monitor
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the monitor logging configuration:

```
Switch> display logging monitor  
Logging monitor:                enabled (Severity: notifications)
```

---

## display logging rate-limit

Displays the rate limit configuration (maximum number of messages that can be logged per time interval in seconds) for three supported contexts:

- for the entire system;
- for each severity level;
- for each facility;

## Syntax

**display logging rate-limit**

## Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the limit of logged messages:

```
Switch> display logging rate-limit
```

| Dimension |       | Default Burst/Interval | Current Burst/Interval |
|-----------|-------|------------------------|------------------------|
| system    |       | 512/5                  | 512/5                  |
| emerg     | S(0)  | 1024/10                | 1024/10                |
| alert     | S(1)  | 1024/10                | 1024/10                |
| crit      | S(2)  | 1024/10                | 1024/10                |
| err       | S(3)  | 1024/10                | 1024/10                |
| warning   | S(4)  | 1024/10                | 1024/10                |
| notice    | S(5)  | 1024/10                | 1024/10                |
| info      | S(6)  | 1024/10                | 1024/10                |
| debug     | S(7)  | 1024/10                | 1024/10                |
| aaa       | F( 9) | 512/10                 | 512/10                 |
| bgp       | F(11) | 512/10                 | 512/10                 |
| chassisd  | F(12) | 512/10                 | 512/10                 |
| clid      | F(13) | 512/10                 | 512/10                 |
| dhcp_snp  | F(14) | 512/10                 | 512/10                 |
| ecp       | F(17) | 512/10                 | 512/10                 |
| hostmib   | F(18) | 512/10                 | 512/10                 |
| hostp     | F(19) | 512/10                 | 512/10                 |
| hsl       | F(20) | 512/10                 | 512/10                 |
| imi       | F(23) | 512/10                 | 512/10                 |
| imish     | F(24) | 512/10                 | 512/10                 |
| khs1      | F(26) | 512/10                 | 512/10                 |
| ...       |       |                        |                        |

---

## display logging server

Displays the remote syslog server configuration including the server or address (IPv4 or IPv6), the severity level and the outgoing facility.

### Syntax

```
display logging server
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the remove syslog server configuration:

```
Switch> display logging server

IPv4 Servers:
    *2.2.2.1
severity: (debugging)
facility: local7
* - Values assigned by DHCP Client.
```

---

## display logging throttle

Displays logging throttle information.

### Syntax

```
display logging throttle
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays logging throttle information:

```
Switch> display logging throttle
Logging throttling:          disabled
```

---

## display logging timestamp

Displays the logging time-stamp unit configured.

### Syntax

```
display logging timestamp
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the logging time-stamp units configured:

```
Switch> display logging timestamp
Logging timestamp:          seconds
```

---

## display mac access-lists

Displays Media Access Control (MAC) Access Control Lists (ACLs).

### Syntax

**display mac access-lists** [*<access list name>*] [**expanded**|**summary**]

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>access list name</i> | The name of the MAC access list.   |
| expanded                | Displays the contents of each ACE (Access Control Entry).  |
| summary                 | Displays a summary of each ACL, including the total number of configured ACEs and the interfaces on which the ACL is configured or active. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays all MAC ACLs:

```
Switch> display mac access-lists
```

---

## display mac address-table

Displays Media Access Control (MAC) addresses.

### Syntax

```
display mac address-table [dynamic|static] [address <MAC address>] [interface {ethernet <chassis number/port number>|port-aggregation <LAG number>}] [vlan <VLAN number>]
```

where:

| Parameter   | Function  |
|---|---|
| <b>dynamic</b>  | Displays dynamic MAC addresses.   |
| <b>static</b>   | Displays static MAC addresses.  |
| <b>address</b> <i>MAC address</i>                           | Displays information for the specified MAC address. The <i>MAC address</i> can be written in any of the following formats: <ul style="list-style-type: none"><li>• X.X.X</li><li>• XX-XX-XX-XX-XX-XX</li><li>• XX:XX:XX:XX:XX:XX</li><li>• XXXX.XXXX.XXXX</li></ul> |
| <b>interface ethernet</b> <i>chassis number/port number</i> | Displays MAC addresses for the specified ethernet interface. The <i>chassis number</i> is 1.  |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Displays MAC addresses for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.   |
| <b>vlan</b> <i>VLAN number</i>                              | Displays MAC addresses for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 3999.  |

### Modes

All command modes



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the MAC address table:

```
Switch> display mac address-table
```

| VLAN | MAC Address    | Type    | Ports  |
|------|----------------|---------|--------|
| 1    | 0000.0001.0203 | dynamic | po1000 |
| 1    | 0000.0001.0204 | dynamic | po1000 |
| 1    | 0000.0001.0205 | dynamic | po1000 |
| 1    | 0000.0001.0206 | dynamic | po1000 |
| 1    | 0000.0001.0207 | dynamic | po1000 |
| 1    | a897.dcf7.d501 | static  | po100  |
| 1    | 0100.7fa3.b200 | static  | po100  |

---

## display mac address-table aging-time

Displays the global aging time for dynamic Media Access Control (MAC) addresses. Aging time is the number of seconds until a dynamic MAC address is removed from the Forwarding Database (FDB). The aging time starts when the MAC address is learned.

### Syntax

```
display mac address-table aging-time
```

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the aging time for dynamic MAC addresses:

```
Switch> display mac aging-time  
Mac address Aging Time: 1800
```

---

## display mac address-table count

Displays the number of Forwarding Database (FDB) entries.

### Syntax

```
display mac address-table count [dynamic|static] [address <MAC address>] [interface {ethernet <chassis number/port number>|port-aggregation <LAG number>}] [vlan <VLAN number>]
```

where:

| Parameter   | Function  |
|---|---|
| <b>dynamic</b>  | Displays the number of FDB dynamic entries.   |
| <b>static</b>   | Displays the number of FDB static entries.  |
| <b>address</b> <i>MAC address</i>                           | Displays the number of FDB entries for the specified address. The <i>MAC address</i> can be written in any of the following formats: <ul style="list-style-type: none"><li>o X.X.X</li><li>o XX-XX-XX-XX-XX-XX</li><li>o XX:XX:XX:XX:XX:XX</li><li>o XXXX.XXXX.XXXX</li></ul> |
| <b>interface ethernet</b> <i>chassis number/port number</i> | Displays the number of FDB entries for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.  |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Displays the number of FDB entries for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.   |
| <b>vlan</b> <i>VLAN number</i>                              | Displays the number of FDB entries for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.  |

### Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the number of FDB entries:

```
Switch> display mac address-table count  
  
MAC Entries for all vlans:  
Dynamic Address Count: 5  
Static Address Count: 1  
Multicast MAC Address Count: 1  
Total MAC Addresses in Use: 7
```

---

## display mac address-table learning

Displays the status of Media Access Control (MAC) address learning for each ethernet interface.

### Syntax

**display mac address-table learning** [**interface ethernet** <*chassis number/port number*>]

where:

| Parameter  | Function  |
|--|---|
| <i>interface ethernet chassis number/port number</i> | Displays the status of MAC address learning for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the status of MAC address learning:

```
Switch> display mac address-table learning

MAC Learning is globally enabled
-----
Ethernet/Aggregation      Learning
Interface                  Status
-----
Ethernet1/1               Enabled
Ethernet1/2               Enabled
Ethernet1/3               Enabled
Ethernet1/4               Enabled
Ethernet1/5               Enabled
Ethernet1/6               Enabled
Ethernet1/7               Enabled
Ethernet1/8               Enabled
Ethernet1/9               Enabled
Ethernet1/10              Enabled
Ethernet1/11              Enabled
Ethernet1/12              Enabled
...

```

---

## display mac address-table multicast

Displays multicast Media Access Control (MAC) addresses.

### Syntax

```
display mac address-table multicast [count] [vlan <VLAN number>] [user]
```

where:

| Parameter               | Function   |
|-------------------------|--|
| count                   | Displays the number of multicast MAC addresses.  |
| vlan <i>VLAN number</i> | Displays the number of multicast MAC addresses for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 3999. |
| user                    | Displays only the user configured multicast MAC addresses.   |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays multicast MAC addresses:

```
Switch> display mac address-table multicast
```

| VLAN | MAC Address    | Type   | Ports |
|------|----------------|--------|-------|
| 1    | 0100.7fa3.b200 | static | po100 |

---

## display monitor

Displays Ethernet Switch Port Analyzer (SPAN) information.

### Syntax

```
display monitor [session {<session number>|all|range <session range>}  
[brief]]
```

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <b>session</b>                    | Displays information for the specified SPAN session.   |
| <i>session number</i>             | The number of the SPAN session. The <i>session number</i> is from 1 to 18.                   |
| <b>all</b>                        | Displays information for all SPAN sessions.  |
| <b>range</b> <i>session range</i> | Displays information for a range of SPAN sessions. The <i>session range</i> is from 1 to 18. |
| <b>brief</b>                      | Displays a short SPAN session summary.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays ethernet SPAN information:

```
Switch> display monitor  
Session State Reason Description  
-----  
1 down No route exists for cfg dst ip
```

```
Switch> display monitor  
Session State Reason Description  
-----  
1 down Waiting for ARP response
```

```
Switch> display monitor  
Session State Reason Description  
-----  
1 up The session is up
```

---

## display nsm client

Displays Network Service Module (NSM) client information.

### Syntax

```
display nsm client
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays NSM client information:

```
Switch# display nsm client

NSM client ID: 4
  OSPF, socket 22
  Service: Interface Service, Router ID Service, VRF Service
  Message received 5, sent 191
  Connection time: Fri Jan  8 04:58:32 2016
  Last message read: Qos Copp parameter change
  Last message write: Address Add
NSM client ID: 7
  HOSTP, socket 30
  Service: Interface Service, Route Service, Router ID Service, VRF
           Service, VLAN service
  Message received 3, sent 360
  Connection time: Fri Jan  8 04:58:37 2016
  Last message read: Qos Copp parameter change
  Last message write: Address Add
NSM client ID: 14
  LACP, socket 26
  Service: Interface Service
  Message received 1, sent 158
  Connection time: Fri Jan  8 04:58:33 2016
  Last message read: Service Request
  Last message write: VR Sync MSG after config restore
...
```



---

## display npa internal event-history

Displays Network Policy Agent (NPA) event history information.

### Syntax

**display npa internal event-history {errors|msgs}**

where:

| Parameter | Function                           |
|-----------|------------------------------------|
| errors    | Displays NPA errors information.   |
| msgs      | Displays NPA messages information. |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command displays information on all NPA errors:

```
Switch# display npa internal event-history errors

Switch subscribe vm uuid: 1493ea75-f5e4-47f5-9f99-9d6a4005bc04

Switch subscribe vnet uuid: 6d61cffe-15f5-4d58-80d1-50adc37292b3

Event: ERRORS, length:51, at 994416 usecs after Mon Mar 20 16:33:47 2017
npa_nx_update_vnic_ifmap(2415):
invalid VDM node

Event: ERRORS, length:51, at 994683 usecs after Mon Mar 20 16:33:47 2017
npa_nx_update_vnic_ifmap(2415):
invalid VDM node

Event: ERRORS, length:51, at 994834 usecs after Mon Mar 20 16:33:47 2017
npa_nx_update_vnic_ifmap(2415):
invalid VDM node

Event: ERRORS, length:51, at 994992 usecs after Mon Mar 20 16:33:47 2017
npa_nx_update_vnic_ifmap(2415):
invalid VDM node

Event: ERRORS, length:51, at 12254 usecs after Mon Mar 20 16:33:48 2017
npa_nx_update_vnic_ifmap(2415):
invalid VDM node
...
```

The following command displays information on all NPA messages:

```
Switch# display npa internal event-history msgs

Switch subscribe vm uuid: 1493ea75-f5e4-47f5-9f99-9d6a4005bc04

Switch subscribe vnet uuid: 6d61cffe-15f5-4d58-80d1-50adc37292b3

Event: MESSAGES, length:93, at 977495 usecs after Mon Mar 20 16:33:47
2017
_npa_if_set_auto_policy(684):
Received auto-policy for iface po1, state = 1 ifindex 100001

Event: MESSAGES, length:93, at 979900 usecs after Mon Mar 20 16:33:47
2017
_npa_if_set_auto_policy(684):
Received auto-policy for iface po2, state = 1 ifindex 100002

Event: MESSAGES, length:93, at 980019 usecs after Mon Mar 20 16:33:47
2017
_npa_if_set_auto_policy(684):
Received auto-policy for iface po3, state = 1 ifindex 100003

Event: MESSAGES, length:93, at 980129 usecs after Mon Mar 20 16:33:47
2017
_npa_if_set_auto_policy(684):
Received auto-policy for iface po4, state = 1 ifindex 100004
...
```

---

## display npa internal vlan

Displays Network Policy Agent (NPA) VLAN information.

### Syntax

**display npa internal vlan** {**interface** {**ethernet** <*chassis number/port number*>}|**port-aggregation** <*LAG number or range*> } [**reference**]

where:

| Parameter   | Function   |
|---|--|
| interface ethernet<br><i>chassis number/port number</i>     | Displays NPA VLAN information for the specified ethernet interface. The <i>chassis number</i> is 1.                    |
| interface<br>port-aggregation<br><i>LAG number or range</i> | Displays NPA VLAN information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096. |
| reference   | Displays NPA VLAN reference information.   |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command displays information about NPA VLAN interface:

```
Switch# display npa internal vlan interface port-aggregation 1

Interface po1 NPA internal:
CFG VLAN:
  1-3999
REQ VLAN:
  10,50
added in VDM
auto-policy enabled
```

The following command displays NPA VLAN reference information:

```
Switch# display npa internal vlan reference
```

```
VLAN reference information:
```

```
2: 100003  
10: 100001  
11: 100004  
14: 100004  
30: 100002 100004  
40: 100002 100003  
45: 100003  
50: 100001  
89: 100003  
210: 100004
```

---

## display npa internal vm-with-down-link

Displays Network Policy Agent (NPA) vm-with-down-link information.

### Syntax

```
display npa internal vm-with-down-link
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command displays NPA vm-with-down-link information:

```
Switch# display npa internal vm-with-down-link  
  
VM(s) with down link:  
e90e2907-78a8-4129-9821-9f09b796d653
```

---

## display npa internal vnic

Displays Network Policy Agent (NPA) VNIC information.

### Syntax

```
display npa internal vnic
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command displays NPA VNIC information:

```
Switch# display npa internal vnic
vNICs info:
  vNIC uuid: 9ace26e5-39a7-469a-96f5-42f668a70f7e
    vm uuid: 526f3c82-7872-4bb2-a9a8-7b51ad513526
      vid: 210
      ifmap: 100004

  vNIC uuid: 1d009a7b-d27f-4463-ac03-ad882c220b91
    vm uuid: 526f3c82-7872-4bb2-a9a8-7b51ad513526
      vid: 30
      ifmap: 100004

  vNIC uuid: e1709dc3-c2eb-4f99-9247-5dbb164b1728
    vm uuid: 526f3c82-7872-4bb2-a9a8-7b51ad513526
      vid: 11
      ifmap: 100004

  vNIC uuid: 1491abde-58f8-422a-b914-6da9c3235fa6
    vm uuid: 67669b5d-db2d-458f-ae8d-8334c9e8d0d8
      vid: 89
      ifmap: 100003

  vNIC uuid: 63665b53-4b2b-4038-9f83-26202846875a
    vm uuid: 67669b5d-db2d-458f-ae8d-8334c9e8d0d8
      vid: 45
      ifmap: 100003

  vNIC uuid: c4e1ea20-130f-48af-a091-35f068e8349e
    vm uuid: 67669b5d-db2d-458f-ae8d-8334c9e8d0d8
      vid: 40
      ifmap: 100003
```

---

## display ntp authentication-keys

Displays Network Time Protocol (NTP) authentication keys.

### Syntax

```
display ntp authentication-keys
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays NTP authentication keys:

```
Switch> display ntp authentication-keys
-----
Auth key      MD5 String
-----
1             IBMkalsdifjaldskf
```

---

## display ntp authentication-status

Displays the status of Network Time Protocol (NTP) authentication.

### Syntax

```
display ntp authentication-status
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays NTP authentication status:

```
Switch> display ntp authentication-status  
Authentication enabled.
```



---

## display ntp peer-status

Displays the status of Network Time Protocol (NTP) association.

### Syntax

```
display ntp peer-status
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays NTP association status:

```
Switch> display ntp peer-status

Total peers : 1
* - selected for sync, + - peer mode(active),
- - peer mode(passive), = - polled in client mode
remote          local          st    poll    reach    delay
-----
=9.110.36.180    9.111.86.200    16    64     0        0.00000
```

---

## display ntp peers

Displays configured Network Time Protocol (NTP) servers and peers.

### Syntax

**display ntp peers**

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays NTP servers and peers:

```
Switch> display ntp peers
-----
Peer IP Address          Serv/Peer
-----
9.110.36.180             Server (configured)
```

---

## display ntp statistics

Displays Network Time Protocol (NTP) statistics.

### Syntax

```
display ntp statistics {io|local|memory|peer ipaddr <peer  
address>}
```

where:

| Parameter                           | Function  |
|-------------------------------------|---|
| io                                  | Displays input-output module statistics.  |
| local                               | Displays local system statistics.   |
| memory                              | Displays memory allocation statistics.  |
| peer ipaddr <i>peer<br/>address</i> | Displays statistics associated with the specified peer.<br>The <i>peer address</i> can be either an IPv4 or an IPv6<br>address. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays NTP local system statistics:

```
Switch> display ntp statistics local  
  
system uptime:          85589  
time since reset:      85589  
old version packets:   0  
new version packets:   0  
unknown version number: 0  
bad packet format:    0  
packets processed:     0  
bad authentication:    0
```

---

## display ntp trusted-keys

Displays Network Time Protocol (NTP) trusted keys.

### Syntax

```
display ntp trusted-keys
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays NTP trusted keys:

```
Switch> display ntp trusted-keys  
  
Trusted Keys:  
1
```

---

## display pending

Displays the Multiple Spanning Tree (MST) configuration waiting to be applied.

