



Hardened Managed 8-port 10/100/1000BASE-T +16-port 100/1000BASE SFP +4-port 1G/10G SFP+ Layer 3 Switch

EG97000 Series User's Guide - CLI

FastFind Links

Introduction

Installing the Switch

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Products Supported by this Manual:

EG97000 Series

Preface

Audience

This guide is designed for the person who installs, configures, deploys, and maintains the Ethernet network. This document assumes the reader has moderate hardware, computer, and networking skills.

Document Revision Level

This section provides a history of the revision changes to this document.

Revision	Document Version	Date	Description
A	Version 1	04/16/2019	
A	Version 2	04/28/2020	Added note to duplex/speed configuration
A	Version 3	10/29/2020	Added console port pin definitions
A	Version 4	03/29/2021	Removed vrf commands and parameters.
A	Version 5	03/01/2023	Removed BFD references

Changes in this Revision

Document Conventions

This guide uses the following conventions to draw your attention to certain information.

Safety and Warnings

This guide uses the following symbols to draw your attention to certain information.

Symbol	Meaning	Description
	Note	Notes emphasize or supplement important points of the main text.
	Tip	Tips provide helpful information, guidelines, or suggestions for performing tasks more effectively.
	Warning	Warnings indicate that failure to take a specified action could result in damage to the device, or could result in serious bodily injury.

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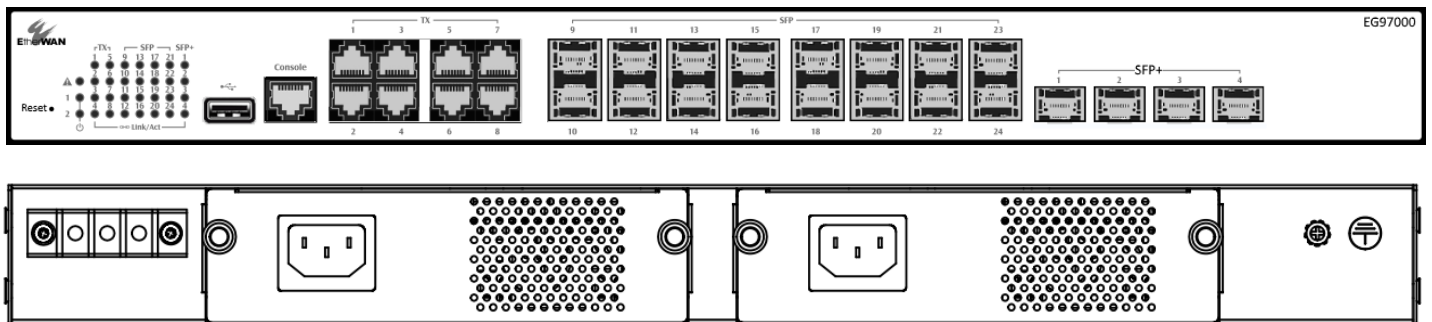
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1 Introduction

EtherWAN's EG97000 is a gigabit Layer 3 switch designed for high bandwidth uplink or interconnection. With full wire speed switching capability, the EG97000 provides IP routing and switching across VLANs and subnetworks with no compromise in performance. The EG97000 supports comprehensive internetwork IP routings including static route, RIP v1 & v2, and OSPF v2 for IPv4. All these routing protocols can operate simultaneously with redistributions to each other and route control tools, including IP prefix-list and route-map.

In addition to Layer 3 features, the EG97000 supports a full set of EtherWAN Layer 2 features such as port security, IGMP snooping, port-based VLAN, GARP protocols, link aggregation, access control lists and STP/RSTP/MSTP. Besides in-band management via web browser, Telnet, SSH and SNMP, the EG97000 supports out-band management via a dedicated RJ-45 Management port.

The EG97000 Series provides high reliability and nonstop operation in harsh environments where temperatures range from -40° to 75°C (-40° to 167°F), as well as in areas with high electromagnetic interference (EMI). The EG97000 is also equipped with sophisticated network and system failure recovery features including VRRP, and dual redundant power supplies to minimize the chance of network or system downtime. This makes it an ideal choice for both industrial and mission critical applications where sustained connectivity is crucial.



Unpacking and Installation

Unpacking

Unpack the items and confirm that no items are missing or damaged. Your package should include:

- EG97000 Ethernet switch
- 2 Mounting brackets
- 12 Mounting screws
- 1 Console cable
- 1 AC Power Cord (optional)
- Quick install guide

If any item is damaged or missing, notify your authorized EtherWAN representative. Keep the carton, including the original packing material, in case you need to store the product or return it.

Installing the Switch

Use the enclosed screws and brackets to mount the switch in an open or enclosed rack.

- Select a power source within 6 feet (1.8 meters).
- Choose a dry area with ambient temperature between -40 and 75°C (-40 and 167°F).
- Be sure there is adequate airflow.

Connecting to the Data Ports

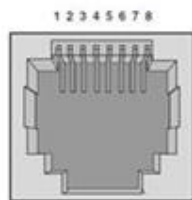
The EG97000 has the following ports:

- 8 x 10/100/1000 Mbps RJ-45 copper ports
- 16 x 100/1000 SFP slots
- 4 x 1/10G SFP+ slots
- 1 x RJ-45 Management port
- 1 x USB port

Console Port

Interface is RJ-45. Pin definitions are as follows:

RJ-45



Pin	Signal	Function
1	3.3V	Connected 0 ohm to RTS signal
2	3.3V/NC	Connected 0 ohm for Backup (NC)
3	TxD	Transmit Data from Switch
4	GND	Ground
5	GND	Ground
6	RxD	Receive Data to Switch
7	NC	Not Connected
8	NC	Not Connected

(Pin 8 of RTS with 3.3vdc for EB-232 dongle device).

10/100/1000BASE-TX Ports

Ports 1 to 8 are gigabit copper ports and can be connected to routers, other switches, or end devices. Use category 5 or higher STP cable.

100 Mbps / 1 Gbps SFP Slots

Ports 9 – 24 are dual-rate gigabit SFP slots, for connection with stackable switches to form multiple fiber interconnections. Use appropriate SFP transceivers.

1/10 Gbps SFP+ Slots

The dual-rate 10G SFP+ ports 1 – 4 are for uplink connection to core networks. Ensure that the same type of transceiver is used at both ends of the link and that the correct type of fiber cable is used.

Connecting Power

Terminal Block

If your EG97000 comes with AC power cables, connect the cables into the power modules at the back of the switch. If your switch comes with a DC or AC terminal block (no cable), then connect the switch to a suitable power supply using 12 to 24 AWG wire. Redundant power supply is supported. However, only one power input is required to operate the switch. Input voltage is 48 VDC or 100 – 240 VAC, depending on the model.

Relay Output Alarm

The switch provides one dry contact for signaling of a user-defined power or port failure. The alarm relay default is “open” and forms a closed circuit when the event occurs. The relay output can be connected to an alarm signaling device, and supports both normally open and normally closed. Relay output current is 30VDC / 0.6A.



NOTE: The initial normal state of the relay is open, and if the switch loses *all* power, then this state will come into effect. This is important to remember when using the relay to indicate a power failure. The relay will close in an alarm state when there is redundant power input and an alarmed input fails.

Initial Configuration

Connect to the switch using the enclosed Ethernet cable to connect a serial port on a PC to the RJ-45 Management port located on the front panel next to the USB port. You can also use regular Ethernet cable to connect the RJ-45 port on the PC to any of the TX ports 1 - 8. The IP address of VLAN 1 is 192.168.1.10.

Configuration via CLI

If using a terminal-emulation program such as Putty, configuration settings are: Baud rate: 115,200bps, Data bits: 8, Parity: none, Stop bit: 1, Flow control: none.

The default login name is “root,” no password.

Configuration via Web Browser

Log in to the switch by launching a web browser and entering 192.168.1.10 in the address bar.

Enter the default login ID: root (no password) and click “Login.” The system information screen will display.



Note: Starting from firmware 3.00.4.5, when logging into the GUI or the CLI for the first time, the switch will prompt you to change the default password to a new one. The new password must meet the following complexity requirements:

- Minimum 8 characters and maximum 35 characters in password length without leading or trailing blanks.
- The password must contain characters from the following categories:
 1. Uppercase English letters, (A to Z)
 2. Lowercase English letters, (a to z)
 3. Numbers, (0 to 9)
 4. Non-alphanumeric characters (e.g. @, #, \$), but not including (", ?, !)

User account will be locked after 10 (configurable) password attempts and will stay locked for 5 minutes.

Alternate (Backup) Firmware

Under certain circumstances, such as when there is a loss of power during an upgrade, the firmware build on the switch can become unstable. There are two firmware images stored on the switch: Active and Alternate. If the Active firmware image becomes unstable, the switch will automatically boot from the Alternate image on the next boot.

Copy Configuration to USB

The USB port can be used to save the running switch configuration to a (FAT32) USB storage device. Plug the device into the USB port, and use the “Save Configuration” command in the web interface, or “write config-file usb://FILENAME” in the CLI. You can later load the configuration from the USB drive by navigating to System --> Configuration in the GUI, or using install config-file usb://FILENAME in the CLI.

Alternate (Backup) Firmware

Under certain circumstances, such as when there is a loss of power during an upgrade, the firmware build on the switch can become unstable. There are two firmware images stored on the switch: Active and Alternate. If the Active firmware image becomes unstable, the switch will automatically boot from the Alternate image on the next boot.

2 Command Line Interface Conventions and Usage

This manual describes accessing the EG97000 by using Telnet, SSH, or serial ports to configure the switch, using the Command Line Interface (CLI).

Navigating the CLI Hierarchy

The CLI is organized into a hierarchy of command modes. The basic modes are User exec mode, Privileged exec mode, and Global configuration mode. There are also other modes, specific to certain configurations. Each mode has its own group of commands for a specific purpose. Below are examples of CLI commands needed to enter a specific mode:

```
switch_a> ← User exec mode
switch_a>enable
switch_a# ← Privileged exec mode
switch_a#configure terminal
switch_a(config) ← Global configuration mode
switch_a(config) spanning-tree mst configuration
switch_a(config-mst) # ← MSTP configuration mode

switch_a(config)# line console 0
switch_a(config-line) # ← Line configuration mode

switch_a(config)# interface gel
switch_a(config-if) # ← Interface configuration mode

switch_a(config)#vlan database
switch_a(config-vlan) # ← VLAN database configuration mode

switch_a(config)# router ospf
switch_a(config-router) # ← Router configuration mode
```

In any mode, the **exit** command will leave the current mode and enter the previous higher-order mode:

Example:

```
switch_a(config-line) # exit
switch_a(config) #
```

Saving a Configuration from the CLI

Command: **write**

Example:

```
switch_a>enable
switch_a#write memory
Building configuration.....
[OK]
switch_a#>
```

Command: **copy running-config startup-config**

Example:

```
switch_a>enable
switch_a#copy running-config startup-config
Building configuration.....
[OK]
switch_a#>
```

CLI Keyboard Shortcuts

Ctrl + a: place cursor at the beginning of a line

Ctrl + b: backspace one character

Ctrl + d: delete one character

Ctrl + e: place cursor at the end of the line

Ctrl + f: move cursor forward one character

Ctrl + k: delete from the current position to the end of the line

Ctrl + l: redraw the command line

Ctrl + n: display the next line in the history

Ctrl + p: display the previous line in the history

Ctrl + u: delete entire line and place cursor at start of prompt

Ctrl + w: delete one word back

Command Syntax

The following symbols are used to describe the values and arguments for command entries in the CLI.