### Syntax

```
display pending
```

### Modes

MST Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the pending MST configuration:

```
Switch(config-mst)# display pending
```

---

## display pki

Displays Private Key Infrastructure (PKI) summary information.

### Syntax

**display pki**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays PKI summary information:

```
Switch> display pki

PKI Profile Name: rest_default
  CSR: non-existed
  Host certificate: existed
  CA: 0
  In used: Yes

PKI Profile Name: rest_mgmt
  CSR: non-existed
  Host certificate: existed
  CA: 0
  In used: No

PKI Profile Name: test
  CSR: existed
  Host certificate: existed
  CA: 3
  In used: Yes
```

---

## display pki ca

Displays Certificate Authority (CA) information.

### Syntax

**display pki** <PKI profile name> **ca** [**base64**|**brief**]

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>PKI profile name</i> | The name of the PKI profile. The <i>PKI profile name</i> can be up to 16 characters in length. |
| <b>base64</b>           | Displays CA information in base 64 format.   |
| <b>brief</b>            | Displays a brief summary of the CA information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays CA information:

```
Switch> display pki privKey1 ca
```

---

## display pki csr

Displays Certificate Signing Request (CSR) information.

### Syntax

**display pki** <PKI profile name> **csr** [**base64**]

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>PKI profile name</i> | The name of the PKI profile. The <i>PKI profile name</i> can be up to 16 characters in length. |
| <b>base64</b>           | Displays CSR information in base 64 format.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays CSR information:

```
Switch> display pki privKey1 csr
```



---

## display pki host-certificate

Displays host certificate information.

### Syntax

**display pki** <PKI profile name> **host-certificate** [**base64**]

where:

| Parameter               | Function   |
|-------------------------|--|
| <i>PKI profile name</i> | The name of the PKI profile. The <i>PKI profile name</i> can be up to 16 characters in length. |
| <b>base64</b>           | Displays host certificate information in base 64 format.                                       |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

## Example

The following command displays host certificate information:

```
Switch> display pki privKey1 host-certificate

Data:
  Version: 3 (0x2)
  Serial Number: 2 (0x2)
  Signature Algorithm: sha256WithRSAEncryption
  Issuer: CN=MyTestCA
  Validity
    Not Before: Dec 5 11:39:34 2016 GMT
    Not After : Dec 5 11:39:34 2017 GMT
  Subject: CN=ubuntu, O=client
  Subject Public Key Info:
    Public Key Algorithm: rsaEncryption
    Public-Key: (2048 bit)
    Modulus:
      00:94:29:cc:b4:ec:08:14:f3:ac:91:e3:55:ca:59:
      88:81:3f:49:83:bf:18:ba:8c:65:78:e8:72:8a:eb:
      da:3a:c3:2d:38:84:03:c6:23:34:7e:8f:81:cc:b1:
      8b:a2:04:f3:ba:5a:7f:1f:f1:4a:1e:82:7c:8b:76:
      48:e5:35:73:6b:89:65:27:50:18:02:55:e9:3d:b8:
      54:00:4e:2f:39:66:2a:53:c0:36:d9:5b:40:91:85:
      ea:1d:5b:9a:e9:8f:a0:71:b0:77:df:51:28:27:5b:
      23:45:63:23:b3:d9:0c:85:18:f2:fd:6d:14:39:4e:
      26:9d:95:95:42:d4:8f:4c:f2:c6:ab:7b:fc:50:70:
      bc:b2:f6:36:ad:be:c2:e8:b5:7d:8d:68:2f:69:09:
      e3:ea:b9:58:b6:ca:a3:5e:8b:d3:37:f8:68:c9:02:
      ef:64:f7:fb:21:c6:3a:5d:da:2f:bc:6d:46:0b:d7:
      ee:94:29:31:ca:59:c1:6d:ec:0d:94:39:ba:51:45:
      4e:78:26:28:01:48:74:41:14:ff:c3:57:7c:2c:f0:
      61:ec:94:d9:bd:d0:6e:db:bd:83:05:eb:76:28:e1:
      40:0c:c4:6c:6c:79:2e:b8:ff:6e:15:20:5b:37:6f:
      8a:99:b5:9c:35:3f:a8:0f:8e:eb:f3:45:82:b9:93:
      36:89
    Exponent: 65537 (0x10001)
  X509v3 extensions:
    X509v3 Basic Constraints:
      CA:FALSE
    X509v3 Key Usage:
      Digital Signature
    X509v3 Extended Key Usage:
      TLS Web Client Authentication
  Signature Algorithm: sha256WithRSAEncryption
  0a:ff:26:4f:e1:d2:76:95:2a:86:18:14:9d:46:c8:0b:a8:ed:
  a7:01:5a:58:04:b7:6d:87:c4:aa:17:40:e2:a4:59:3a:ef:a6:
  17:db:80:37:73:d9:7b:51:a9:82:17:fa:f6:7d:45:e0:e9:f0:
  b7:5f:1f:04:b4:0e:74:52:16:31:a3:b4:59:72:4b:50:48:81:
  14:f0:6f:26:11:49:8f:31:c2:76:3a:49:df:fb:24:2e:19:12:
  90:51:1f:21:7b:32:5c:76:bd:29:03:77:29:57:bc:f2:0e:70:
  3a:5d:53:41:2e:27:23:f8:35:06:2e:7e:2a:93:cb:62:98:37:
  5c:7a:bf:43:e1:d5:c8:45:0e:b6:8e:1d:75:03:bf:0d:a9:19:
  2f:0b:4e:c6:e8:9c:97:67:8d:8c:2d:82:e6:9d:79:4d:10:90:
  98:d3:18:86:09:37:ef:02:5a:8e:4c:9e:ac:c8:d5:4c:7d:81:
  6f:34:3a:46:6b:a8:11:0d:b1:c2:5f:3c:36:c3:0b:68:a6:2c:
  a4:76:df:a8:f8:f2:90:e0:e0:3c:4e:07:d7:16:56:e1:0e:db:
  9e:5f:9b:1f:bd:4b:01:58:fb:5a:f3:b6:d6:17:d2:ac:70:6a:
  65:d2:30:f2:c9:76:90:d5:ce:8c:f8:5f:f3:99:96:03:0c:10:
  e8:34:4a:50
```

---

## display policy-map

Displays policy map information.

### Syntax

**display policy-map** [*<policy map name>*]

where:

| Parameter              | Function  |
|------------------------|---|
| <i>policy map name</i> | Displays information only for the specified policy map. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays policy map information:

```
Switch> display policy-map

Type control-plane policy-maps
=====

policy-map type control-plane copp-system-policy
  class type control-plane copp-s-default
    police pps 100
  class type control-plane copp-s-ntp
    police pps 200
  class type control-plane copp-s-arprequest
    police pps 500
  class type control-plane copp-s-nd
    police pps 500
  class type control-plane copp-s-arpresponse
    police pps 500
  class type control-plane copp-s-bfd
    police pps 2300
  class type control-plane copp-s-lacp
    police pps 700
  ...
```

---

## display policy-map interface

Displays policy map information for the specified interface.

### Syntax

```
display policy-map interface {<interface  
name>|brief|control-plane|  
ethernet <chassis number/port number>|port-aggregation <LAG number>|  
vlan <VLAN number>} [input|output] [type {qos|queuing}]
```

where:

| Parameter   | Function  |
|---|---|
| <i>interface name</i>                             | The name of the interface.  |
| <b>brief</b>                                      | Displays a short policy map summary for all interfaces.   |
| <b>control-plane</b>                              | Displays Control Plane Protection (CoPP) packet level statistics.   |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays policy map information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays policy map information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                    | Displays policy map information for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| <b>input</b>                                      | Displays input policy map information.  |
| <b>output</b>                                     | Displays output policy map information.   |
| <b>type qos</b>                                   | Displays Quality of Service (QoS) policy map information.   |
| <b>type queuing</b>                               | Displays queuing policy map information.  |

### Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays policy map information for ethernet interface 1/12:

```
Switch> display policy-map interface ethernet 1/12

Global statistics status : disabled

Ethernet1/12

  Service-policy (queuing) output: default-out-policy

  Class-map (queuing): 1p7q1t-out-pq1 (match any)
  match cos 5-7
    priority level 1

  Class-map (queuing): 1p7q1t-out-q2 (match any)

  Class-map (queuing): 1p7q1t-out-q3 (match any)

  Class-map (queuing): 1p7q1t-out-q-default (match any)
  match cos 0-4
  match qos-group 0-7
    bandwidth remaining percent 25
```

## Restrictions

For brief and control-plane parameters, the options below are unavailable:

- input
- output
- type qos
- type queuing

---

## display policy-map type

Displays information only for the specified policy map type.

### Syntax

**display policy-map type {control-plane|qos|queuing}**

where:

| Parameter     | Function  |
|---------------|---|
| control-plane | Displays Control Plane Protection (CoPP) policy map information, including associated class map and rate limit. |
| qos           | Displays Quality of Service (QoS) policy map information.   |
| queuing       | Displays queuing policy map information.  |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays queuing policy map information:

```
Switch> display policy-map type queuing

Type queuing policy-maps
=====

policy-map type queuing default-out-policy
  class type queuing 1p7q1t-out-pq1
    priority level 1
  class type queuing 1p7q1t-out-q2
  class type queuing 1p7q1t-out-q3
  class type queuing 1p7q1t-out-q-default
    bandwidth remaining percent 25
```

---

## display port-aggregation

Displays Link Aggregation Group (LAG) information.

### Syntax

```
display port-aggregation {capacity|compatibility-parameters|summary}
```

where:

| Parameter                       | Function                                    |
|---------------------------------|---|
| <b>capacity</b>                 | Displays LAG capacity resource information. |
| <b>compatibility-parameters</b> | Displays LAG compatibility information.     |
| <b>summary</b>                  | Displays LAG summary information.           |

### Modes

All command modes

### History

| Release | Modification                                  |
|---------|---|
| 10.1    | The command was introduced.                   |
| 10.2    | Added <b>capacity</b> option.                 |
| 10.2    | Added <b>compatibility-parameters</b> option. |

### Example

The following command displays a short summary of all LAGs:

```
Switch> display port-aggregation summary

Flags:
D - Down          P - Up in port-aggregation (members)
S - Switched     R - Routed
I - Individual   s - Suspended
U - Up (port-aggregation)

-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Group  port-aggregation  Protocol  Member  Ports
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
100    po100             (SU)     NONE    Ethernet1/49(P) Ethernet1/50(P)
1000   po1000            (SU)     LACP    Ethernet1/1(P) Ethernet1/2(P)
2000   po2000            (SU)     LACP    Ethernet1/9(P) Ethernet1/10(P) Ethernet1/11(P)
                                         Ethernet1/12(P)
```

The following command displays LAG capacity resource information:

```
Switch> display port-aggregation capacity

port-aggregation resources
Available: 72 Used: 0( 0%) Static: 0 LACP: 0 Free: 72
```

The following command displays port-aggregation compatibility information:

```
Switch> display port-aggregation compatibility-parameters

+-----+
+ Parameters          + Description                                     +
+-----+-----+
Port mode             Members must have the same port mode configured.
Speed                 Members must have the same speed.
MTU                   Members must have the same MTU configured.
Duplex Mode           Members must have same Duplex Mode.
Storm Control         Members must have same storm control configured.
Flow Control          Members must have same flow control.
Capabilities           Members must have common capabilities.
Capabilities speed     Members must have common speed capabilities.
Capabilities duplex    Members must have common speed duplex capabilities.
Bridge-port           Members must be bridge-port, Layer 2.
Port access VLAN      Members must have the same port access VLAN.
Port native VLAN      Members must have the same port native VLAN.
Port allowed VLAN     Members must have the same port allowed VLAN list.
list
Mac learn             Members must have the same mac learn configuration
```



---

## display port-aggregation load-balance

Displays Link Aggregation Group (LAG) hash configuration.

### Syntax

```
display port-aggregation load-balance [forwarding-path  
interface port-aggregation <LAG number> {[src-interface  
ethernet <chassis number/port number>] [dst-mac <MAC address>]  
[src-mac <MAC address>] [dst-ip <IPv4 address>] [src-ip <IPv4  
address>] [dst-ipv6 <IPv6 address>] [src-ipv6 <IPv6 address>]  
[l4-dst-port <layer 4 port>] [l4-src-port <layer 4 port>]}
```

where:

| Parameter  | Function  |
|--|---|
| <code>forwarding-path interface port-aggregation LAG number</code> | Displays hash configuration for the selected LAG that forwards a specified packet. The <i>LAG number</i> is from 1 to 4096. |
| <code>src-interface ethernet chassis number/port number</code>     | Displays hash configuration for the specified source ethernet interface. The <i>chassis number</i> is 1.                    |
| <code>dst-mac MAC address</code>                                   | Displays hash configuration for the specified destination MAC address.  |
| <code>src-mac MAC address</code>                                   | Displays hash configuration for the specified source MAC address.   |
| <code>dst-ip IPv4 address</code>                                   | Displays hash configuration for the specified destination IPv4 address.   |
| <code>src-ip IPv4 address</code>                                   | Displays hash configuration for the specified source IPv4 address.  |
| <code>dst-ipv6 IPv6 address</code>                                 | Displays hash configuration for the specified destination IPv6 address.   |
| <code>src-ipv6 IPv6 address</code>                                 | Displays hash configuration for the specified source IPv6 address.  |
| <code>l4-dst-port layer 4 port</code>                              | Displays hash configuration for the specified destination layer 4 port. The <i>layer 4 port</i> range is from 0 to 65535.   |
| <code>l4-src-port layer 4 port</code>                              | Displays hash configuration for the specified source layer 4 port. The <i>layer 4 port</i> range is from 0 to 65535.        |

## Modes

All command modes.

The following command is available only in Privileged EXEC mode:

**display port-aggregation load-balance forwarding-path**

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays LAG hash configuration:

```
Switch> display port-aggregation load-balance

Port Aggregation Load-Balancing Configuration:
System: source-dest-ip

Port Aggregation Load-Balancing Addresses Used Per-Protocol:
Non-IP: source-dest-mac
IP: source-dest-ip
```

---

## display port-aggregation traffic

Displays Link Aggregation Group (LAG) traffic statistics.

### Syntax

**display port-aggregation traffic** [**interface port-aggregation** <LAG number or range>]

where:

| Parameter   | Function   |
|---|--|
| interface port-aggregation<br>LAG number or range | Displays traffic statistics for the specified LAG. The LAG number is from 1 to 4096. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LAG traffic statistics:

```
Switch> display port-aggregation traffic
```

| AggId | Port           | Rx-Ucst | Tx-Ucst | Rx-Mcst | Tx-Mcst | Rx-Bcst | Tx-Bcst |
|-------|----------------|---------|---------|---------|---------|---------|---------|
| 100   | Ethernet1/49/1 | 0.00%   | 0.00%   | 0.01%   | 0.01%   | 0.00%   | 0.00%   |
| 100   | Ethernet1/49/2 | 0.00%   | 0.00%   | 93.55%  | 93.81%  | 0.00%   | 0.00%   |
| 100   | Ethernet1/49/3 | 0.00%   | 0.00%   | 0.01%   | 0.01%   | 0.00%   | 0.00%   |
| 100   | Ethernet1/49/4 | 0.00%   | 0.00%   | 0.01%   | 0.01%   | 0.00%   | 0.00%   |
| 100   | Ethernet1/50/1 | 0.00%   | 0.00%   | 0.01%   | 0.01%   | 0.00%   | 0.00%   |
| 100   | Ethernet1/50/2 | 0.00%   | 0.00%   | 5.73%   | 0.02%   | 0.00%   | 0.00%   |
| 100   | Ethernet1/50/3 | 0.00%   | 0.00%   | 0.01%   | 5.70%   | 0.00%   | 0.00%   |
| 100   | Ethernet1/50/4 | 0.00%   | 0.00%   | 0.65%   | 0.42%   | 0.00%   | 0.00%   |
| 1000  | Ethernet1/1    | 0.00%   | 0.00%   | 89.43%  | 94.25%  | 0.00%   | 0.00%   |
| 1000  | Ethernet1/2    | 0.00%   | 0.00%   | 10.57%  | 5.75%   | 0.00%   | 0.00%   |
| 2000  | Ethernet1/9    | 0.00%   | 0.00%   | 24.62%  | 24.78%  | 0.00%   | 0.00%   |
| 2000  | Ethernet1/10   | 0.00%   | 0.00%   | 24.40%  | 25.55%  | 0.00%   | 0.00%   |
| 2000  | Ethernet1/11   | 0.00%   | 0.00%   | 26.69%  | 24.85%  | 0.00%   | 0.00%   |
| 2000  | Ethernet1/12   | 0.00%   | 0.00%   | 24.30%  | 24.82%  | 0.00%   | 0.00%   |
| 4096  | Ethernet1/25   | 0.00%   | 0.00%   | 100.00% | 100.00% | 0.00%   | 0.00%   |

---

## display privilege

Displays the current user privilege level.