Monospaced courier font	Command line example.
<angle brackets>	Variable or value that must be specified.
[square brackets]	Optional parameters or arguments.
optionA optionB	Vertical bar. Separates multiple exclusive items in a list of options.
{braces}	Indicate optional values or arguments, where one must be selected
(parentheses)	Indicates at least one or more of the values or arguments in the preceding syntax enclosed by braces must be specified.

Variable Placeholders

The command syntax uses the following tokens to represent command line variables for which you supply a value:

Token	Description
WORD	A contiguous text string (excluding spaces), such as IFNAME for the name of an interface
LINE	A text string, including spaces; no other parameters can follow this parameter
A.B.C.D	IPv4 address
A.B.C.D/M	IPv4 address and mask/prefix
HH:MM:SS	Time format
AA:NN	BGP community value
XX:XX:XX:XX:XX:XX	MAC address
<1-5> <1-65535> <0-2147483647> <0-4294967295>	Numeric range

Command Help

Help information is available from the command line by entering the following commands:

- **help** *command_name* Shows help for the specific command.
- **help ?** Shows commands for which there is help.
- *command_name* ? Shows a list of arguments available.
- *string?* (no space) Lists the possible commands that start with the string.

Command Abbreviations

The CLI accepts abbreviations that uniquely identify a keyword in commands.

Example:

```
sh in ge1
```

is is the same as

```
show interface ge1
```

3 System Commands

Terminal Line Commands

exec-timeout	
Purpose	Set the interval from last user input for system to log out
Command Mode	Line configuration
Syntax	[no] exec-timeout (<0-35791> <0-2147483>)
Parameters	minutes, seconds
Example usage	<code>switch_a(config-line)#exec-timeout 20</code>

login	
Purpose	Set login type. Use login with no parameters to set single-user.
Command Mode	Line configuration
Syntax	[no] login [local tacplus]
Parameters	Local password checking
Example usage	<code>switch_a(config-line)#</code>

privilege	
Purpose	Change privilege level for line
Command Mode	Line configuration
Syntax	[no] privilege level <1-15, 16>
Parameters	Default privilege levels are 1 – 15, max is 16
Example usage	<code>switch_a(config-line)#</code>

Basic System Configuration

show running-config

Purpose	Display the current operating configuration, hardware and firmware versions, hostname data, etc..
Command Mode	Privilege Exec
Syntax	show running-config show running-config dns show hosts show hostname show hardware show version
Parameters	none
Example usage	switch_a(config)# show running-config

Ip address

Purpose	Set the IP address for an interface.
Command Mode	Interface Configuration
Syntax	[no] ip address A.B.C.D [no] ip address A.B.C.D/M [no] ip address A.B.C.D DHCP
Parameters	A.B.C.D: IPv4 address format A.B.C.D: IPv4 address format with mask M DHCP: Dynamic Host Configuration Protocol
Example usage	switch_a(config-if)# ip address 192.168.1.100/24

Ipv6 address

Purpose	Set the IPv6 address for an interface.
Command Mode	Interface Configuration
Syntax	[no] ipv6 address X:X::X/M [no] ipv6 address X:X::X/M DHCP
Parameters	X:X::X/M: IPv6 address format with mask M X:X::X/M: IPv4 address format with mask M DHCP: Dynamic Host Configuration Protocol
Example usage	switch_a(config-if)# ip address 192.168.1.100/24

banner	
Purpose	Display the banner motive of the day upon login.
Command Mode	Global Configuration
Syntax	banner motd default no banner motd banner motd line <STRING>
Parameters	none
Example usage	switch_a# banner motd line Howdy

hostname	
Purpose	Set the name of the switch
Command Mode	Global configuration
Syntax	[no] hostname <name>
Parameters	One word (use dash or underscore to separate), 1 – 64 characters
Example usage	switch_a(config)#hostname test_switch test_switch(config)#

enable password	
Purpose	Specify a password for the privilege level. Password can be an alpha-numeric string up to 80-characters, including spaces. The string cannot begin with a number.
Command Mode	Global configuration
Syntax	[no] enable password (8 <password>)
Parameters	8 Specify that a hidden password will follow. line Specify the hidden enable password string.
Example usage	switch_a(config)#enable password xyzzy

ip default-gateway	
Purpose	Enable/disable a default gateway - specify the default router or next hop where IP datagrams will be forwarded if no routes are found.
Command Mode	Global configuration
Syntax	[no] ip default-gateway A.B.C.D
Parameters	none
Example usage	switch_a(config)# ip default-gateway 10.10.10.10

ip http server	
Purpose	To enable or disable HTTP or HTTPS
Command Mode	Global configuration
Syntax	[no] ip http server [no] ip http secure-server
Parameters	none
Example usage	switch_a(config)# ip http secure-server

feature telnet	
Purpose	Enable/disable telnet access to the switch
Command Mode	Global configuration
Syntax	[no] feature telnet
Parameters	none
Example usage	switch_a(config)#feature telnet
NOTE	If using Telnet to run the CLI Command that disables telnet, you will lose your connection.

feature ssh	
Purpose	Enable/disable SSH access to the switch
Command Mode	Global configuration
Syntax	[no] feature ssh
Parameters	none
Example usage	switch_a(config)#feature ssh
NOTE	If using SSH to run the CLI Command that disables SSH, you will lose your connection.

install config-file	
Purpose	Load a configuration from a TFTP server or USB flash drive
Command Mode	Privileged exec
Syntax	install config-file usb://(path/)<filename> install config-file tftp://A.B.C.D(:port)/(path/)<filename>
Parameters	IP address and port of tftp server
Example usage	switch_a# install config-file tftp://10.10.10.10/EG97000_backup

ip domain-list	
Purpose	Define a list of default domain names used to complete unqualified host names. Each domain in the list is to be tried in turn. The ip domain-list command is similar to the ip domain-name command, except that with the ip domain-list command you can define a list of domains, each to be tried in turn. If there is no domain list, the default domain name specified with the ip domain-name command is used. If there is a domain list, the default domain name is not used.
Command Mode	Global Configuration
Syntax	ip domain-list DOMAIN-NAME no ip domain-list DOMAIN-NAME
Parameters	DOMAIN-NAME: Domain name, e.g. mycompany.com
Example usage	switch_a(config)# ip domain-list compa.com switch_a(config)# ip domain-list compbb.com

ip domain-lookup	
Purpose	Enable DNS hostname-to-address translation
Command Mode	Global Configuration
Syntax	[no] ip domain-lookup
Parameters	None
Example usage	<code>switch_a(config)# ip domain-lookup</code>

ip domain-name	
Purpose	Set the default domain name used to complete unqualified host names (names without a dotted decimal domain name).
Command Mode	Global Configuration
Syntax	ip domain-name DOMAIN-NAME no ip domain-name DOMAIN-NAME
Parameters	DOMAIN-NAME: Domain name, e.g. mycompany.com
Example usage	<code>switch_a(config)# ip domain-name chaon.com</code>

ip host	
Purpose	Define 1-2 static hostname-to-address mappings in DNS.
Command Mode	Global Configuration
Syntax	ip host WORD A.B.C.D ip host WORD (A.B.C.D) (A.B.C.D) no ip host WORD A.B.C.D no ip host WORD A.B.C.D A.B.C.D
Parameters	WORD: Hostname, such as mycompany.com A.B.C.D: IPv4 address of the host
Example usage	<code>switch_a(config)# ip host grooscompany.com 123.70.0.23 123.70.0.24</code>

ip name-server	
Purpose	Add 1-3 DNS server addresses that are used to translate hostnames to IP addresses.
Command Mode	Global Configuration
Syntax	ip name-server A.B.C.D ip name-server (A.B.C.D) (A.B.C.D) ip name-server (A.B.C.D) (A.B.C.D) (A.B.C.D) no ip name-server A.B.C.D no ip name-server A.B.C.D A.B.C.D no ip name-server A.B.C.D A.B.C.D A.B.C.D
Parameters	A.B.C.D: IPv4 address of the name server
Example usage	switch_a(config)# ip name-server 123.70.0.23 123.70.0.24

service auto-config enable	
Purpose	Enable auto save of configuration, and set interval
Command Mode	Global Configuration
Syntax	[no] service auto-config enable service auto-config interval <number>
Parameters	Number is interval time in seconds, <5-65535>
Example usage	switch_a(config)#service auto-config enable switch_a(config)#service auto-config interval 10

show firmware	
Purpose	Display the current primary and alternate firmware versions.
Command Mode	Privileged Exec
Syntax	show firmware
Parameters	none
Example usage	switch_a# show firmware

install image	
Purpose	Load a firmware image from a TFTP server
Command Mode	Privileged exec
Syntax	install image <A.B.C.D> FILENAME [reload]
Parameters	IP address of tftp server and filename of firmware image to load reload option will reboot the switch after the firmware is updated
Example usage	switch_a# install image tftp://10.10.10.10 flash.tgz
NOTE	Depending on the firmware being loaded, the extension may not be .tgz. The Switch does not use the extension to validate the firmware file.

reload	
Purpose	Reboot the switch
Command Mode	Privileged exec
Syntax	reload
Parameters	none
Example usage	switch_a#reload

logout	
Purpose	Log out from the switch
Command Mode	User Exec Mode or Privileged Exec Mode
Syntax	logout
Parameters	none
Example usage	switch_a#logout

restore default	
Purpose	Restore switch to default settings and reboot
Command Mode	Privileged exec
Syntax	restore default
Parameters	none
Example usage	switch_a#restore default

reset log file	
Purpose	Reset the current, open log file.
Command Mode	Privileged exec
Syntax	reset log file
Parameters	none
Example usage	switch_a# reset log file

write config-file	
Purpose	Save a configuration from a TFTP server or USB flash drive
Command Mode	Privileged exec
Syntax	write config-file [usb://<path/><filename> tftp://server<:port></path>/<filename>]
Parameters	Server: A.B.C.D IP address of tftp server
Example usage	switch_a# write config-file tftp://10.10.10.10/image.tgz

User Account

username	
Purpose	Establish user name authentication
Command Mode	Global Configuration
Syntax	username <WORD> privilege <admin operator technician> password < 8 blank> <password> no username <WORD>
Parameters	WORD is the user name: 4-6 characters Password: 1 to 35 characters Entering and “8” after the password command specifies a HIDDEN password will follow. It will be encrypted in the configuration file.
Example usage	switch_a(config)# username cooluser privilege operator password 1234