### Syntax

**display privilege**

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the current user privilege level:

```
Switch> display privilege
Current privilege level is 1.

Switch> enable
Switch# display privilege
Current privilege level is 16.
```

---

## display proc-names

Displays a list with the names of all running processes.

### Syntax

```
display proc-names
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays a list with the names of all running processes:

```
Switch# display proc-names

nsm
ospfd
hostpd
lacpd
mstpd
imi
onmd
HSL
oamd
vlogd
vrrpd
ndd
ribd
bgpd
hostmibd
l2mribd
hsl_ras_mgr
vlagd
```

---

## display process

Displays a list with all running processes.

### Syntax

**display process [cpu [history|sort]|memory]**

where:

| Parameter      | Function  |
|----------------|---|
| <b>cpu</b>     | Displays the CPU workload of running processes.                                 |
| <b>history</b> | Displays the CPU utilization history.   |
| <b>sort</b>    | Displays process information sorted by CPU utilization, from highest to lowest. |
| <b>memory</b>  | Displays memory statistics of running processes.                                |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays a list of all running processes:

```
Switch# display process

PID NAME          TIME      FD
  1 nsm            5d22h58m 36
  4 ospfd         5d22h58m 22
  7 hostpd       5d22h58m 40
 14 lacpd        5d22h58m 24
 17 mstpd        5d22h58m 21
 24 onmd         5d22h58m 25
 26 hsl          5d22h58m 29
 28 oam          5d22h58m 37
 39 vrrpd        5d22h58m 27
 40 ndd          5d22h58m 39
 42 ribd         5d22h58m 20
 44 bgpd         5d22h58m 23
 45 hostmibd     5d22h58m 28
 46 l2mribd      5d22h58m 38
 47 hsl_ras_mgr  5d22h58m 30
 61 sysmgr       5d22h58m 34
 64 vlagd        5d22h58m 32
 65 slpd         5d22h58m 26
 70 npad         5d22h58m 31
 72 dhcpsnpd    5d22h58m 33
 73 telemetryd  5d22h58m 35
```

The following command displays process information sorted by CPU utilization:

```
Switch# display process cpu sort

PID  Runtime(ms)  Invoked  uSecs  1Sec  Process
-----
 26   74510350    913767  81541   4.3%  hsl
 39   2014720    101786614  19   0.1%  vrrpd
 68   953330     184851  5157   0.1%  platform_mgr
  1   752590    32255358  23   0.0%  nsm
  7   147610    1215118  121   0.0%  hostpd
 69   147440     901810  163   0.0%  service_mgr
 17   52740     1147294  45   0.0%  mstpd
 44   42350     1192240  35   0.0%  bgpd
 28   41530     1000875  41   0.0%  oam
 14   38270     1141820  33   0.0%  lacpd
 40   29530     231881  127   0.0%  ndd
 24   28240     204605  138   0.0%  onmd
 61   16810     88157  190   0.0%  sysmgr
 64   13700      7534  1818   0.0%  vlagd
 42   8860     114881  77   0.0%  ribd
  4   8150     113379  71   0.0%  ospfd
 45   7390     114099  64   0.0%  hostmibd
 70   5310     212875  24   0.0%  npad
 65   3890      7651  508   0.0%  slpd
 46   480      8205  58   0.0%  l2mribd
 73   350      8578  40   0.0%  telemetryd
 72   280      7244  38   0.0%  dhcpsnpd

CPU util : 5.4% user, 1.2% kernel, 93.4% idle
```

The following command displays memory statistics of running processes:

```
Switch# display process memory
```

| PID | MemAlloc | StkSize | RSSMem | LibMem | StackBase/Ptr     | Process      |
|-----|----------|---------|--------|--------|-------------------|--------------|
| 1   | 22832    | 8388608 | 11744  | 8896   | aad460/aad008     | nsm          |
| 4   | 18816    | 8388608 | 5780   | 8880   | beffb200/beffae08 | ospfd        |
| 7   | 92824    | 8388608 | 5960   | 8852   | 6ad27a70/6ad27630 | hostpd       |
| 14  | 18448    | 8388608 | 5616   | 8880   | 66efd0/66eba8     | lacpd        |
| 17  | 65164    | 8388608 | 36800  | 8880   | dfede9d0/dfede5b0 | mstpd        |
| 24  | 18992    | 8388608 | 6096   | 8880   | 18329110/18328d08 | onmd         |
| 26  | 1522900  | 8388608 | 174948 | 8940   | f152eb80/f152e790 | hsl          |
| 28  | 18560    | 8388608 | 5528   | 8880   | e2549ce0/e2549888 | oam          |
| 39  | 37904    | 8388608 | 8376   | 8880   | bf6cc150/bf6cbd40 | vrpd         |
| 40  | 18632    | 8388608 | 4524   | 8852   | 5749fb10/5749f718 | ndd          |
| 42  | 18992    | 8388608 | 6028   | 8880   | c85414b0/c8541048 | ribd         |
| 44  | 30764    | 8388608 | 17988  | 8896   | 7b398000/7b397ba8 | bgpd         |
| 45  | 18132    | 8388608 | 5084   | 8880   | 6bb0db0/6bb09a8   | hostmibd     |
| 46  | 56304    | 8388608 | 26064  | 8852   | 488b6590/488b6180 | l2mribd      |
| 61  | 18308    | 8388608 | 4612   | 8880   | e7ecc4a0/e7ecc098 | sysmgr       |
| 64  | 249400   | 8388608 | 66948  | 8860   | 254c630/254c210   | vlagd        |
| 65  | 18292    | 8388608 | 3912   | 8852   | 2e303570/2e303168 | slpd         |
| 70  | 19036    | 8388608 | 6416   | 11492  | 8a450410/8a44fff8 | npad         |
| 72  | 18324    | 8388608 | 3284   | 8852   | a4874ca0/a4874888 | dhcpsnpd     |
| 73  | 46724    | 8388608 | 27160  | 11452  | 5d6b8330/5d6b7f00 | telemetryd   |
| 68  | 256036   | 8388608 | 6360   | 5548   | ccf77270/ccf76e60 | platform_mgr |
| 69  | 82172    | 8388608 | 1932   | 2144   | e88baa60/e88ba810 | service_mgr  |



---

## display queuing interface ethernet

Displays ethernet interface queuing information.

### Syntax

**display queuing interface ethernet** <*chassis number/port number*>

where:

| Parameter                         | Function   |
|-----------------------------------|--|
| <i>chassis number/port number</i> | The ethernet interface chassis and port numbers. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays queuing information for ethernet interface 1/1:

```
Switch> display queuing interface ethernet 1/1

Egress Queuing for Ethernet Ethernet1/1 [System]
-----
Template: 4Q8E
-----
Que#      Group      Bandwidth  PrioLevel  Shape%     CoSMap
-----
0         0-7        -          -          -          0-4
1         -          -          High       -          5-7
2         -          -          -          -          -
3         -          -          -          -          -
4         -          -          -          -          -
5         -          -          -          -          -
6         -          -          -          -          -
7         -          -          -          -          -
```

---

## display restApi server

Displays the status of the Representational State Transfer (REST) server and the listening port number.

### Syntax

```
display restApi server
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the status of the rest server and the listening port number:

```
Switch> display restApi server

rest server enabled port: 443
restApi pki rest_mgmt vrf management
restApi pki rest_default vrf default
```

Please refer to *Lenovo REST API Programming Guide* for details on how to use the Lenovo REST API.

---

## display rib

Displays Routing Information Base (RIB) information.

### Syntax

```
display rib {bgp forwarding-timer|client|ipc stats|ospf forwarding-timer|txlist}
```

where:

| Parameter             | Function   |
|-----------------------|--|
| bgp forwarding-timer  | Displays BGP forwarding-timer statistics.              |
| client                | Displays user statistics.                              |
| ipc stats             | Displays inter-process communication (IPC) statistics. |
| ospf forwarding-timer | Displays OSPF forwarding-timer statistics.             |
| txlist                | Displays text list statistics.                         |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays RIB IPC statistics:

```
Switch> display rib ipc stats

Total Async Messages sent : 2
Total Async Messages Rcvd : 2
Total Bulk Messages sent : 2
Total Bulk Messages Rcvd : 2
Total Buffers Allocated : 2
Bulking is in progress : Yes
Acknowledged Buffers : 2
UnAcknowledged Buffers : 0
Total Buffers not found : 0
Total Timeout's sent : 0
Current Buffer Usage : 0%
Last Message sent : Fri Jan 8 04:58:50 2016

Last Message Rcvd : Fri Jan 8 04:58:50 2016
```

---

## display role

Displays the user role configuration.

### Syntax

**display role** [**name** <role name>]

where:

| Parameter                    | Function  |
|------------------------------|---|
| <b>name</b> <i>role name</i> | Displays the user role configuration for the specified role. The <i>role name</i> can be either <i>network-admin</i> or <i>network-operator</i> . |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays user role configuration:

```
Switch> display role

Role : network-admin
  Description: Predefined network admin role has access to all commands
              on the switch
-----
Rule   Perm   Type      Scope      Entity
-----
1      permit read-write

Role : network-operator
  Description: Predefined network operator role has access to all read
              commands on the switch
-----
Rule   Perm   Type      Scope      Entity
-----
1      permit read
```

---

## display route-map

Displays user readable route-map information.

### Syntax

**display route-map** [*<route map name>*]

where:

| Parameter             | Function                   |
|-----------------------|----------------------------|
| <i>route map name</i> | The name of the route map. |

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays route map information:

```
Switch# display route-map
route-map A, permit, sequence 10
  Match clauses:
    ip address prefix-list: pf_1
    community: commlist_1
  Set clauses:
    as-path prepend 1234
route-map A, deny, sequence 20
  Match clauses:
    as-path: as_acl_1
  Set clauses:
route-map A, permit, sequence 30
  Match clauses:
  Set clauses:
    metric 20
route-map local_pref, permit, sequence 10
  Match clauses:
    ip next-hop prefix-list: pf_2
    origin: igp
  Set clauses:
    local-preference 150
    weight 400
```

---

## display router-id

Displays the configured router ID.

### Syntax

```
display router-id
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the configured router ID:

```
Switch> display router-id  
Router ID: 20.211.2.2 (automatic)
```

---

## display routing

Displays routing information.

### Syntax

```
display routing [<IPv4 address/prefix length> | all | bgp | connected |  
next-hop | ospf | static | summary | vrf { all | default | management } ]
```

```
display routing database [all | bgp | connected | ospf | static ]
```

```
display routing interface [<interface name> | ethernet <chassis  
number/port number> | loopback <loopback interface> | mgmt <management  
interface> | port-aggregation <LAG number> | vlan <VLAN number> ]
```

```
display routing {ip|ipv4|ipv6} [<IP network address> | <prefix  
length> | all | bgp | connected | database | interface | next-hop | ospf |  
static | vrf { all | default | management } ]
```

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>IPv4 address</i>   | Displays routing information for routes associated with a specific network from the IP routing table.      |
| <i>prefix length</i>  | Displays routing information for routes associated with a specific IP and a specific network mask.         |
| <b>all</b>            | Displays routing information for all routes.   |
| <b>bgp</b>            | Displays routing information for routes associated with Border Gateway Protocol (BGP).                     |
| <b>connected</b>      | Displays routing information for connected routes only.  |
| <b>next-hop</b>       | Displays routing information for the specified next hop address in IPv4 address format.                    |
| <b>ospf</b>           | Displays routing information for Open Shortest Path First (OSPF) routes.                                   |
| <b>static</b>         | Displays routing information for static routes only.   |
| <b>summary</b>        | Displays a summary of all routes.  |
| <b>vrf all</b>        | Displays routing information for routes associated with any Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf default</b>    | Displays routing information for routes associated with the default VRF instance.                          |
| <b>vrf management</b> | Displays routing information for routes associated with the management VRF instance.                       |
| <i>interface name</i> | The name of the interface.   |

| Parameter                                  | Function   |
|--|--|
| ethernet <i>chassis number/port number</i> | Displays routing information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| loopback <i>loopback interface</i>         | Displays routing information for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| mgmt <i>management interface</i>           | Displays routing information for the specified management interface. The <i>management interface</i> is 0.   |
| port-aggregation <i>LAG number</i>         | Displays routing information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| vlan <i>VLAN number</i>                    | Displays routing information for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| ip   | Displays routing information for routes associated with Internet Protocol version 4 and 6.   |
| ipv4                                       | Displays routing information for routes associated with Internet Protocol version 4.   |
| ipv6                                       | Displays routing information for routes associated with Internet Protocol version 6.   |

## Modes

Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |



## Example

The following command displays routing information:

```
Switch> display routing
Codes: C - connected, S - static, R - RIP, B - BGP
       O - OSPF, IA - OSPF inter area, D - DHCP
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       * - candidate default

IP Route Table for VRF "default"
B      1.1.1.0/24 [200/0] via 23.1.1.2, Vlan23, 00:00:59
C      23.1.1.0/24 is directly connected, Vlan23
C      24.1.1.0/24 is directly connected, Vlan24
S      45.0.0.0/8 [1/0] via 113.0.0.105, Vlan113
       [1/0] via 24.1.1.2, Vlan24
O E1   57.61.0.0/24 [110/125] via 23.1.1.2, Vlan23, 00:27:44
B      100.0.0.0/24 [20/0] via 113.0.0.100, Vlan113, 00:15:07
B      100.0.1.0/24 [20/0] via 113.0.0.100, Vlan113, 00:31:18
C      113.0.0.0/24 is directly connected, Vlan113
O      116.0.0.0/24 [110/124] via 23.1.1.2, Vlan23, 00:34:45
O IA   117.1.1.1/32 [110/124] via 23.1.1.2, Vlan23, 00:34:35
B      145.45.0.0/16 [200/0] via 23.1.1.2, Vlan23, 00:01:02
O E2   190.20.20.20/32 [110/20] via 23.1.1.2, Vlan23, 00:05:07
C      192.168.1.2/32 is directly connected, loopback0

Gateway of last resort is not set
```

---

## display routing hash

Displays the route that the unicast Routing Information Base (RIB) Forwarding Information Base (FIB) uses for a source and destination address pair.

### Syntax

**display routing hash** <source address> <destination address> [**ip-proto** <IP protocol>] [<source port> <destination port>] [**vrf** {<VRF instance>|**default**}]

where:

| Parameter                          | Function   |
|------------------------------------|--|
| <i>source address</i>              | The IPv4 address of the source.  |
| <i>destination address</i>         | The IPv4 address of the destination.   |
| <b>ip-proto</b> <i>IP protocol</i> | Displays routing information for the specified IPv4 protocol. The <i>IP protocol</i> is from 1 to 255.               |
| <i>source port</i>                 | The port number of the source. The <i>source port</i> is from 1 to 65535.  |
| <i>destination port</i>            | The port number of the destination. The <i>destination port</i> is from 1 to 65535.                                  |
| <b>vrf</b> <i>VRF instance</i>     | Displays routing information for routes associated with the specified Virtual Routing and Forwarding (VRF) instance. |
| <b>vrf default</b>                 | Displays routing information for routes associated with the default VRF instance.                                    |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays routing information:

```
Switch> display routing hash
```

---

## display running-config

Displays the running configuration.

### Syntax

```
display running-config [aaa [all]|access-list|aclmrg  
[all]|arp [all]|as-path access-list|bfd|bgp|community-list|  
|dhcp|diff|dns|ipqos [all]|key chain|lcp|lldp|logging|  
|monitor [all]|ntp [all]|ospf|prefix-list|radius|restApi  
server|route-map|router-id|security [all]|snmp|  
|spanning-tree|ssh server|syslog|tacacs+|telnet server|vlag|  
|vlan <VLAN number>|vrf <VRF instance>|vrrp|vdm]
```

where:

| Parameter                  | Function  |
|----------------------------|---|
| <b>aaa</b>                 | Displays only the Authentication, Authorization and Accounting (AAA) running configuration. |
| <b>all</b>                 | Displays the running configuration for the specified process, including the default values. |
| <b>access-list</b>         | Displays only the Access Control List (ACL) running configuration.                          |
| <b>aclmrg</b>              | Displays only the Access Control List (ACL) manager running configuration.                  |
| <b>arp</b>                 | Displays only the Address Resolution Protocol (ARP) running configuration.                  |
| <b>as-path access-list</b> | Displays only the autonomous system (AS) path filter running configuration.                 |
| <b>bfd</b>                 | Displays only the Bidirectional Forwarding Detection (BFD) running configuration.           |
| <b>bgp</b>                 | Displays only the Border Gateway Protocol (BGP) running configuration.                      |
| <b>community-list</b>      | Displays only the community list running configuration.                                     |
| <b>dhcp</b>                | Displays only the Dynamic Host Configuration Protocol (DHCP) running configuration.         |
| <b>diff</b>                | Displays only the difference between startup and running configurations.                    |
| <b>dns</b>                 | Displays only the Domain Name Service (DNS) running configuration.                          |
| <b>ipqos</b>               | Displays only the IP Quality of Service (QoS) running configuration.                        |

| <b>Parameter</b>      | <b>Function</b>  |
|-----------------------|--|
| <b>key chain</b>      | Displays the authentication key management running configuration.  |
| <b>lACP</b>           | Displays only the Link Aggregation Control Protocol (LACP) running configuration.                        |
| <b>lldp</b>           | Displays only the Link Layer Discovery Protocol (LLDP) running configuration.                            |
| <b>logging</b>        | Displays only the syslog running configuration.  |
| <b>monitor</b>        | Displays only the Ethernet Switch Port Analyzer (SPAN) session running configuration.                    |
| <b>ntp</b>            | Displays only the Network Time Protocol (NTP) running configuration.                                     |
| <b>ospf</b>           | Displays only the Open Shortest Path First (OSPF) running configuration.                                 |
| <b>prefix-list</b>    | Displays only the prefix list running configuration.   |
| <b>radius</b>         | Displays only the current RADIUS configuration.  |
| <b>restApi server</b> | Displays only the REpresentational State Transfer (REST) server running configuration.                   |
| <b>route-map</b>      | Displays only the route map running configuration.   |
| <b>router-id</b>      | Displays only the router ID running configuration.   |
| <b>security</b>       | Displays only the security running configuration.  |
| <b>snmp</b>           | Displays only the Simple Network Management Protocol (SNMP) running configuration.                       |
| <b>spanning-tree</b>  | Displays only the Multiple Spanning Tree Protocol (MSTP) running configuration.                          |
| <b>ssh server</b>     | Displays only the Secure Shell (SSH) server running configuration.                                       |
| <b>syslog</b>         | Displays only the syslog running configuration.  |
| <b>tacacs+</b>        | Displays only the Terminal Access Controller Access-Control System Plus (TACACS+) running configuration. |
| <b>telnet server</b>  | Displays only the Telnet running configuration.  |
| <b>vdm</b>            | Displays only the Virtual Domain Plugin (VDM) running configuration.                                     |
| <b>vlag</b>           | Displays only Virtual Link Aggregation Group (VLAG) running configuration.                               |

| Parameter                      | Function  |
|--------------------------------|---|
| <b>vlan</b> <i>VLAN number</i> | Displays only the specified Virtual LAN (VLAN) running configuration. The <i>VLAN number</i> is from 1 to 4094. |
| <b>vrf</b> <i>VRF instance</i> | Displays only the specified Virtual Routing and Forwarding (VRF) instance running configuration.                |
| <b>vrrp</b>                    | Displays only the Virtual Router Redundancy Protocol (VRRP) running configuration.                              |

## Modes

All command modes

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |
| 10.3    | Added <b>radius</b> option. |

## Example

The following command displays the current running configuration of the switch:

```
Switch> display running-config
!
version "10.4.0.55"
!
hostname Switch08
!
!
logging console 6
logging monitor 6
logging library mcast facility l2mrib 2
vrf context management
 ip route 0.0.0.0/0 mgmt0 10.241.39.1
!
!
username admin role network-admin password encrypted
$6$bJowJEi.$4VDFQk.gT55Sn1wkVvyBRgcC6fsw0zS8DrL
82GGSbSFuk4V6l4uthK094w/Sp34BtqLA3hmEOPTNiSnOxdm1Q0
restApi pki rest_mgmt vrf management
restApi pki rest_default vrf default
feature restApi
lACP system-priority 100
vlag tier-id 1
vlag priority 32768
vlag isl port-aggregation 41
vlag hlthchk peer-ip 10.241.39.72 vrf management
vlag enable
vlag instance 1 port-aggregation 111
vlag instance 1 enable
vlag instance 12 port-aggregation 112
vlag instance 12 enable
spanning-tree pathcost method long
!
mac address-table aging-time 70
!
vlan 1
!
vlan 10
!
vlan 30
!
vlan 40
!
vlan 70
!
spanning-tree mst 0-64 priority 16384
!
spanning-tree vlan 1-500 priority 4096
!
interface Ethernet1/1
 bridge-port access vlan 40
!
interface Ethernet1/2
 bridge-port access vlan 10
 aggregation-group 111 mode active
!
interface Ethernet1/3
 bridge-port access vlan 10
 aggregation-group 111 mode active
...
```

## Restrictions

In User EXEC mode only the following command parameters are available:

- aaa [all]
- aclmgr [all]
- arp [all]
- dhcp
- ipqos [all]
- logging
- monitor [all]
- ntp [all]
- restApi server
- security [all]
- snmp
- ssh server
- tacacs+
- telnet server
- vlag

---

## display running-config interface

Displays only interface running configuration.

### Syntax

**display running-config interface** [*<interface name>* | **ethernet** *<chassis number/port number>* | **loopback** *<loopback interface>* | **mgmt** *<management interface>* | **port-aggregation** *<LAG number>* | **vlan** *<VLAN number>*] [**lacp** | **mstp** | **ospf**]

where:

| Parameter   | Function  |
|---|---|
| <i>interface name</i>                             | The name of the interface.  |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays running configuration only for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>loopback</b> <i>loopback interface</i>         | Displays running configuration only for the specified loopback interface. The <i>loopback interface</i> is from 0 to 7.   |
| <b>mgmt</b> <i>management interface</i>           | Displays running configuration only for the specified management interface. The <i>management interface</i> is 0.   |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays running configuration only for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>vlan</b> <i>VLAN number</i>                    | Displays running configuration only for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| <b>lacp</b>                                       | Displays interface running configuration only for Link Aggregation Control Protocol (LACP).   |
| <b>mstp</b>                                       | Displays interface running configuration only for Multiple Spanning Tree Protocol (MSTP).   |
| <b>ospf</b>                                       | Displays interface running configuration only for Open Shortest Path First (OSPF).  |

### Modes

- Privileged EXEC mode
- Global Configuration mode



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays the running configuration for management interface 0:

```
Switch# display running-config interface mgmt 0  
  
!  
interface mgmt0  
  no bridge-port  
  vrf member management  
  no ip address dhcp  
  ip address 10.241.41.21/25
```

---

## display running-config ip

Displays IPv4 running configuration.

### Syntax

**display running-config ip [igmp snooping|route]**

where:

| Parameter     | Function   |
|---------------|--|
| igmp snooping | Displays Internet Group Management Protocol (IGMP) snooping running configuration. |
| route         | Displays static IPv4 route running configuration.                                  |

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays IPv4 running configuration:

```
Switch# display running-config ip
!
ip route 0.0.0.0/0 10.241.39.254
ip route 84.0.0.0/24 15.0.0.1
ip route 84.0.1.0/24 15.0.0.1
ip route 84.0.2.0/24 15.0.0.1
ip route 84.0.3.0/24 15.0.0.1
ip route 84.0.4.0/24 15.0.0.1
ip route 84.0.5.0/24 15.0.0.1
!
!
interface Ethernet1/13
 ip address 13.1.1.2/16
!
!
interface Ethernet1/14
 ip address 14.1.1.2/24
!
!
interface Ethernet1/20
 ip address 1.1.0.1/16
!
!
interface loopback0
 ip address 4.4.4.4/32
!
!
interface mgmt0
 no ip address dhcp
 ip address 10.241.39.135/25
!
!
interface Vlan10
 ip address 94.1.1.1/24
!
```

---

## display running-config ipv6

Displays IPv6 running configuration.

### Syntax

**display running-config ipv6 [neighbor [all]]|prefix-list|route]**

where:

| Parameter   | Function   |
|-------------|--|
| neighbor    | Displays static IPv6 neighbor running configuration.                           |
| all         | Displays static IPv6 neighbor running configuration, including default values. |
| prefix-list | Displays prefix list running configuration.                                    |
| route       | Displays static IPv6 route running configuration.                              |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays IPv6 running configuration:

```
Switch> display running-config ipv6
!
ipv6 route 3333::/64 5011::2
ipv6 route 3334::/64 5011::2
ipv6 route 3335::/64 5011::2
!
!
interface Ethernet1/20
ipv6 address 5011::1/64
!
!
interface Vlan10
ipv6 address 2001::4/64
!
```

### Restriction

In User EXEC mode, the only available command is:

- **display running-config ipv6 [neighbor [all]]**

---

## display running-config routing-protocol

Displays running configuration for routing network protocols.

### Syntax

**display running-config routing-protocol {bgp|ospf}**

where:

| Parameter   | Function  |
|-------------|---|
| <b>bgp</b>  | Displays Border Gateway Protocol (BGP) running configuration.   |
| <b>ospf</b> | Displays Open Shortest Path First (OSPF) running configuration. |

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays BGP running configuration:

```
Switch# display running-config routing-protocol bgp
!  
router bgp 64800  
  cluster-id 11  
  timers bgp 10 30  
  address-family ipv4 unicast  
    maximum-paths ibgp 32  
    redistribute direct  
  neighbor 9.3.11.1 remote-as 64800  
    advertisement-interval 0  
    bfd  
  address-family ipv4 unicast  
    route-reflector-client  
  neighbor 20.111.1.1 remote-as 64800  
    advertisement-interval 0  
    bfd  
  address-family ipv4 unicast  
    route-map peer-address in  
  neighbor 20.111.2.1 remote-as 64800  
    advertisement-interval 0  
    bfd  
  address-family ipv4 unicast  
    route-map peer-address in  
  neighbor 20.211.1.1 remote-as 64800  
    advertisement-interval 0  
    bfd  
  address-family ipv4 unicast  
    route-map peer-address in  
  neighbor 20.211.2.1 remote-as 64800  
    advertisement-interval 0  
    bfd  
  address-family ipv4 unicast  
    route-map peer-address in  
!
```

---

## display running-config switch

Displays running configuration for switch network processes.

### Syntax

**display running-config switch {lacp|mstp}**

where:

| Parameter | Function   |
|-----------|--|
| lacp      | Displays Link Aggregation Control Protocol (LACP) running configuration. |
| mstp      | Displays Multiple Spanning Tree Protocol (MSTP) running configuration.   |

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays LACP running configuration:

```
Switch# display running-config switch lacp
```

---

## display script

Displays a list of all installed python scripts.

### Syntax

**display script** [*<script name>*]**running**

where:

| Parameter          | Function  |
|--------------------|---|
| <i>script name</i> | Displays the contents of the specified user python script.                |
| running            | Displays detailed information about all currently running python scripts. |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays a list of all installed python scripts:

```
Switch# display script
```



---

## display script-job

Displays user defined jobs.

### Syntax

```
display script-job
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays user defined jobs:

```
Switch# display script-job
```

---

## display script-log

Displays the log file of all user script executions.

### Syntax

**display script-log** [*<script log file>*]

where:

| Parameter       | Function   |
|-----------------|--|
| <i>log file</i> | Displays the specified user script execution log file. |

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the log file of all user script executions:

```
Switch# display script-log
```

---

## display snmp

Displays Simple Network Management Protocol (SNMP) information.

### Syntax

**display snmp [community|engine-id|group|host|trap|user|view]**

where:

| Parameter | Function                             |
|-----------|--------------------------------------|
| community | Displays SNMP community information. |
| engine-id | Displays SNMP engine ID information. |
| group     | Displays SNMP group information.     |
| host      | Displays SNMP host information.      |
| trap      | Displays SNMP trap information.      |
| user      | Displays SNMP user information.      |
| view      | Displays SNMP view information.      |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays SNMP information:

```
Switch> display snmp

sys Contact:
sys Location:

-----
Community                Group/Access            Context
-----

SNMP USERS

User                Auth                Priv(enforce)
Groups

SNMP Tcp-session :Disabled

SNMP Protocol:Enabled
```

---

## display spanning-tree

Displays Spanning Tree Protocol (STP) information.

### Syntax

```
display spanning-tree [blockedports|inconsistentports|  
pathcost method|summary [totals]]
```

where:

| Parameter                | Function  |
|--------------------------|---|
| <b>blockedports</b>      | Displays ports blocked by STP.                        |
| <b>inconsistentports</b> | Displays ports that are in an inconsistent STP state. |
| <b>pathcost method</b>   | Displays STP path cost calculation method.            |
| <b>summary</b>           | Displays summary STP information.                     |
| <b>totals</b>            | Displays only the STP totals information.             |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays STP information:

```
Switch> display spanning-tree
MST0000
  spanning-tree enabled protocol mstp
  ROOT ID      priority  32768
                address  a897.dcf7.dd00
                Cost     500
                Port     100001 (po1)
                Hello Time 2   Max age 20   Forward Delay 15
  BRIDGE ID    priority  32768 (32768 sys-id-ext 0)
                address  a897.dcf7.f000
                Hello Time 10  Max age 40   Forward Delay 30

Interface      Role Sts cost      Prio.Nbr   Type
-----
po1             Root FWD 500        128.100001 point-to-point
Ethernet1/48   Desg FWD 20000     128.410480 Edge point-to-point

MST0001
  spanning-tree enabled protocol mst
  ROOT ID      priority  32769
                address  a897.dcf7.dd00
                Cost     500
                Port     100001 (po1)
                Hello Time 10  Max age 40   Forward Delay 30
  BRIDGE ID    priority  32769 (32768 sys-id-ext 1)
                address  a897.dcf7.f000
                Hello Time 10  Max age 40   Forward Delay 30

Interface      Role Sts cost      Prio.Nbr   Type
-----
po1             Root FWD 500        128.100001 point-to-point
Ethernet1/48   Desg FWD 20000     128.410480 Edge point-to-point

MST0002
  spanning-tree enabled protocol mst
  ROOT ID      priority  32770
                address  a897.dcf7.dd00
                Cost     500
                Port     100001 (po1)
                Hello Time 10  Max age 40   Forward Delay 30
  BRIDGE ID    priority  32770 (32768 sys-id-ext 2)
                address  a897.dcf7.f000
                Hello Time 10  Max age 40   Forward Delay 30

Interface      Role Sts cost      Prio.Nbr   Type
-----
po1             Root FWD 500        128.100001 point-to-point
Ethernet1/48   Desg FWD 20000     128.410480 Edge point-to-point
```

---

## display spanning-tree active

Displays information about Spanning Tree Protocol (STP) active interfaces.

### Syntax

**display spanning-tree active [brief|detail]**

where:

| Parameter | Function   |
|-----------|--|
| brief     | Displays a summary information about STP active interfaces.  |
| detail    | Displays a detailed information about STP active interfaces. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays information about STP active interfaces:

```
Switch> display spanning-tree active
MST0000
  spanning-tree enabled protocol mstp
  ROOT ID      priority  32768
                address  a897.dcf7.dd00
                Cost     500
                Port     100001 (po1)
                Hello Time 2   Max age 20   Forward Delay 15

  BRIDGE ID    priority  32768 (32768 sys-id-ext 0)
                address  a897.dcf7.f000
                Hello Time 10   Max age 40   Forward Delay 30

Interface      Role Sts cost      Prio.Nbr   Type
-----
po1            Root FWD 500       128.100001 point-to-point
Ethernet1/48   Desg FWD 20000    128.410480 Edge point-to-point

MST0001
  spanning-tree enabled protocol mst
  ROOT ID      priority  32769
                address  a897.dcf7.dd00
                Cost     500
                Port     100001 (po1)
                Hello Time 10   Max age 40   Forward Delay 30

  BRIDGE ID    priority  32769 (32768 sys-id-ext 1)
                address  a897.dcf7.f000
                Hello Time 10   Max age 40   Forward Delay 30

Interface      Role Sts cost      Prio.Nbr   Type
-----
po1            Root FWD 500       128.100001 point-to-point
Ethernet1/48   Desg FWD 20000    128.410480 Edge point-to-point

MST0002
  spanning-tree enabled protocol mst
  ROOT ID      priority  32770
                address  a897.dcf7.dd00
                Cost     500
                Port     100001 (po1)
                Hello Time 10   Max age 40   Forward Delay 30

  BRIDGE ID    priority  32770 (32768 sys-id-ext 2)
                address  a897.dcf7.f000
                Hello Time 10   Max age 40   Forward Delay 30

Interface      Role Sts cost      Prio.Nbr   Type
-----
po1            Root FWD 500       128.100001 point-to-point
Ethernet1/48   Desg FWD 20000    128.410480 Edge point-to-point
```



---

## display spanning-tree bridge

Displays the status and configuration of Spanning Tree Protocol (STP) local bridge.