4 Diagnostic Commands

System and Settings Information

show system-log	
Purpose	Shows the system log
Command Mode	User Exec or Privileged Exec
Syntax	show system-log
Parameters	none
Example usage	switch_a# show system-log

show cpu-usage	
Purpose	Shows current and max CPU utilization
Command Mode	Privileged Exec
Syntax	show cpu-usage [reset]
Parameters	none
Example usage	switch_a# show cpu-usage

show memory-usage	
Purpose	Shows memory utilization
Command Mode	Privileged Exec
Syntax	show memory-usage
Parameters	none
Example usage	switch_a# show memory-usage

show system-log	
Purpose	Show the system log
Command Mode	Privileged Exec
Syntax	show system-log
Parameters	none
Example usage	switch_a(config)#show system-log

show rmon	
Purpose	Shows rmon data
Command Mode	Privileged Exec
Syntax	show rmon [alarm event history statistics]
Parameters	alarm: RMON alarm table, event: event table, history, statistics
Example usage	switch_a# show rmon alarm

remote-log	
Purpose	Configure remote logging
Command Mode	Global config
Syntax	[no] remote-log enable remote-log add <A.B.C.D> remote-log del [A.B.C.D all]
Parameters	Ip address of syslog server
Example usage	switch_a(config)#remote-log enable switch_a(config)#remote-log add 192.168.1.100

Alarm Configuration

show alarm, show alarm-trigger	
Purpose	Shows alarm information and settings for link down, power failure, temperature, and SFP transceiver
Command Mode	Privileged Exec
Syntax	show alarm show alarm-trigger link show alarm-trigger power show alarm-trigger temper show alarm-trigger sfp <temper vcc tx-bias tx-pow rx-pow> <major minor>
Parameters	Temper: temperature, vcc: voltage, tx-bias: TX bias current, tx,rx-pow: TX, RX power major/minor: severity
Example usage	switch_a# show alarm-trigger link

alarm-trigger	
Purpose	Set alarms for link down, power failure, temperature, and SFP transceiver
Command Mode	Global config
Syntax	[no] alarm-trigger link <IFNAME> [no] alarm-trigger power <LEVEL> [no] alarm-trigger temper [no] alarm-trigger sfp <IFNAME> <temper vcc tx-bias tx-pow rx-pow> <major minor>
Parameters	LEVEL is a power input (1-2), Temper: temperature, vcc: voltage, tx-bias: TX bias current, tx,rx-pow: TX, RX power, major/minor: alarm severity
Example usage	Set alarms to trigger if port ge1 goes down, power input 2 fails, an excessive temperature is reached, and signal an alarm with major severity if there is a voltage error on xe1.
	switch(config)#alarm-trigger link ge10 switch(config)#alarm-trigger power 2 switch(config)#alarm-trigger temper switch(config)#alarm-trigger sfp xe1 vcc major

DDM (Digital Diagnostics Monitoring) Configuration

show	
Purpose	Show alarm and digital input configuration and settings.
Command Mode	Privileged exec
Syntax	show sfp-alarm-trigger <IFNAME> show threshold sfp <IFNAME> show digital-input
Parameters	IFNAME: Interface name
Example usage	switch_a# show sfp-alarm-trigger xe1

threshold sfp	
Purpose	Set threshold values for Digital Diagnostics Monitoring (DDM) alarms on SFP modules. The SFP module must support DDM.
Command Mode	Global config
Syntax	threshold sfp IFNAME vcc <high-major low-major high-minor low-minor> <LEVEL> threshold sfp IFNAME tx-bias <high-major low-major high-minor low-minor> <LEVEL> threshold sfp IFNAME tx-pow < high-major low-major high-minor low-minor > <LEVEL> threshold sfp IFNAME rx-pow < high-major low-major high-minor low-minor > <LEVEL>
Parameters	vcc: Supply voltage in volts < 0 - 6.55> tx-bias: TX Bias Current threshold in milliamps <0 - 131> tx-pow: TX power threshold in dBm <-40.0 - 8.16> rx-pow: RX power threshold in dBm <-40.0 - 8.16> IFNAME: Interface name LEVEL: Numerical threshold value
Example usage	switch(config)#threshold sfp xe1

Email Alerts

show	
Purpose	Configure email alerts through msmtp.
Command Mode	Privileged exec
Syntax	[no] msmtp enable msmtplib host WORD msmtplib passwd [no] msmtp receive <1-5> [no] msmtp ssl msmtplib username WORD1
Parameters	WORD: smtp.server.com format WORD1: user@domain.com format
Example usage	switch_a(config)# msmtp host smtp.frodo.com username chaon@frodo.com passwd 1234 ssl

5 Port Commands

Port Configuration

show interface	
Purpose	Display the port status for a port, the description, port statistics, and modes of the Layer 2 interfaces
Command Mode	Privileged Exec
Syntax	show interface <IFNAME> show interface description <IFNAME> show interface statistics <IFNAME> show interface switchport bridge <GROUP NUMBER>
Parameters	IFNAME: interface name, GROUP NUMBER: the bridge group number
Example usage	switch_a# show interface ge5

show running-config interface	
Purpose	Display configuration for an interface.
Command Mode	Privileged Exec
Syntax	show running-config interface <IFNAME>
Parameters	IFNAME: interface name
Example usage	switch_a# show running-config interface ge5

description	
Purpose	Provide a custom description for a port
Command Mode	Interface Configuration
Syntax	[no] description <DESCRIPTION TEXT>
Parameters	DESCRIPTION TEXT: 1 – 80 characters, can use spaces
Example usage	switch(config-if)#description second floor printer

shutdown	
Purpose	Enable or disable a port
Command Mode	Interface Configuration
Syntax	[no] shutdown
Parameters	None
Example usage	<code>switch(config-if)#shutdown</code>

bandwidth	
Purpose	Set the maximum port speed for a port
Command Mode	Interface Configuration
Syntax	[no] bandwidth <1-10000000000(UNIT)>
Parameters	UNIT: <1-10000000> k for 1 to 10000000 kilobits <1-10000> m for 1 to 10000 megabits <1-10> g for 1 to 10 gigabits <1-10000000000.0> for 1 to 10000000000 bits
Example usage	<code>switch(config-if)#bandwidth 1000000k</code>

duplex	
Purpose	Set duplex to interface
Command Mode	Interface Configuration
Syntax	duplex <auto full half> no duplex
Parameters	Auto: auto-negotiate, full: full-duplex, half: half-duplex
Example usage	<code>switch(config-if)#duplex full</code>
Note	It is recommended to manually select the speed required instead of using the Auto option.