### Syntax

```
display spanning-tree bridge [address|brief|detail|
|forward-time|hello-time|id|max-age|priority [system-id]|
|protocol]
```

where:

| Parameter    | Function   |
|--------------|--|
| address      | Displays the MAC address of the STP local bridge.  |
| brief        | Displays a brief STP information summary of the local bridge.  |
| detail       | Displays a detailed STP information of the local bridge.   |
| forward-time | Displays the Forward Delay interval which specifies the amount of time in seconds needed for a port to change its state from Listening to Learning or from Learning to Forwarding. |
| hello-time   | Displays the time interval in seconds at which the STP bridge transmits configuration Bridge Protocol Data Units (BPDUs).  |
| id           | Displays the STP local bridge ID.  |
| max-age      | Displays the time a BPDU is stored before it is removed. If the max-age timer expires before receiving a new BPDU, the associated interface transitions to the listening state.    |
| priority     | Displays the bridge priority of the STP local bridge.  |
| system-id    | Displays the bridge priority and the system ID extension of the STP local bridge.  |
| protocol     | Displays which STP protocol is active.   |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays STP local bridge information:

```
Switch> display spanning-tree bridge
```

| MST INSTANCE | Bridge ID                       | Hello Time | Max Age | Fwd Dly | Protocol |
|--------------|---------------------------------|------------|---------|---------|----------|
| MST0000      | 32768 (32768,00) a897.dcde.2500 | 2          | 20      | 15      | mst      |

---

## display spanning-tree brief

Displays a brief Spanning Tree Protocol (STP) information summary.

### Syntax

**display spanning-tree brief [active]**

where:

| Parameter | Function   |
|-----------|--|
| active    | Displays information only for STP active interfaces. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays a brief STP information summary:

```
Switch> display spanning-tree brief
MST0000
  spanning-tree enabled protocol mstp
  ROOT ID      priority  32768
                address   a897.dcf7.dd00
                Cost      500
                Port      100001 (po1)
                Hello Time 2    Max age 20  Forward Delay 15

  BRIDGE ID    priority  32768 (32768 sys-id-ext 0)
                address   a897.dcf7.f000
                Hello Time 10   Max age 40  Forward Delay 30
Interface      Role Sts cost      Prio.Nbr  Type
-----
po1             Root FWD 500        128.100001 point-to-point
Ethernet1/48   Desg FWD 20000     128.410480 Edge point-to-point

MST0001
  spanning-tree enabled protocol mst
  ROOT ID      priority  32769
                address   a897.dcf7.dd00
                Cost      500
                Port      100001 (po1)
                Hello Time 10   Max age 40  Forward Delay 30

  BRIDGE ID    priority  32769 (32768 sys-id-ext 1)
                address   a897.dcf7.f000
                Hello Time 10   Max age 40  Forward Delay 30

Interface      Role Sts cost      Prio.Nbr  Type
-----
po1             Root FWD 500        128.100001 point-to-point
Ethernet1/48   Desg FWD 20000     128.410480 Edge point-to-point

MST0002
  spanning-tree enabled protocol mst
  ROOT ID      priority  32770
                address   a897.dcf7.dd00
                Cost      500
                Port      100001 (po1)
                Hello Time 10   Max age 40  Forward Delay 30

  BRIDGE ID    priority  32770 (32768 sys-id-ext 2)
                address   a897.dcf7.f000
                Hello Time 10   Max age 40  Forward Delay 30

Interface      Role Sts cost      Prio.Nbr  Type
-----
po1             Root FWD 500        128.100001 point-to-point
Ethernet1/48   Desg FWD 20000     128.410480 Edge point-to-point
```

---

## display spanning-tree detail

Displays a detailed Spanning Tree Protocol (STP) information.

### Syntax

**display spanning-tree detail [active]**

where:

| Parameter | Function   |
|-----------|--|
| active    | Displays information only for STP active interfaces. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays a detailed STP information summary:

```
Switch> display spanning-tree detail

MST0000 is executing the mst compatible Spanning-tree protocol
  Bridge Identifier has priority 32768, sysid 0, address a897.dcf7.f000
  Configured hello time 10 max age 40 forward delay 30
  Current root has priority 32768 address a897.dcf7.dd00
  Topology change flag not set, - topology change detected
  Number of topology change(s) 26 - last change occurred Thu Feb 18
15:31:01 20
16

Interface po1 of MST0000 is Root forwarding
  Port path cost 500 port priority 128 port identifier 100001
  Designated root has priority 32768, address a897.dcf7.dd00
  Designated bridge has priority 61440, address 0817.f4c3.dd01
  Timers: message age 5 forward delay 0 hold 0
  Link type is point-to-point
  BPDU: sent 41 received 520

Interface Ethernet1/48 of MST0000 is designated forwarding
  Port path cost 20000 port priority 128 port identifier 410480
  Designated root has priority 32768, address a897.dcf7.dd00
  Designated bridge has priority 32768, address a897.dcf7.f000
  Timers: message age 0 forward delay 0 hold 0
  Link type is Edge point-to-point
  Bpdu filter is enabled
  The port type is edge
  BPDU: sent 0 received 0
.....
```

---

## display spanning-tree ecp

Displays Virtual Link Aggregation Group (VLAG) - Multiple Spanning Tree Protocol (MSTP) Edge Control Protocol (ECP) information.

### Syntax

**display spanning-tree ecp {channels|statistics|upper-layer-protocols}**

where:

| Parameter             | Function                                      |
|-----------------------|---|
| channels              | Displays ECP channel information.             |
| statistics            | Displays ECP statistics.                      |
| upper-layer-protocols | Displays upper layer protocols active in ECP. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays a list of ECP channels:

```
Switch> display spanning-tree ecp channels
---- ECP CHANNELS ----
Ifindex   Ena   State   NextSeq   LastAck   FreeWindow
-----+-----+-----+-----+-----
100003    1     0       65520     65519     999
```

---

## display spanning-tree interface

Displays Spanning Tree Protocol (STP) interface information.

### Syntax

**display spanning-tree interface** {**ethernet** <*chassis number/port number*>|**port-aggregation** <*LAG number*>} [**brief**|**detail**]

where:

| Parameter   | Function  |
|---|---|
| <b>ethernet</b> <i>chassis number/port number</i> | Displays STP information only for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays STP information only for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>brief</b>                                      | Displays a brief STP information summary.   |
| <b>detail</b>                                     | Displays a detailed STP interface information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays STP information for ethernet interface 1/48:

```
Switch> display spanning-tree interface ethernet 1/48
```

| Mst Instance | Role | Sts | cost  | priority | Type                |
|--------------|------|-----|-------|----------|---------------------|
| MST0000      | Desg | FWD | 20000 | 128      | Edge point-to-point |
| MST0001      | Desg | FWD | 20000 | 128      | Edge point-to-point |
| MST0002      | Desg | FWD | 20000 | 128      | Edge point-to-point |
| MST0003      | Desg | FWD | 20000 | 128      | Edge point-to-point |



---

## display spanning-tree internal event-history

Displays Spanning Tree Protocol (STP) event logs.

### Syntax

```
display spanning-tree internal event-history {all|  
|buffer-size|deleted|errors|msgs|tree <spanning tree ID>  
[all-ports|interface {ethernet <chassis number/port number>|  
|port-aggregation <LAG number>}]]}
```

where:

| Parameter   | Function  |
|---|---|
| all   | Displays all STP event logs.  |
| buffer-size   | Displays memory allocation statistics for STP event logs.   |
| deleted   | Displays deleted STP trees and ports event logs.  |
| errors  | Displays STP error event logs.  |
| msgs  | Displays STP messages.  |
| tree <i>spanning tree ID</i>                                | Displays STP event logs for the specified spanning tree. The <i>spanning tree ID</i> is: <ul style="list-style-type: none"><li>• for CIST is 0</li><li>• for MSTP is the instance number from 0 to 64</li><li>• for Rapid PVST+ is the VLAN number from 1 to 4094</li></ul> |
| all-ports   | Displays STP event logs for all ports.  |
| interface ethernet<br><i>chassis number/port<br/>number</i> | Displays STP event logs only for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.  |
| interface<br>port-aggregation<br><i>LAG number</i>          | Displays STP event logs only for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays all STP event logs:

```
Switch> display spanning-tree internal event-history all

Event: msgs, length:19, at 440026 usecs after Fri Jan  8 04:58:33 2016
interface mgmt0 add
Event: msgs, length:23, at 440344 usecs after Fri Jan  8 04:58:33 2016
interface loopback0 add
Event: msgs, length:19, at 440432 usecs after Fri Jan  8 04:58:33 2016
interface Vlan1 add
Event: msgs, length:25, at 440524 usecs after Fri Jan  8 04:58:33 2016
interface Ethernet1/1 add
Event: msgs, length:25, at 440638 usecs after Fri Jan  8 04:58:33 2016
interface Ethernet1/2 add
Event: msgs, length:25, at 440736 usecs after Fri Jan  8 04:58:33 2016
interface Ethernet1/3 add
Event: msgs, length:25, at 440832 usecs after Fri Jan  8 04:58:33 2016
interface Ethernet1/4 add
Event: msgs, length:25, at 440929 usecs after Fri Jan  8 04:58:33 2016
interface Ethernet1/5 add
Event: msgs, length:25, at 441042 usecs after Fri Jan  8 04:58:33 2016
interface Ethernet1/6 add
Event: msgs, length:25, at 441139 usecs after Fri Jan  8 04:58:33 2016
interface Ethernet1/7 add
Event: msgs, length:25, at 441235 usecs after Fri Jan  8 04:58:33 2016
interface Ethernet1/8 add
Event: msgs, length:25, at 441345 usecs after Fri Jan  8 04:58:33 2016
```

---

## display spanning-tree internal info tree

Displays Spanning Tree Protocol (STP) internal information.

### Syntax

```
display spanning-tree internal info tree <spanning tree ID>  
[all-ports|interface {ethernet <chassis number/port number>|  
port-aggregation <LAG number>]
```

where:

| Parameter  | Function  |
|--|---|
| <i>spanning tree ID</i>  | Displays STP internal information for the specified spanning tree. The <i>spanning tree ID</i> is: <ul style="list-style-type: none"><li>• for CIST is 0</li><li>• for MSTP is the instance number from 0 to 64</li><li>• for Rapid PVST+ is the VLAN number from 1 to 4094</li></ul> |
| <b>all-ports</b>   | Displays STP internal information for all ports.  |
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Displays STP internal information only for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.  |
| <b>interface port-aggregation</b><br><i>LAG number</i>         | Displays STP internal information only for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays STP internal information:

```
Switch> display spanning-tree internal info tree 1
----- STP Tree Info (tree 1) -----
port_list                               Ethernet1/54(410540)
Ethernet1/53(410530)                    Ethernet1/50(410500)
Ethernet1/49(410490)                    Ethernet1/48(410480)
Ethernet1/47(410470)                    Ethernet1/46(410460)
Ethernet1/45(410450)                    Ethernet1/44(410440)
Ethernet1/43(410430)                    Ethernet1/42(410420)
Ethernet1/41(410410)                    Ethernet1/40(410400)
Ethernet1/39(410390)
.....
vlan_list                                1
fid_list
instance_id                              1
low_port                                  3
master                                    false
learning_enabled                          true
msti_mastered                             false
reselect                                  false
msti_bridge_id                            80:01:a8:97:dc:f7:f0:00
msti_bridge_priority                       32768
recent_root                               100001
br_inst_all_rr_timer_cnt                   0
msti_designated_root                       80:01:a8:97:dc:f7:dd:00
msti_designated_bridge                     f0:01:08:17:f4:c3:dd:01
internal_root_path_cost                    500
designated_internal_root_path_cost          0
msti_root_port_id                          34465
root_inst_port                             po1(100001)
msti_root_port_ifindex                     100001
port_index                                  0
hop_count                                  18
tc_flag                                    true
topology_change_detected                   true
time_last_topo_change                      Thu Jan  1 03:11:52 1970
num_topo_changes                           5
total_num_topo_changes                     5
tc_initiator                               34465
tc_last_rcvd_from                          08:17:f4:c3:dd:01
is_te_instance                             0
```

---

## display spanning-tree mst

Displays Multiple Spanning Tree Protocol (MSTP) information.

### Syntax

**display spanning-tree mst** [*<MST instance>*] [**interface** {**ethernet** *<chassis number/port number>*|**port-aggregation** *<LAG number>*}] [**detail**]

where:

| Parameter   | Function   |
|---|--|
| <i>MST instance</i>   | Displays MSTP information for the specified instance. The <i>MST instance</i> is from 0 to 64. A range of instances can also be added (e.g. 7-9).          |
| <b>interface ethernet</b> <i>chassis number/port number</i> | Displays MSTP information only for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <b>interface port-aggregation</b> <i>LAG number</i>         | Displays MSTP information only for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |
| <b>detail</b>   | Displays detailed MSTP information.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays MSTP information:

```
Switch> display spanning-tree mst
##### MST0    vlans mapped: 4-4094
Bridge        address a897.dcf7.f000 priority 32768 (32768 sysid 0)
Root         address a897.dcf7.dd00 priority 32768 (32768 sysid 0)
              port po1 path cost 0
Regional Root address a897.dcf7.dd00 priority 32768 (32768 sysid 0)
              internal cost 500 rem hops 18
Operational  hello time 2 , forward delay 15, max age 20, txholdcount 6
Configured   hello time 10, forward delay 30, max age 40, max hops 64

Interface      Role Sts cost      Prio.Nbr   Type
-----
po1            Root FWD 500      128.100001 point-to-point
Ethernet1/48   Desg FWD 20000   128.410480 Edge point-to-point

##### MST1    vlans mapped: 1
Bridge        address a897.dcf7.f000 priority 32769 (32768 sysid 1)
Root         address a897.dcf7.dd00 priority 32769 (32768 sysid 1)
              port po1 cost 500 rem hops 18

Interface      Role Sts cost      Prio.Nbr   Type
-----
po1            Root FWD 500      128.100001 point-to-point
Ethernet1/48   Desg FWD 20000   128.410480 Edge point-to-point
.....
```

---

## display spanning-tree mst configuration

Displays Multiple Spanning Tree Protocol (MSTP) configuration information.

### Syntax

**display spanning-tree mst configuration [digest]**

where:

| Parameter | Function                  |
|-----------|---------------------------|
| digest    | Displays the MSTP digest. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays MSTP configuration information:

```
Switch> display spanning-tree mst configuration
Name      [region]
Revision 65535 Instances configured 3
Instance  Vlans mapped
-----
0         4-4094
1         1
2         2
3         3
-----
```

---

## display spanning-tree vlan

Display STP information for the specified VLAN(s).

### Syntax

```
display spanning-tree vlan <VLAN ID> [active|brief|  
detail|summary|interface {ethernet <chassis number/port number>|  
port-aggregation <LAG number>} {brief|detail}]
```

where:

| Parameter   | Function  |
|---|---|
| vlan <i>VLAN ID</i>                                     | Displays STP information for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.  |
| active  | Displays only active interfaces.  |
| brief   | Displays a short interface configuration summary.   |
| detail  | Displays detailed interface information.  |
| summary   | Displays a summary of STP information.  |
| interface ethernet<br><i>chassis number/port number</i> | Displays STP VLAN information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface<br>port-aggregation<br><i>LAG number</i>      | Displays STP VLAN information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.                                    |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode



## History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

## Example

The following command displays STP information for VLAN 300:

```
Switch> display spanning-tree vlan 300
VLAN0300
  spanning-tree enabled protocol rstp
  ROOT ID      priority    33068
                address     a897.dcde.1100
                This bridge is the root
                Hello Time 2   Max age 20   Forward Delay 15

  BRIDGE ID    priority    33068 (32768 sys-id-ext 300)
                address     a897.dcde.1100
                Hello Time 2   Max age 20   Forward Delay 15

Interface      Role Sts cost      Prio.Nbr      Type
-----
po100          Desg FWD 1      128.100100    point-to-point
po1000         Desg FWD 1      128.101000    point-to-point
po2000         Desg FWD 1      128.102000    point-to-point
Ethernet1/33   Desg FWD 2      128.410330    Edge point-to-point
```

The following command displays detailed STP information for VLAN 300:

```
Switch> display spanning-tree vlan 300 detail
Vlan0300 is executing the rpvst compatible Spanning-tree protocol
  Bridge Identifier has priority 32768, sysid 300, address a897.dcde.1100
  Configured hello time 2 max age 20 forward delay 15
  We are the root of the spanning-tree
  Topology change flag not set, Detected flag not set
  Number of topology change(s) 0 - last change occurred Thu Jan 1
03:00:00 197
0

Interface po100 of VLAN0300 is designated forwarding
  Port path cost 1 port priority 128 port identifier 128.1796
  Designated root has priority 33068, address a897.dcde.1100
  Designated bridge has priority 33068, address a897.dcde.1100
  Timers: message age 0 forward delay 0 hold 0
  Link type is point-to-point
  BPDU: sent 97, received 2

Interface po1000 of VLAN0300 is designated forwarding
  Port path cost 1 port priority 128 port identifier 128.2696
  Designated root has priority 33068, address a897.dcde.1100
  Designated bridge has priority 33068, address a897.dcde.1100
  Timers: message age 0 forward delay 0 hold 0
  Link type is point-to-point
  BPDU: sent 47, received 0

Interface po2000 of VLAN0300 is designated forwarding
  Port path cost 1 port priority 128 port identifier 128.3696
  Designated root has priority 33068, address a897.dcde.1100
  Designated bridge has priority 33068, address a897.dcde.1100
  Timers: message age 0 forward delay 0 hold 0
  Link type is point-to-point
  BPDU: sent 47, received 0

Interface Ethernet1/33 of VLAN0300 is designated forwarding
  Port path cost 2 port priority 128 port identifier 128.730
  Designated root has priority 33068, address a897.dcde.1100
  Designated bridge has priority 33068, address a897.dcde.1100
  Timers: message age 0 forward delay 0 hold 0
  Link type is Edge point-to-point
  Bpdu filter is enabled
  The port type is edge
  BPDU: sent 0, received 0
```

---

## display ssh

Displays Secure Shell (SSH) information.