flowcontrol	
Purpose	Set IEEE 802.3x Flow Control on a port
Command Mode	Interface Configuration
Syntax	no flowcontrol flowcontrol both flowcontrol receive <on / off> flowcontrol send <on / off> flowcontrol wmpause <0-255> wmcancel <0-255>
Parameters	both: flow control on send and receive receive: flow control on receive send: flow control on send wmpause: watermark pause wmcancel: watermark cancel
Example usage	switch(config-if)#flowcontrol both

show mirror	
Purpose	Show all port mirroring, show port mirroring for specific interface
Command Mode	Privileged Exec
Syntax	show port mirror [interface <IFNAME>]
Parameters	IFNAME: interface name
Example usage	switch_a# show port mirror interface ge5

mirror interface	
Purpose	Configure a port for port mirroring
Command Mode	Interface Configuration
Syntax	[no] mirror interface <IFNAME> direction <both transmit receive>
Parameters	IFNAME: interface name both: mirror traffic in both directions receive: mirror received traffic transmit: mirror transmitted traffic.
Example usage	switch(config-if)#mirror interface ge2 direction transmit
Note	This command run must separately for each source port. Port mirroring can only be performed on the same type of interfaces, e.g., only a switchport interface can mirror a switchport interface. Issuing a switchport command on a port where mirroring is enabled will

	remove port mirroring on that interface.
--	--

rate-control	
Purpose	Set a port rate control
Command Mode	Interface Configuration
Syntax	rate-control (ingress egress) value <RATE> burst <2-1048576> no rate-control (ingress egress)
Parameters	RATE: kbps <1-1000000>
Example usage	switch_a(config-if)#rate-control ingress value 100000

no switchport	
Purpose	Set the interface to Layer 3 (Routed port)
Command Mode	Interface Configuration
Syntax	no switchport
Parameters	None
Example usage	switch_a(config-if)#no switchport

6 Switching

MAC Table

show mac	
Purpose	Display MAC address information, including lists, tables, groups, and notifications
Command Mode	Privileged Exec
Syntax	show mac show mac access-lists show mac address-table show mac-access-group show mac-notification
Parameters	none
Example usage	switch_a# show mac-access-group

ageing-time	
Purpose	Set the amount of time that a networked device's MAC address will persist in the switch's memory before being removed
Command Mode	Global Configuration
Syntax	bridge 1 ageing-time (TIME)
Parameters	TIME: in seconds <10-1000000>
Example usage	switch_a(config)# bridge 1 ageing-time 5000

bridge acquire	
Purpose	Enable dynamic learning of mac addresses (enabled by default)
Command Mode	Global Configuration
Syntax	[no] bridge <1-32> acquire
Parameters	<1-32>: the bridge group ID
Example usage	switch_a(config)# bridge 3 acquire

clear mac address-table	
Purpose	Clear the filtering database for the default bridge. Command options are: • clear the filtering database • clear all filtering database entries configured through CLI (static) • clear all multicast filtering database entries • clear all multicast filtering database entries for a given VLAN or interface • clear all static or multicast database entries based on a mac address.
Command Mode	Privileged Exec
Syntax	<pre>clear mac address-table dynamic clear mac address-table dynamic bridge <1-32> clear mac address-table dynamic (address MACADDR interface IFNAME (instance INST) vlan VID) clear mac address-table dynamic (address MACADDR interface IFNAME (instance INST) vlan VID) bridge <1-32> clear mac address-table (dynamic static multicast) cvlan VID clear mac address-table (dynamic static multicast) cvlan VID svlan VID clear mac address-table (dynamic static multicast) cvlan VID svlan VID bridge <1-32> clear mac address-table (static multicast) clear mac address-table (static multicast) bridge <1-32> clear mac address-table (static multicast) (address MACADDR interface IFNAME vlan VID) clear mac address-table (static multicast) (address MACADDR interface IFNAME vlan VID) bridge <1-32></pre>
Parameters	dynamic: Clears all dynamic entries. multicast: Clears all multicast filtering database entries. static: Clears all entries configured through management. address: Clear the specified MAC Address. MACADDR: xxxx.xxxx.xxxx format IFNAME: Interface name bridge: Clears the bridge group ID <1-32> cvlan: Clears all MAC address for the specified CVLAN <1-4094>. svlan: Clears all mac address for the specified SVLAN <1-4094>. interface: Clears all MAC address for the specified interface. bridge: Clears the bridge group ID. <1-32>. instance: Clears MSTP instance ID. Range is <1-63>. vlan: Clears all MAC address for the specified VLAN. Range is 1-4094.
Example usage	Clear all filtering database entries configured through the CLI:
	<code>switch_a#clear mac address-table static</code>
	Clear multicast filtering database entries:
	<code>switch_a#clear mac address-table multicast</code>
	Clear all filtering database entries for a given interface:

	<code>switch_a#clear mac address-table static interface eth0</code>
	Clear multicast filtering database entries for a given VLAN:
	<code>switch_a#clear mac address-table multicast vlan 2</code>
	Clear static filtering database entries for a given MAC address:
	<code>switch_a#clear mac address-table static address 0202.0202.0202</code>
	Clear all filtering database entries configured through CLI:
	<code>switch_a#clear mac address-table static bridge 1</code>
	Clear multicast filtering database entries:
	<code>switch_a#clear mac address-table multicast bridge 1</code>
	Clear all filtering database entries for a given interface:
	<code>switch_a#clear mac address-table static interface eth0 bridge 1</code>
	Clear multicast filtering database entries for a given VLAN.
	<code>switch_a#clear mac address-table multicast vlan 2 bridge 1</code>
	Clear static filtering database entries for a given MAC address:
	<code>switch_a#clear mac address-table static address 0202.0202.0202 bridge 1</code>
	Clear all filtering database entries learned through bridge operation for a given MAC address.
	<code>switch_a#clear mac address-table dynamic address 0202.0202.0202</code>

bridge max-age	
Purpose	Set the maximum age for a bridge
Command Mode	Global Configuration
Syntax	<code>[no] bridge <1-32> max-age <6-40></code>
Parameters	<1-32>:: Bridge group ID <6-40>: The maximum time in seconds, to listen for the root bridge
Example usage	<code>switch_a(config)# bridge 2 max-age 12</code>
Note	Maximum age is the max time in seconds for which (if a bridge is the root bridge) a message is considered valid. The value of maximum age should be greater than twice the value of hello time plus 1, but less than twice the value of forward delay minus 1. The allowable range for max-age is 6-40 seconds. Configure this value sufficiently high, so that a frame generated by root can be propagated to leaf nodes without exceeding the maximum age.

Static MAC Entry

mac-address-table	
Purpose	Configure the static forwarding table entry for the default bridge. Use the no parameter to remove the entry for the default bridge.
Command Mode	Global Configuration
Syntax	<pre>mac-address-table static MAC (forward discard) IFNAME mac-address-table static MAC (forward discard) IFNAME vlan <2-4094> mac-address-table static MAC (forward discard) IFNAME vlan <2-4094> svlan <2-4094> no mac-address-table static MAC (forward discard) IFNAME no mac-address-table static MAC (forward discard) IFNAME vlan <2-4094> no mac-address-table static MAC (forward discard) IFNAME vlan <2-4094> svlan <2-4094></pre>
Parameters	static: Configure a static address MAC: Media Access Control address in HHHH.HHHH.HHHH format. forward: Forward matching frames. discard: Discard matching frames. IFNAME: Interface on which the frame comes out. vlan: Identity of the VLAN in range of <2-4094>. svlan: Identity of the SVLAN in range of <2-4094>.
Example usage	<pre>switch_a(config)# mac-address-table static 2222.2222.2222 forward ge5</pre>

bridge address	
Purpose	Statically configure a bridge entry to forward or discard matching frames from matching MAC addresses.
Command Mode	Global Configuration
Syntax	[no] bridge <1-32> address MAC discard IFNAME [no] bridge <1-32> address MAC discard IFNAME vlan <2-4094> [no] bridge <1-32> address MAC discard IFNAME vlan <2-4094> svlan <2-4094> [no] bridge <1-32> address MAC forward IFNAME [no] bridge <1-32> address MAC forward IFNAME vlan <2-4094> [no] bridge <1-32> address MAC forward IFNAME vlan <2-4094> svlan <2-4094>
Parameters	<1-32> : Bridge group ID MAC : Media Access Control (MAC) address in HHHH.HHHH.HHHH format forward : forward matching frames discard : discard matching frames IFNAME : Interface on which the frame are sent vlan : VLAN ID in range of <2-4094> svlan : SVLAN ID in range of <2-4094>
Example usage	<pre>switch_a(config)# bridge 2 address 2222.2222.2222 forward eth0</pre>

bridge forward-time	
Purpose	Set the time (in seconds) after which (if this bridge is the root bridge) each port changes states to learning and forwarding. This value is used by all instances.
Command Mode	Global Configuration
Syntax	[no] bridge <1-32> forward-time <4-30>
Parameters	<1-32> : Bridge group ID <4-30> : forwarding time delay in seconds.
Example usage	<pre>switch_a(config)# bridge 3 forward-time 6</pre>

bridge mac-priority-override	
Purpose	Set a MAC priority override
Command Mode	Global Configuration
Syntax	[no] bridge <1-32> mac-priority-override mac-address MAC interface IFNAME vlan VLANID (static static-priority-override static-mgmt static-mgmt-priority-override) priority <0-7>
Parameters	<1-32> : Bridge group ID. mac-address : MAC address in HHHH.HHHH.HHHH format. interface : Interface information IFNAME : interface name vlan : add a single VLAN ID static : MAC is a static entry static-mgmt : MAC is a Static Management static-mgmt-priority-override : MAC is a Static Management with priority override static-priority-override : MAC is a static with priority override priority : <0-7> priority value
Example usage	<pre>switch_a(config)# bridge 1 mac-priority-override mac-address 1111.1111.1111 interface gel vlan 2 static priority 80</pre>

bridge shutdown	
Purpose	Disable a bridge
Command Mode	Global Configuration
Syntax	[no] bridge shutdown <1-32> [bridge-forward]
Parameters	<1-32> : the bridge group ID bridge-forward : put all ports of the bridge into forwarding state
Example usage	<pre>switch_a(config)# bridge shutdown 4</pre>
Note	Use the no parameter to reset the bridge.