### Syntax

**display ssh {key|server}**

where:

| Parameter | Function                           |
|-----------|------------------------------------|
| key       | Displays the SSH key.              |
| server    | Displays SSH server configuration. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the SSH key:

```
Switch> display ssh key

*****RSA KEY*****
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQAC99oI5p+qJN98rSnnZ0KY/MK1A9LeF4LN9AZ0lcW
ax6r/5ibBznX6Q4gFPY6/yrwcV1ULZNBisC8rxM8Dvq/m6CGnxqZZrwrTeYmlBX3XGjDcc4jK2L3rmXc
wgSqAvisE4i2NfabvK9zyaPfkBefEPaT0eCedkvE7+vpUhJT7x6qk1Uxdosam6q0PZ7QsAB+XeE8ngDw
IUioHmZgz0C1VYi3P1zCQlkUnyHXqknvDpTR9HWGU3TA9Jnr1TgBS5/aaZexU0Ha0gyPNNZRBI5QrDkZ
BT0Wg1qcaakc3HrbVRxoVpm6fgS3gAt8teCpZ1sCyYaMwK8CHQiGHlkjMIZ/Yb

bitcount: 2048 fingerprint: 0a:79:bc:e7:f4:fb:28:09:19:5a:a4:ff:e4:de:98:3f

*****
*****DSA KEY*****
ssh-dsa AAAAB3NzaC1kc3MAAACBAK6XyWuMFiWJcdABLeF3klmv9zK61KZ9yM5pZKYiiIZukYotrY
G1t6XLVzwjPgjpZwm/IawGjGjUNThyKL9FrcDPi+18bmGwXJ/FtZ6BnduLQjLmTu1YppF0LUNHx2BXoR
p3vNbo7KX0yCnb0X6RNKsv6xcka6RrKP1ZPPbA+cdNAAAFQDPJCqVvhqv8mKNic1gdZLDKNSqiwAAAI
Bq032fymIi0zbwPrXJqv90G/gKdKeSAVN40IfL4RlD/CPSDMwKVugakiMi+K1nfCFTT0IWI88qtbfnRc
Nzsmamot7rntXsL9ICdBxPs+MvQR0oG+/UJ3iwG1TGjya1tbVst4q2TwNtwrJMoromCzMFMBf+1VnqyL
qUse/20d5CrAAAIIEAmMAK5PSU+YblPf1kT8ItH4K2Eci0mnoUB06euXSZMuodtEW2v4wxWh78a5bN4R
Ee6nHgFAcftWEvjTmR7QqznTy2FJbUkhF++u6XoG0xpLf2hEECLVRR662veQpXI39oyBE1zV80qABv5f
lo2g9Dqy0SZkUTVn/kYpCo19e0JA=

bitcount: 1024 fingerprint: 77:c0:d3:71:7d:9c:26:28:9d:8b:fd:7d:55:63:e8:50

*****
```

The following command displays SSH server configuration:

```
Switch> display ssh server  
ssh server enabled port: 22  
authentication-retries 3
```

---

## display startup-config

Displays the startup configuration.

### Syntax

```
display startup-config
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the startup configuration:

```
Switch# display startup-config
!
version "10.4.2.0"
!
logging console 6
logging level 12mrib 3
vrf context default
!
vrf context management
 ip route 0.0.0.0/0 10.241.41.1
!
microburst-detection interval 100
!
no ip icmp-broadcast
control-plane service-policy input copp-system-policy
no feature telnet
feature ssh
no feature tacacs+
snmp-server enable snmp
snmp-server view all .1 included
username admin role network-admin password encrypted
$6$bJow9I4/$JyaAhMzHRMdQNEO
xww4R5FZKykmDm1m1tpQrnAA2NE54Y2tbjIvCfBy//pZhvUFhE0sdipwc5Bra2GvcQYrU1
no feature restApi
spanning-tree mode mst
...
```

---

## display statistics microburst

Displays microburst detection statistics.

### Syntax

**display statistics microburst** [**interface ethernet** <*chassis number/port number*>]

where:

| Parameter  | Function  |
|--|---|
| <b>interface ethernet</b><br><i>chassis number/port number</i> | Displays microburst detection statistics only for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.<br><br>If no interface is specified, the command displays statistics for all ethernet interfaces where microburst detection is enabled. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays microburst detection statistics:

```
Switch> display statistics microburst
-----
Interface      # of uburst  avg size  max size  avg duration  max
duration
-----
-----
Ethernet1/8    0            0         0         0             0
0
```

---

## display switchname

Displays the switch's name.

### Syntax

```
display switchname
```

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the switch's name:

```
Switch# display switchname  
G8272
```

---

## display sys-info

Displays the boot file and hardware environment status information.

### Syntax

**display sys-info**

### Modes

- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the boot file and hardware environment status information:

```
Switch# display sys-info

*** display startup ***
Current FLASH software:
  active image: version 10.4.2.0, downloaded 16:58:01 UTC Mon Jan  4 2016
  standby image: version 10.4.2.0, downloaded 12:53:19 UTC Sat Dec  5 2015
  Uboot: version 10.4.2.0, downloaded 11:17:04 UTC Wed Nov  4 2015
Currently set to boot software active image
Currently scheduled reboot time: none
Current port mode: default mode

*** display env fan detail ***
Total Fan: 8
+-----+-----+-----+-----+-----+-----+
| Module | Fan | Name           | Air-Flow      | Speed | Speed |
| Number | ID  |                 | Direction     | (%)   | (RPM) |
+-----+-----+-----+-----+-----+-----+
01      01  Fan 1          Front-to-Back  0       4225
01      02  Fan 2          Front-to-Back  25      4404
02      03  Fan 3          Front-to-Back  0       4115
02      04  Fan 4          Front-to-Back  25      4444
03      05  Fan 5          Front-to-Back  0       4390
03      06  Fan 6          Front-to-Back  25      4549
04      07  Fan 7          Front-to-Back  0       4344
04      08  Fan 8          Front-to-Back  25      4507
...

```



---

## display system

Displays system related information.

### Syntax

```
display system {cores|internal ipfib errors|reset-reason|resources|uptime|vlan reserved}
```

where:

| Parameter                    | Function  |
|------------------------------|---|
| <b>cores</b>                 | Displays core transfer option information.            |
| <b>internal ipfib errors</b> | Displays error logs for IPFIB.                        |
| <b>reset-reason</b>          | Displays the reason of the most recent switch reload. |
| <b>resources</b>             | Displays overall system resources.                    |
| <b>uptime</b>                | Displays the time since the switch running time.      |
| <b>vlan reserved</b>         | Displays the range of reserved Virtual LANs (VLANs).  |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays overall system resources:

```
Switch# display system resources
load average: 0.10, 0.19, 0.25
Tasks: 91 total, 1 running, 90 sleeping, 0 stopped, 0 zombie
Cpu(s): 5.9%us, 6.7%sy, 0.0%ni, 87.4%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 4086612k total, 1137884k used, 2948728k free, 33624k buffers
```

The following command displays the reserved VLAN range:

```
Switch> display system vlan reserved
Reserved VLAN range: 4000-4094
```

## Restriction

In User EXEC mode, the only available command is:

- **display system vlan reserved**

In Global Configuration mode, the only available commands are:

- **display system internal ipfib errors**
- **display system uptime**

---

## display tacacs-server

Displays Terminal Access Controller Access-Control System Plus (TACACS+) server information.

### Syntax

**display tacacs-server** [*<server address>* | **groups** *<group name>* | **sorted** | **statistics** *<server address>*]

where:

| Parameter             | Function   |
|-----------------------|--|
| <i>server address</i> | Displays information about the specified TACACS+ server. The <i>server address</i> can be either an IPv4 address or an IPv6 address. |
| <b>groups</b>         | Displays TACACS+ server group configuration information.   |
| <i>group name</i>     | Displays TACACS+ server configuration information for the specified group.   |
| <b>sorted</b>         | Displays TACACS+ server information sorted alphabetically by name.   |
| <b>statistics</b>     | Displays TACACS+ server statistics.  |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays TACACS+ server information:

```
Switch> display tacacs-server
```

---

## display tech-support

Displays all system related information and process configurations by automatically running various commands.

### Syntax

```
display tech-support [aaa|arp [brief]]|bfd|bgp [brief]|  
|bootvar|brief|commands|dhcp|forwarding|icmpv6|interfaces|  
|interfaces-vlan|ip [igmp snooping] [brief]|ipv6|lacp [all]|  
|lldp|logging|microburst|ntp|obs|ospf|platform|port-agent|  
|port-aggregation|port-manager|process|rib|snmp|ssh server|  
|stp|summary [page-optimized]|tacacs+|telemetry|telnet  
server|um|vlag|vlan|vrrp [brief]] [page]
```

where:

| Parameter         | Function   |
|-------------------|--|
| <b>page</b>       | Displays the command output a page at a time. If not used, the output scrolls until all the pre-configured commands are ran. To stop the command execution press <b>&lt;Ctrl + C&gt;</b> . |
| <b>aaa</b>        | Displays all Authentication, Authorization and Accounting (AAA) related information and configurations.  |
| <b>arp</b>        | Displays all Address Resolution Protocol (ARP) related information and configurations.   |
| <b>bfd</b>        | Displays all Bidirectional Forwarding Detection (BFD) related information and configurations.  |
| <b>bgp</b>        | Displays all Border Gateway Protocol (BGP) related information and configurations.   |
| <b>bootvar</b>    | Displays all boot related information and configurations.  |
| <b>brief</b>      | Displays a short information summary.  |
| <b>commands</b>   | Displays the list of commands automatically run by <b>display tech-support</b> .   |
| <b>dhcp</b>       | Displays all Dynamic Host Configuration Protocol (DHCP) related information and configurations.  |
| <b>forwarding</b> | Displays all forwarding related information and configurations.  |
| <b>icmpv6</b>     | Displays all Internet Control Message Protocol version 6 (ICMPv6) related information and configurations.  |
| <b>interfaces</b> | Displays all interface related information and configurations.   |

| <b>Parameter</b>        | <b>Function</b>   |
|-------------------------|---|
| <b>interfaces-vlan</b>  | Displays all VLAN interface related information and configurations.                                     |
| <b>ip</b>               | Displays all IPv4 related information and configurations.   |
| <b>igmp snooping</b>    | Displays all Internet Group Management Protocol (IGMP) snooping related information and configurations. |
| <b>ipv6</b>             | Displays all IPv6 related information and configurations.   |
| <b>lACP</b>             | Displays Link Aggregation Control Protocol (LACP) related information and configurations.               |
| <b>all</b>              | Displays all Link Aggregation Control Protocol (LACP) related information and configurations.           |
| <b>lldp</b>             | Displays all Link Layer Discovery Protocol (LLDP) related information and configurations.               |
| <b>logging</b>          | Displays all logging related information and configurations.  |
| <b>microburst</b>       | Displays all microburst detection related information and configurations.                               |
| <b>ntp</b>              | Displays all Network Time Protocol (NTP) related information and configurations.                        |
| <b>obs</b>              | Displays all Python Scripting related information and configurations.                                   |
| <b>ospf</b>             | Displays all Open Shortest Path First (OSPF) related information and configurations.                    |
| <b>platform</b>         | Displays all platform related information and configurations.   |
| <b>port-agent</b>       | Displays all port agent related information and configurations.   |
| <b>port-aggregation</b> | Displays all Link Aggregation Group (LAG) related information and configurations.                       |
| <b>port-manager</b>     | Displays all port manager related information and configurations.                                       |
| <b>process</b>          | Displays information and configurations relating to all running processes.                              |
| <b>rib</b>              | Displays all Routing Information Base (RIB) related information and configurations.                     |
| <b>snmp</b>             | Displays all Simple Network Management Protocol (SNMP) related information and configurations.          |

| Parameter             | Function   |
|-----------------------|--|
| <b>ssh server</b>     | Displays all Secure Shell (SSH) server related information and configurations.                                       |
| <b>stp</b>            | Displays all Spanning Tree Protocol (STP) related information and configurations.                                    |
| <b>summary</b>        | Displays a short information summary.  |
| <b>page-optimized</b> | Uses less system memory and disk space while gathering information.  |
| <b>tacacs+</b>        | Displays all Terminal Access Controller Access-Control System Plus (TACACS+) related information and configurations. |
| <b>telemetry</b>      | Displays all Telemetry service related information and configurations.   |
| <b>telnet server</b>  | Displays all Telnet server related information and configurations.   |
| <b>um</b>             | Displays all user management related information and configurations.   |
| <b>vlag</b>           | Displays all Virtual Link Aggregation Group (VLAG) related information and configurations.                           |
| <b>vlan</b>           | Displays all Virtual LAN (VLAN) related information and configurations.  |
| <b>vrrp</b>           | Displays all Virtual Router Redundancy Protocol (VRRP) related information and configurations.                       |

## Modes

- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays all system related information and process configurations by automatically running various commands:

```
Switch# display tech-support

*** display running-config security ***
!Command: display running-config security
!Time:2016 Jan 10 14:11:44

NOSX version 10.4.2.0 LENOVO G8272, Thu Jan 14 10:34:20 PST 2016
username admin role network-admin password encrypted
$6$bJow9I4/$JyaAhMzHRMqNEO
xwW4R5FZKykmDM1m1tpQrnAA2NE54Y2tbj1IvCfBy//pZhvUFhE0sdipwc5Bra2GvcQYrU1
ssh key rsa 2048

*** display role ***
Role : network-admin
  Description: Predefined network admin role has access to all commands
  on the switch
-----
Rule    Perm    Type    Scope    Entity
-----
1       permit  read-write

Role : network-operator
  Description: Predefined network operator role has access to all read
  commands on the switch
-----
Rule    Perm    Type    Scope    Entity
-----
1       permit  read

*** display user-account ***
User:admin
      role: network-admin
...
```

---

## display telemetry bst-feature

Displays Buffer Statistics Tracking (BST) configuration information.

### Syntax

```
display telemetry bst-feature
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays BST configuration information:

```
Switch> display telemetry bst-feature

BST Enabled           : disabled
Send Async Reports   : disabled
Collection Interval  : 60 seconds
Stats in Percentage  : enabled
Stat Units in Cells  : disabled
Trigger Rate Limit   : 1
Trigger Rate Limit Interval : 10 seconds
Send Snapshot on Trigger : enabled
Async Full Reports   : disabled
```



---

## display telemetry bst-tracking

Displays Buffer Statistics Tracking (BST) tracking information.

### Syntax

```
display telemetry bst-tracking
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays BST tracking information:

```
Switch> display telemetry bst-tracking

Track Peak Stats                : disabled
Track Ingress Port Priority Group : enabled
Track Ingress Port Service Pool  : enabled
Track Ingress Service Pool       : enabled
Track Egress Port Service Pool    : enabled
Track Egress Service Pool        : enabled
Track Egress RQE Queue           : enabled
Track Device                      : enabled
```

---

## display telemetry information

Displays telemetry agent information, including information relating to the configured controller and heartbeat messages.

### Syntax

```
display telemetry information
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays telemetry agent information:

```
Switch> display telemetry information

Telemetry admin status   : enabled
Telemetry oper status   : up
Heartbeat status        : enabled
Heartbeat interval      : 30
Controllers configured   : 1
Controller 0:
  IP address             : 10.240.177.235
  TCP port               : 80
  VRF                   : management
  Protocol               : HTTP
```

---

## display telemetry switch-properties

Displays telemetry information describing the capabilities of the switch, which includes parameters such as supported telemetry options, agent IP address, network operating system and more.

### Syntax

```
display telemetry switch-properties
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.4    | The command was introduced. |

### Example

The following command displays telemetry switch information:

```
Switch> display telemetry switch-properties

Timestamp           : 2017-03-31 07:16:00
Number of ASICs     : 1
ASIC 0:
  Notation          : 1
  Type              : BCM56760
  Ports             : 54
Supported features  : BST
Network OS          : CNOS
Unique identifier   : 0000a48cdb951e00
Agent IP address    : 10.241.30.234
Agent TCP port      : 8080
Agent software version : 2017.03.01.1
```

---

## display telnet server

Displays Telnet server information.

### Syntax

```
display telnet server
```

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays telnet server information:

```
Switch> display telnet server
telnet server disabled port: 23
```

---

## display terminal

Displays terminal configuration for the current session.

### Syntax

```
display terminal
```

### Modes

Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays terminal configuration for the current session:

```
Switch# display terminal  
  
TTY: /dev/ttyS0 Type: vt100-nam  
Length: 24 lines, Width: 80 columns  
Session Timeout: 600 seconds
```

---

## display user-account

Displays the current user role configurations.

### Syntax

**display user-account** [*<account name>*]

where:

| Parameter           | Function                        |
|---------------------|---------------------------------|
| <i>account name</i> | The name of the user's account. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the current user role configurations:

```
Switch> display user-account
User:admin
   role: network-admin
```

---

## display users

Displays the currently logged in users.

### Syntax

**display users**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the currently logged in users:

```
Switch> display users
```

| Line    | User  | Time                    | Up Time  | PID  | Comment |
|---------|-------|-------------------------|----------|------|---------|
| console | admin | Fri Jan 8 05:13:39 2016 | 00:04:25 | 3696 | --      |

---

## display vdm information

Displays Virtual Domain Manager (VDM) information.

### Syntax

**display vdm information [nutanix]**

where:

| Parameter      | Description  |
|----------------|--|
| <b>nutanix</b> | Displays VDM information only for the Nutanix Cloud Manager. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command displays VDM information:

```
Switch> display vdm information
Owner: nutanix
IP Address: 10.241.31.102 vrf management
Username: admin
VDM URL:
    https://10.241.31.102:9440/api/nutanix/v3/webhooks
Switch URL(VM):
    https://10.241.30.139:443/nos/api/cfg/nutanix/vm
Switch URL(VNETWORK):
    https://10.241.30.139:443/nos/api/cfg/nutanix/network
Topology discovery URL:
    https://10.241.31.102:9440/PrismGateway/services/rest/v1/vms
Topology discovery query delay : 5
Topology startup delay : 120
Refresh Virtual-Machine URL:
    https://10.241.31.102:9440/api/nutanix/v3/vms/list
Refresh Virtual-Network URL:
    https://10.241.31.102:9440/api/nutanix/v3/networks/list
Interfaces
    po1 po2 po3 po4
```



---

## display version

Displays information about the running Cloud Network OS.

### Syntax

**display version**

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays information about the running CNOS:

```
Switch> display version

Lenovo Networking Operating System (NOS) Software
Technical Assistance Center: http://www.lenovo.com
Copyright (C) Lenovo, 2016. All rights reserved.

Software:
  Bootloader version: 10.4.2.0
  System version: 10.4.2.0
  System compile time: Tue Jan 19 10:28:02 PST 2016

Hardware:
  G8272 ("48x10GE + 6x40GE")
  NXP P2020 CPU with 4096 MB of memory

  Device name: G8272
  Boot Flash: 16 MB

Kernel uptime is 0 day(s), 0 hour(s), 21 minute(s), 47 second(s)

Last Reset Reason: Reset by CLI reload command
```

---

## display virtual-machine information

Display Virtual Machine (VM) information.

### Syntax

```
display virtual-machine information [interface {all|ethernet  
<chassis number/port number>}|port-aggregation <LAG number>]|vm <uuid>]
```

where:

| Parameter   | Description   |
|---|---|
| <b>interface</b>                                  | Displays VM information for a switch interface.   |
| <b>all</b>  | Display VM information for all switch ethernet ports and Link Aggregation Groups (LAGs).                          |
| <b>ethernet</b> <i>chassis number/port number</i> | Displays VM information for the specified ethernet port.  |
| <b>port-aggregation</b> <i>LAG number</i>         | Displays VM information for the specified LAG. <i>LAG number</i> is an integer from 1 to 4096.                    |
| <b>vm</b> <i>uuid</i>                             | Displays VM information for the specified Virtual Machine identified by its Universally Unique Identifier (UUID). |

### Modes

- User EXEC mode
- Privileged EXEC mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

## Example

The following command display VM information:

```
Switch> display virtual-machine information interface port-aggregation 1
Interface po1
uuid: 67669b5d-db2d-458f-ae8d-8334c9e8d0d8
  name: Win-1
  description: descp7
  host_reference:
    kind: host
    uuid: d899b03a-d926-4b5e-b4fa-1f0eaf9457f4
  num_cores_per_vcpu: 1
  hypervisor_type: AHV
  memory_size_mb: 4096
  num_vcpus: 2
  power_state: POWERED_ON
  nic_list:
    kind: network
    uuid: 0d932759-7c2a-46b4-8a1e-6dba6646b628
    mac_address: 50:6B:8D:24:E6:64
```

---

## display vlag config-consistency

Displays Virtual Link Aggregation Group (VLAG) global or detailed consistency checking information.

### Syntax

**display vlag config-consistency [detail]**

where:

| Parameter     | Function  |
|---------------|---|
| <b>detail</b> | Displays detailed consistency checking information about vLAG global and ISL related items, including the digest value and its configuration. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays global VLAG consistency checking information:

```
Switch> display vlag config-consistency
  item                Prio  result local          remote
-----
-----
  sys mac learn       high  pass  enable             enable
  global tag native   high  pass  disable            disable
  ISL port mode       high  pass  access             access
  ISL access vlan     high  pass  1                   1
  ISL native vlan     high  pass  1                   1
  ISL allowed vlan    high  pass  -                   -
  ISL tag native      high  pass  none                none
  ISL dot1q tunnel    high  pass  disable             disable
  stp mode            high  pass  mst                 disable
  stp path cost       high  pass  short               short
  mst region name     high  pass  -                   -
  mst region version  high  pass  200                 0
  mst inst mapping    high  pass  -                   -
  mst max-age         low   pass  20                  20
  mst max-hops        low   pass  20                  20
  mst hello time      low   pass  2                   2
  mst forward time    low   pass  15                  15
```



---

## display vlag configuration

Displays Virtual Link Aggregation Group (VLAG) global and Inter-Switch Link (ISL) related configuration.

### Syntax

**display vlag configuration**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAG configuration information:

```
Switch> display vlag configuration
!
vlag tier-id 1
vlag priority 100
vlag isl port-aggregation 3
vlag hlthchk keepalive-interval 2
vlag hlthchk retry-interval 3
vlag hlthchk peer-ip 10.241.38.183 vrf management
vlag auto-recover 240
vlag startup-delay 100
vlag enable
!
```

---

## display vlag ecp

Displays Virtual Link Aggregation Group (VLAG) Edge Control Protocol (ECP) information.

### Syntax

**display vlag ecp {channels|statistics|upper-layer-protocols}**

where:

| Parameter             | Function  |
|-----------------------|---|
| channels              | Displays VLAG ECP channel information.              |
| statistics            | Displays VLAG ECP statistics.                       |
| upper-layer-protocols | Displays VLAG ECP upper layer protocol information. |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAG ECP channel information:

```
Switch> display vlag ecp channels

---- ECP CHANNELS ----
Ifindex   Ena   State   NextSeq   LastAck   FreeWindow
-----+-----+-----+-----+-----+-----
100003    1     0       00513     00512     999
```

---

## display vlag information

Displays Virtual Link Aggregation Group (VLAG) global and Inter-Switch Link (ISL) related state information.

### Syntax

**display vlag information**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAG information:

```
Switch> display vlag information
Global State      : disabled
VRRP active       : enabled
vLAG system MAC   : 08:17:f4:c3:dd:00
ISL Information:
  PAG   Ifindex   State   Previous State
-----+-----+-----+-----
   0     0         Down     Down

Mis-Match Information:
                Local                Peer
-----+-----+-----+-----
Match Result   : Mis-match            Mis-match
Tier ID        : 0                    0
System Type    : G8272                 0.0.x.x
OS Version     : 10.2.x.x              0.0.x.x

Role Information:
                Local                Peer
-----+-----+-----+-----
Admin Role     : Unselected            Unselected
Oper Role      : Unselected            Unselected
Priority        : 0                    0
System MAC     : a8:97:dc:dd:fd:01     00:00:00:00:00:00

Consistency Checking Information:
State          : enabled
Strict Mode    : enabled
Final Result   : pass
...
```



---

## display vlag instance

Displays Virtual Link Aggregation Group (VLAG) instance configuration and state information.

### Syntax

```
display vlag instance {<VLAG instance>|all} {config-consistency  
[detail]|configuration|information}
```

where:

| Parameter                                    | Function  |
|--|---|
| <i>VLAG instance</i>                         | The number of the VLAG instance. The <i>VLAG instance</i> is from 1 to 64.                  |
| <b>all</b>                                   | Displays configuration or state information for all VLAG instances.                         |
| <b>config-consistency</b><br><b>[detail]</b> | Displays global or detailed VLAG consistency checking information for a specified instance. |
| <b>configuration</b>                         | Displays VLAG instance configuration.   |
| <b>information</b>                           | Displays VLAG instance state information.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification   |
|---------|--|
| 10.1    | The command was introduced.  |
| 10.2    | The <b>config-consistency</b> and <b>detail</b> keywords were added. |

### Example

The following command displays configuration for all VLAG instances:

```
Switch> display vlag instance all configuration  
!  
vlag instance 1 port-aggregation 1  
vlag instance 1 enable  
vlag instance 64 port-aggregation 4096  
vlag instance 64 enable  
!
```

---

## display vlag internal event-history

Displays Virtual Link Aggregation Group (VLAG) event logs.

### Syntax

**display vlag internal event-history {errors|msgs}**

where:

| Parameter | Function                  |
|-----------|---------------------------|
| errors    | Displays VLAG error logs. |
| msgs      | Displays VLAG messages.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAG messages:

```
Switch> display vlag internal event-history msgs

Event: MESSAGES, length:59, at 36010 usecs after Fri Jan  8 04:58:42 2016
vlag_sm_isl_init(1428):
VLAG ISL init get system type:64

Event: MESSAGES, length:74, at 36320 usecs after Fri Jan  8 04:58:42 2016
vlag_sm_isl_init(1435):
VLAG ISL init get OS version: 10.4.2.0 [part2]

Event: MESSAGES, length:53, at 134843 usecs after Fri Jan  8 04:58:42
2016
vlag_sm_main(1964):
VLAG SM pthread is running now

Event: MESSAGES, length:46, at 135326 usecs after Fri Jan  8 04:58:42
2016
vlag_fdb_main(1140):
VFDB start event loop.

Event: MESSAGES, length:36, at 933887 usecs after Fri Jan  8 04:58:42
2016
vlag_start(347):
VLAG has started
```

---

## display vlag internal global information

Displays Virtual Link Aggregation Group (VLAG) global internal information.

### Syntax

```
display vlag internal global information
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAG global internal information:

```
Switch> display vlag internal global information
```

---

## display vlag internal instance

Displays Virtual Link Aggregation Group (VLAG) internal instance information.

### Syntax

**display vlag internal instance** {<VLAG instance>|all} **information**

where:

| Parameter            | Function   |
|----------------------|--|
| <i>VLAG instance</i> | The number of the VLAG instance. The <i>VLAG instance</i> is from 1 to 64. |
| all                  | Displays internal information for all VLAG instances.                      |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays internal information for VLAG instance 1:

```
Switch> display vlag internal instance 1 information

Instance Runtime Entry 1 Dump:
  isl_id           : 1
  inst_pch_id     : 0
  pch_ifindex     : 0
  state           : 0(Down)
  old_state       : 0(Down)
  is_err_dis_set  : 0
  is_egr_mask_set : 0
  egr_mask_result : 0
  is_local_pch_up : 0
  reserve        : 0
  waitting_query  : 0
  query_id       : 0
  reply_query_id  : 0
Instance PCH Runtime Information Dump:
      Local                               Peer
-----+-----+-----
LACP Channel : No                        No
Partner Pri  : 0                          0
Partner Key  : 0                          0
Partner MAC  : 00:00:00:00:00:00          00:00:00:00:00:00
```

---

## display vlag internal isl information

Displays Virtual Link Aggregation Group (VLAG) internal Inter-Switch Link (ISL) information.

### Syntax

```
display vlag internal isl information
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays VLAG internal ISL information:

```
Switch> display vlag internal isl information

ISL Runtime Entry Dump:
  isl_pch_id       : 0
  pch_ifindex     : 0
  state           : 0(Down)
  old_state       : 0(Down)
  peer_state      : 0(Down)
  is_local_match  : 0(No)
  is_peer_match   : 0(No)
  mis_log_printed : 0(No)
  err_dis_all_inst : 0(No)
  reserved        : 0
  local_tier_id   : 0
  peer_tier_id    : 0
  local_sys_type  : 64(G8272)
  peer_sys_type   : 0(Unknown)
  local_version   : 1075721256
  peer_version    : 1075721204
  lacp_prio       : 0
  peer_lacp_prio  : 0
  ecp_ulp_id      : -1

Role Runtime Entry Dump:
  admin_role      : 0(Unselected)
  oper_role       : 0(Unselected)
  peer_admin_role : 0(Unselected)
  peer_oper_role  : 0(Unselected)
  state           : 0
  old_state       : 0
  local_priority  : 0
  peer_priority   : 0
  local_mac       : a8:97:dc:de:25:01
  peer_mac        : 00:00:00:00:00:00
```

---

## display vlag internal syncdb

Displays Virtual Link Aggregation Group (VLAG) Forwarding Database (FDB) information.

### Syntax

```
display vlag internal syncdb {count|local|remote} [address  
<MAC address> [interface {ethernet <chassis number/port number>|  
port-aggregation <LAG number>} [vlan <VLAN number>]]]
```

where:

| Parameter  | Function   |
|--|--|
| count  | Displays the number VLAG FDB entries.  |
| local  | Displays VLAG local FDB information.   |
| remote   | Displays VLAG remote FDB information.  |
| address <i>MAC address</i>                           | Displays VLAG FDB information for the specified MAC address. The <i>MAC address</i> can be written in any of the following formats: <ul style="list-style-type: none"><li>o X.X.X</li><li>o XX-XX-XX-XX-XX-XX</li><li>o XX:XX:XX:XX:XX:XX</li><li>o XXXX.XXXX.XXXX</li></ul> |
| interface ethernet <i>chassis number/port number</i> | Displays VLAG FDB information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type.  |
| interface port-aggregation <i>LAG number</i>         | Displays VLAG FDB information for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096.   |
| vlan <i>VLAN number</i>                              | Displays VLAG FDB information for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.  |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays VLAG local FDB entries:

```
Switch> display vlag internal syncdb local
VLAG local db:
 H - s/w hit bit; for remote db.
 D - del pending bit; for local db.
 P - peer mac bit; for remote db.

  VLAN          MAC          Ifindex Hit Del Peer
  ----+-----+-----+-----+-----+-----
(3999 - A897.DCF7.DD01) 100003
(2000 - A897.DCF7.DD01) 100003
( 10 - A897.DCF7.DD01) 100003
(  9 - A897.DCF7.DD01) 100003
(  8 - A897.DCF7.DD01) 100003
(  7 - A897.DCF7.DD01) 100003
(  6 - A897.DCF7.DD01) 100003
(  5 - A897.DCF7.DD01) 100003
(  4 - A897.DCF7.DD01) 100003
(  3 - A897.DCF7.DD01) 100003
(  2 - A897.DCF7.DD01) 100003
(  1 - A897.DCF7.DD01) 100003
```



---

## display vlag internal vlandb

Displays Virtual Link Aggregation Group (VLAG) internal Forwarding Database (FDB) Virtual LAN (VLAN) configuration.

### Syntax

```
display vlag internal vlandb {interface port-aggregation <LAG number>}|vlan <VLAN number>}
```

where:

| Parameter  | Function  |
|--|---|
| <code>interface port-aggregation LAG number</code> | Displays VLAG FDB VLAN configuration for the specified Link Aggregation Group (LAG). The <i>LAG number</i> is from 1 to 4096. |
| <code>vlan VLAN number</code>                      | Displays VLAG FDB configuration for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.               |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAG FDB configuration for VLAN 1:

```
Switch> display vlag internal vlandb vlan 1  
  
VLAN 1 contain:  
100012
```

---

## display vlag statistics

Displays Virtual Link Aggregation Group (VLAG) statistics.

### Syntax

**display vlag statistics**

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAG statistics:

```
Switch> display vlag statistics
TLV statistics :
-----+-----+-----+-----+-----
Hello      : 17153      0      17153      1
Role Elect : 10         1       10         1
Mis-Match  : 9          5       7          0
Global State : 2         0       1          0
Channel Status: 28      0       25         0
Query      : 30         0       30         0

FDB sync statistics :
Local add      :      6054
Local learn    :      6763
Local del      :     12780
Remote add     :      4018
Remote del     :      8155
Sync add       :      8044
Sync del       :      6769
ECP TX alloc ok :      784
ECP TX alloc fails :      0
socket | sent | handled | fails
HAL cb : 25597 25597 0
br evt : 117 117 0
ECP RX : 521 521 0

FDB sync db statistics :
Local db current : 13
Local db highest : 4013
Remote db current: 12
Remote db highest: 2012
```

---

## display vlan

Displays Virtual LAN (VLAN) information.

### Syntax

**display vlan** [**access-map**|**brief**|**id** <VLAN number>|**name** <VLAN name>|**summary**]

where:

| Parameter             | Function   |
|-----------------------|--|
| access-map            | Displays VLAN access map information.  |
| brief                 | Displays all VLAN status information in brief.   |
| id <i>VLAN number</i> | Displays information about the specified VLAN. The <i>VLAN number</i> is from 1 to 4094. |
| name <i>VLAN name</i> | Displays information about the specified VLAN by its configured name.                    |
| summary               | Displays a short VLAN information summary.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays VLAN information:

```
Switch> display vlan

Flags:
u - untagged egress traffic for this VLAN
t - tagged egress traffic for this VLAN

d - auto-provisioned VLAN
h - static and auto-provisioned VLAN

VLAN    Name                               Status  IPMC FLOOD Ports
=====
1       default                            ACTIVE  Disabled
                                             Ethernet1/1(u)
                                             Ethernet1/35(u)
                                             Ethernet1/36(u)
                                             Ethernet1/37(u)
                                             Ethernet1/38(u)
                                             Ethernet1/39(u)
                                             Ethernet1/41(u)
                                             Ethernet1/42(u)
                                             Ethernet1/43(u)
                                             Ethernet1/44(u)
                                             Ethernet1/45(u)
                                             Ethernet1/46(u)
                                             Ethernet1/47(u)
                                             Ethernet1/48(u)
                                             Ethernet1/49(u)
                                             Ethernet1/50(u)
                                             Ethernet1/51(u)
                                             Ethernet1/52(u)
                                             Ethernet1/53(u)
                                             Ethernet1/54(u)
                                             po12(u)
2       VLAN0002                           ACTIVE  Disabled
                                             Ethernet1/1(t)
                                             Ethernet1/2(u)
3       VLAN0003                           ACTIVE  Disabled
                                             Ethernet1/1(t)
                                             Ethernet1/3(u)
4       VLAN0004                           ACTIVE  Disabled
                                             Ethernet1/1(t)
                                             Ethernet1/4(u)
5       VLAN0005                           ACTIVE  Disabled
                                             Ethernet1/1(t)
                                             Ethernet1/5(u)
6       VLAN0006                           ACTIVE  Disabled
                                             Ethernet1/1(t)
                                             Ethernet1/6(u)
7       VLAN0007                           ACTIVE  Disabled
                                             Ethernet1/1(t)
                                             Ethernet1/7(u)
...

```

---

## display vlan access-list

Displays Virtual LAN (VLAN) access list information.

### Syntax

**display vlan access-list** [*<access list name>*]

where:

| Parameter               | Function                          |
|-------------------------|-----------------------------------|
| <i>access list name</i> | The name of the VLAN access list. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAN access list information:

```
Switch> display vlan access-list
```

---

## display vlan dot1q tag native

Displays the status of tagging on the native Virtual LANs (VLANs).

### Syntax

```
display vlan dot1q tag native
```

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays the status of tagging on the native VLANs:

```
Switch> display vlan dot1q tag native
Tag native vlan global setting: enabled
Port                Tag Native VLAN Status
-----
Ethernet1/8         enabled
Ethernet1/4         enabled
po100               enabled
po1                 disabled
Ethernet1/3         enabled
Ethernet1/7         enabled
Ethernet1/10        enabled
Ethernet1/48        enabled (egress-only)
Ethernet1/40        enabled
Ethernet1/52/2      enabled
Ethernet1/51/2      enabled
Ethernet1/51/1      enabled
Ethernet1/51/4      enabled
Ethernet1/51/3      enabled
Ethernet1/52/1      enabled
Ethernet1/52/4      enabled
Ethernet1/52/3      enabled
```

---

## display vlan filter

Displays information about all Virtual LAN (VLAN) filters.

### Syntax

**display vlan filter** [**access-map** *<access map name>* | **vlan** *<VLAN number>*]

where:

| Parameter                                | Function  |
|--|---|
| <b>access-map</b> <i>access map name</i> | Displays filter information about the specified VLAN access map.                                |
| <b>vlan</b> <i>VLAN number</i>           | Displays filter information about the specified VLAN. The <i>VLAN number</i> is from 1 to 4094. |

### Modes

All command modes

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays VLAN filter information:

```
Switch> display vlan filter
```

---

## display vnetworks

Displays Virtual Network (vNetwork) information.

### Syntax

**display vnetworks [uuid <vNetwork UUID>]**

where:

| Parameter            | Description  |
|----------------------|--|
| <i>vNetwork UUID</i> | Display information for the specified vNetwork identified by its Universally Unique Identifier (UUID). |

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.3    | The command was introduced. |

### Example

The following command displays vNetwork information:

```
Switch> display vnetworks

uuid: ce4afd70-f934-4fc6-842b-eecc4ee6a831
  name: vl1010
  vlan_id: 1010

uuid: cb36a1db-9913-4aa6-bc44-b44176a44349
  name: vl3
  vlan_id: 33

uuid: c24f3ffa-6343-4fb3-8902-77221efdaba0
  name: vl30
  vlan_id: 30
```

The following command displays vNetwork information:

```
Switch> display vnetworks uuid bde82d23-72d5-4ca5-b8bc-a2efda381502

uuid: bde82d23-72d5-4ca5-b8bc-a2efda381502
  name: vl1075
  vlan_id: 1075
```



---

## display vrrp

Displays Virtual Router Redundancy Protocol (VRRP) information.

### Syntax

```
display vrrp [ipv6] [detail] [interface {<interface name>|  
|ethernet <chassis number/port number>|vlan <VLAN number>}]  
[backup|init|master]
```

where:

| Parameter  | Function  |
|--|---|
| ipv6   | Displays VRRP information only for IPv6 sessions.   |
| detail   | Displays detailed VRRP information.   |
| interface <i>interface name</i>                      | Displays VRRP information for the specified interface by name.  |
| interface ethernet <i>chassis number/port number</i> | Displays VRRP information for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface vlan <i>VLAN number</i>                    | Displays VRRP information for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| backup   | Displays information about VRRP groups in backup state.   |
| init   | Displays information about VRRP groups in init state.   |
| master   | Displays information about VRRP groups in master state.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays VRRP information:

```
Switch> display vrrp
```

| Interface      | VR | IpVer | Pri | Time | Pre  | State  | VR IP addr |
|----------------|----|-------|-----|------|------|--------|------------|
| Ethernet1/51/4 | 1  | IPV4  | 100 | 100  | cs Y | Master | 15.1.1.10  |
| Vlan2          | 1  | IPV4  | 102 | 100  | cs Y | Backup | 200.0.2.10 |
| Vlan12         | 2  | IPV4  | 100 | 100  | cs Y | Init   | 11.1.2.100 |

---

## display vrrp ecp

Displays Virtual Router Redundancy Protocol (VRRP) Edge Control Protocol (ECP) information.

### Syntax

**display vrrp ecp {channels|statistics|upper-layer-protocols}**

where:

| Parameter             | Function  |
|-----------------------|---|
| channels              | Displays VRRP ECP channel information.              |
| statistics            | Displays VRRP ECP statistics.                       |
| upper-layer-protocols | Displays VRRP ECP upper layer protocol information. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays VRRP ECP channel information:

```
Switch> display vrrp ecp channels
---- ECP CHANNELS ----
Ifindex   Ena   State   NextSeq   LastAck   FreeWindow
-----+-----+-----+-----+-----+-----
100100    1     0       65501     65500     999
```

---

## display vrrp vlag

Displays vLAG Virtual Router Redundancy Protocol (VRRP) information.

### Syntax

```
display vrrp vlag [interface {<interface name>|ethernet <chassis  
number/port number>|vlan <VLAN number>}|vr <VRRP group>]  
[backup|init|master]
```

where:

| Parameter  | Function  |
|--|---|
| <code>interface interface name</code>                      | Displays vLAG VRRP statistics for the specified interface by name.  |
| <code>interface ethernet chassis number/port number</code> | Displays vLAG VRRP statistics for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| <code>interface vlan VLAN number</code>                    | Displays vLAG VRRP statistics for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| <code>backup</code>  | Displays statistics about vLAG VRRP groups in backup state.   |
| <code>init</code>  | Displays statistics about vLAG VRRP groups in init state.   |
| <code>master</code>  | Displays statistics about vLAG VRRP groups in master state.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

## Example

The following command displays vLAG VRRP information:

```
Switch> display vrrp vlag
Flags: F - Forwarding enabled on Backup for vLAG
vLAG enabled, mode: vrrp active
  Interface      VR  IpVer  Pri  Time    Pre  State  VR IP addr
-----
(F)Vlan100      1   IPV4   160  100    cs   Y      Backup  172.16.10.250
(F)Vlan200      150 IPV4   160  100    cs   Y      Backup  172.16.20.250
```

---

## display vrrp vr

Displays Virtual Router Redundancy Protocol (VRRP) group information.

### Syntax

```
display vrrp [ipv6] [detail] vr <VRRP group> [backup|init|  
|master]
```

where:

| Parameter         | Function   |
|-------------------|--|
| ipv6              | Displays VRRP information only for IPv6 sessions.  |
| detail            | Displays detailed VRRP information.  |
| <i>VRRP group</i> | Displays information about the specified VRRP group. The <i>VRRP group</i> is from 1 to 255. |
| backup            | Displays information about VRRP groups in backup state.                                      |
| init              | Displays information about VRRP groups in init state.  |
| master            | Displays information about VRRP groups in master state.                                      |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

### Example

The following command displays information about VRRP group 1:

```
Switch> display vrrp vr 1
```

| Interface      | VR | IpVer | Pri | Time | Pre | State | VR IP addr        |
|----------------|----|-------|-----|------|-----|-------|-------------------|
| Ethernet1/51/4 | 1  | IPV4  | 100 | 100  | cs  | Y     | Master 15.1.1.10  |
| Vlan2          | 1  | IPV4  | 102 | 100  | cs  | Y     | Backup 200.0.2.10 |

---

## display vrrp statistics

Displays Virtual Router Redundancy Protocol (VRRP) statistics.

### Syntax

```
display vrrp [ipv6] statistics [interface {<interface name>|  
|ethernet <chassis number/port number>|vlan <VLAN number>}|vr <VRRP  
group>] [backup|init|master]
```

where:

| Parameter  | Function   |
|--|--|
| ipv6   | Displays VRRP statistics only for IPv6 sessions.   |
| interface <i>interface name</i>                      | Displays VRRP statistics for the specified interface by name.  |
| interface ethernet <i>chassis number/port number</i> | Displays VRRP statistics for the specified ethernet interface. The <i>chassis number</i> is 1 and the <i>port number</i> depends on the switch type. |
| interface vlan <i>VLAN number</i>                    | Displays VRRP statistics for the specified Virtual LAN (VLAN). The <i>VLAN number</i> is from 1 to 4094.   |
| backup   | Displays statistics about VRRP groups in backup state.   |
| init   | Displays statistics about VRRP groups in init state.   |
| master   | Displays statistics about VRRP groups in master state.   |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays VRRP statistics:

```
Switch> display vrrp statistics
Checksum Errors: 0
Version Errors: 0
VRid Errors: 0
Address family IPv4
VRRP Id: 1 on interface: Ethernet1/51/4
Master Transitions: 1
Advertisements Rcvd: 71
Pkts Rcvd with IP TTL Errors: 0
Pkts Rcvd with Zero Priority: 0
Pkts Sent with Zero Priority: 0
Pkts Rcvd with Invalid TYPE: 0
Pkts Rcvd with VR IP Address Errors: 0
Pkts Rcvd with Packet Length Errors: 0
Pkts Rcvd with IP Count Mismatch: 0
Discontuinity Time: (0) 0:00:00.00
Refresh Rate: 1000 ms

Address family IPv4
VRRP Id: 1 on interface: Vlan2
Master Transitions: 0
Advertisements Rcvd: 2138
Pkts Rcvd with IP TTL Errors: 0
Pkts Rcvd with Zero Priority: 0
Pkts Sent with Zero Priority: 0
Pkts Rcvd with Invalid TYPE: 0
Pkts Rcvd with VR IP Address Errors: 0
Pkts Rcvd with Packet Length Errors: 0
Pkts Rcvd with IP Count Mismatch: 0
Discontuinity Time: (0) 0:00:00.00
Refresh Rate: 1000 ms

Address family IPv4
VRRP Id: 2 on interface: Vlan12
Master Transitions: 0
Advertisements Rcvd: 0
Pkts Rcvd with IP TTL Errors: 0
Pkts Rcvd with Zero Priority: 0
Pkts Sent with Zero Priority: 0
Pkts Rcvd with Invalid TYPE: 0
Pkts Rcvd with VR IP Address Errors: 0
Pkts Rcvd with Packet Length Errors: 0
Pkts Rcvd with IP Count Mismatch: 0
Discontuinity Time: (0) 0:00:00.00
Refresh Rate: 1000 ms
```



---

## display vrrp summary

Displays a short Virtual Router Redundancy Protocol (VRRP) information summary.

### Syntax

**display vrrp [ipv6] summary**

where:

| Parameter | Function  |
|-----------|---|
| ipv6      | Displays VRRP information only for IPv6 sessions. |

### Modes

- User EXEC mode
- Privileged EXEC mode
- Global Configuration mode

## History

| Release | Modification                |
|---------|-----------------------------|
| 10.1    | The command was introduced. |

## Example

The following command displays a short VRRP information summary:

```
Switch> display vrrp summary
Total Number of Groups Configured: 3
      Init : 0      Backup : 1      Master : 2
Number of VRRP enabled interfaces : 3

FSM State History

Ethernet1/51/4 - Group 1 (IPV4)
-----
Time      Prev State      State      Event
-----
65        BACKUP         MASTER     preempted

Vlan2 - Group 1 (IPV4)
-----
Time      Prev State      State      Event
-----
298       INIT           BACKUP     Not Master

Vlan12 - Group 2 (IPV4)
-----
Time      Prev State      State      Event
-----
78        BACKUP         MASTER     no response
```

---

## display zerotouch

Displays a short Zero Touch Provisioning (ZTP) information summary.

### Syntax

**display zerotouch**

### Modes

- User EXEC mode
- Privileged EXEC mode

### History

| Release | Modification                |
|---------|-----------------------------|
| 10.2    | The command was introduced. |

### Example

The following command displays a short ZTP information summary:

```
Switch> display zerotouch  
TFTP server: 10.122.3.69  
Image: G8xxx-10.2.0.1.img  
Configuration: netboot_config_file_G8xxx  
Script: netboot_G8xxx.p
```



---

## Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

Use this information to obtain additional information about Lenovo and Lenovo products, and determine what to do if you experience a problem with your Lenovo system or optional device.

**Note:** This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for the System x, Flex System, and NeXtScale System products.

Before you call, make sure that you have taken these steps to try to solve the problem yourself.

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call.

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check the [IBM ServerProven website](#) to make sure that the hardware and software is supported by your product.
- Go to the [IBM Support portal](#) to check for information to help you solve the problem.
- Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
  - Hardware and Software Maintenance agreement contract numbers, if applicable
  - Machine type number (if applicable—Lenovo 4-digit machine identifier)
  - Model number
  - Serial number
  - Current system UEFI and firmware levels
  - Other pertinent information such as error messages and logs
- Start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

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## Appendix B. Notices

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.



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Linux is a registered trademark of Linus Torvalds.

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## Important Notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1,024 bytes, MB stands for 1,048,576 bytes and GB stands for 1,073,741,824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1,000,000 bytes and GB stands for 1,000,000,000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

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## Recycling Information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to:

<http://www.lenovo.com/recycling>

## Particulate Contamination

**Attention:** Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility..

| Contami-<br>nant  | Limits  |
|---|---|
| Particulate   | <ul style="list-style-type: none"> <li>The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2<sup>1</sup>.</li> <li>Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.</li> <li>The deliquescent relative humidity of the particulate contamination must be more than 60%<sup>2</sup>.</li> <li>The room must be free of conductive contamination such as zinc whiskers.</li> </ul> |
| Gaseous   | <ul style="list-style-type: none"> <li>Copper: Class G1 as per ANSI/ISA 71.04-1985<sup>3</sup></li> <li>Silver: Corrosion rate of less than 300 Å in 30 days</li> </ul>   |
| <p><sup>1</sup> ASHRAE 52.2-2008 - <i>Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size</i>. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.</p> <p><sup>2</sup> The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.</p> <p><sup>3</sup> ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p> |   |

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## Telecommunication Regulatory Statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

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## Electronic Emission Notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

## Federal Communications Commission (FCC) Statement

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

## Industry Canada Class A Emission Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

## Avis de Conformité à la Réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.


## Australia and New Zealand Class A Statement

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## European Union - Compliance to the Electromagnetic Compatibility Directive

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC (until April 19, 2016) and EU Council Directive 2014/30/EU (from April 20, 2016) on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A equipment according to European Standards harmonized in the Directives in compliance. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

 Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

**Warning:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### Germany Class A Statement

**Deutschsprachiger EU Hinweis:**

**Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit**

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2014/30/EU (früher 2004/108/EC) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der Klasse A der Norm gemäß Richtlinie.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

**Deutschland:**

**Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln**

Dieses Produkt entspricht dem „Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln“ EMVG (früher „Gesetz über die elektromagnetische Verträglichkeit von Geräten“). Dies ist die Umsetzung der EU-Richtlinie 2014/30/EU (früher 2004/108/EC) in der Bundesrepublik Deutschland.

**Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EU Richtlinie 2014/30/EU (früher 2004/108/EC), für Geräte der Klasse A.**

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Meitnerstr. 9, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:

**Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.**

Nach der EN 55022: „Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.“

Nach dem EMVG: „Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.“ (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

## Japan VCCI Class A Statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用する  
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策  
を講ずるよう要求されることがあります。 VCCI-A

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.



## Japan Electronics and Information Technology Industries Association (JEITA) Statement

高調波ガイドライン適合品

Japan Electronics and Information Technology Industries Association (JEITA)  
Confirmed Harmonics Guidelines (products less than or equal to 20 A per phase)

高調波ガイドライン準用品

Japan Electronics and Information Technology Industries Association (JEITA)  
Confirmed Harmonics Guidelines with Modifications (products greater than 20 A per phase).

## Korea Communications Commission (KCC) Statement

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A).  
Sellers and users need to pay attention to it. This is for any areas other than home.

## Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.  
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

## People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

## Taiwan Class A compliance statement

警告使用者：  
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