bridge transmit-holdcount	
Purpose	Set the maximum number of transmissions of BPDUs by the transmit state machine. Use the no parameter to restore the default transmit hold-count value.
Command Mode	Global Configuration
Syntax	[no] bridge <1-32> transmit-holdcount <1-10>
Parameters	<1-32> : Bridge group ID <1-10> : transmit hold-count value.
Example usage	switch_a(config)# bridge 1 transmit-holdcount 5

bridge group	
Purpose	Bind an interface with a bridge specified by the parameter.
Command Mode	Interface Configuration
Syntax	[no] bridge-group <1-32>
Parameters	<1-32> : Bridge group ID
Example usage	switch_a(config-if)# bridge-group 2

bridge-group path-cost	
Purpose	Set the cost of a path associated with a bridge group. The lower the path cost, the greater the likelihood of the bridge becoming root. Use the no parameter to restore the default priority value.
Command Mode	Interface Configuration
Syntax	[no] bridge-group <1-32> path-cost <1-2000000000>
Parameters	<1-32> : Bridge group ID path-cost: the path-cost of a port <1-2000000000>
Example usage	switch_a(config-if)# bridge-group 3 path-cost 123

bridge-group priority	
Purpose	Set the port priority for a bridge. A lower priority indicates a greater likelihood of the bridge becoming root.
Command Mode	Interface Configuration
Syntax	[no] bridge-group <1-32> path-cost <1-2000000000>
Parameters	<1-32> the bridge group ID path-cost: the path-cost of a port <1-2000000000>
Example usage	switch_a(config-if)# bridge-group 4 priority 96
Note	Default priority is 1

Storm Control

show storm-control	
Purpose	Display information on storm control, storm detect, and rate control.
Command Mode	Privileged Exec
Syntax	show storm-control <level pps> show storm-control <level pps> <IFNAME> show storm-detect port-state show utilization show ratecontrol show ratecontrol <IFNAME>
Parameters	None
Example usage	switch_a(config-if)# show storm-control pps
Note	By default, storm control is disabled.

storm-control	
Purpose	Use this command to set the rising threshold level for broadcast, multicast, or destination lookup failure traffic. The storm control action occurs when traffic utilization reaches this level. Storm control is used to block the forwarding of unnecessary flooded traffic. A packet storm occurs when a large number of broadcast packets are received on a port. Forwarding these packets can cause the network to slow down or time out.
Command Mode	Interface Configuration
Syntax	<pre>[no] storm-control (broadcast multicast dlf) level LEVEL storm-control broadcast pps <1-8388608> no storm-control broadcast pps storm-control multicast pps <1-8388608> no storm-control multicast pps storm-control dlf pps <1-8388608> no storm-control dlf pps</pre>
Parameters	broadcast: broadcast rate limiting multicast: multicast rate limiting dlf: destination lookup failure limiting level: The percentage of the threshold LEVEL: percentage of the maximum speed (pps) of the interface <0.01-100.00> <1-8388608>: PPS value
Example usage	<pre>switch_a(config-if)# storm-control broadcast level 30</pre>
Note	By default, storm control is disabled.

Storm Detect

storm-detect	
Purpose	Configure a switch to disable a port that is receiving a large number of Broadcast and/or Multicast packets. The switch can monitor for packets and take action based on percentage of bandwidth utilization or number of packets per second.
Command Mode	Global Configuration
Syntax	<pre>[no] bridge <1-32> storm-detect errdisable bridge <1-32> storm-detect interval <2-65535> bridge 1 storm-detect errdisable-recovery <0-65535></pre>
Parameters	<1-32>: Bridge group ID
Example usage	<pre>switch_a(config)# bridge 1 storm-detect errdisable</pre>

storm-detect interval	
Purpose	Set the storm detect interval
Command Mode	Global Configuration
Syntax	bridge <1-32> storm-detect interval <2-65535>
Parameters	<1-32> the bridge group ID Storm Detect interval: <2- 65535> in seconds
Example usage	switch_a(config)# bridge 1 storm-detect errdisable-recovery 60
Note	Default interval is 0 (disabled).

storm-detect recovery	
Purpose	Set the Storm-Detect errdisable-recovery time. This value determines if the switch should re-enable the port after the specified value or leave the port disabled.
Command Mode	Global Configuration
Syntax	bridge 1 storm-detect errdisable-recovery <0-65535>
Parameters	<1-32> : Bridge group ID
Example usage	switch_a(config)# bridge 1 storm-detect errdisable 60

storm-detect packet type	
Purpose	Enable this port's storm detect by detect number of broadcast or broadcast plus multicast packets per second. Unit is packets per second.
Command Mode	Interface Configuration
Syntax	storm-detect (bc mc-bc) pps <0-100000>
Parameters	bc : broadcast only mc-bc : count broadcast & multicast packets together. pps <0-100000> : packets per second
Example usage	switch_a(config-if)# storm-detect mc-bc pps 50000
Note	The Default is 0 (disabled).

storm detect utilization	
Purpose	Set the By Utilization(%) for a port. Setting this will cause the port to be disabled when the defined percentage of bandwidth is reached.
Command Mode	Interface Configuration
Syntax	storm-detect utilization <0-100>
Parameters	<0-100> : percentage of bandwidth
Example usage	<code>switch_a(config-if)# storm-detect utilization 80</code>
Note	The Default is 0 (disabled).

no storm-detect port enable	
Purpose	Disable storm detect on a port.
Command Mode	Interface Configuration
Syntax	no storm-detect port enable
Parameters	None
Example usage	<code>switch_a(config-if)# no storm-detect port enable</code>

Trunking

show etherchannel	
Purpose	Display information about LACP channels.
Command Mode	Privileged Exec
Syntax	show etherchannel <1-65535> show etherchannel all show etherchannel detail show etherchannel load-balance show etherchannel summary
Parameters	<1-65535> : channel-group number.
Example usage	<code>switch_a# show etherchannel 5</code>

static-channel-group	
Purpose	Create a static aggregator, or add a member port to an existing static aggregator. This command adds the interface to the static aggregator with the specified key. If the aggregator does not exist, it is created, and the interface added to it. If the port is the last member to be detached, the static aggregator is deleted.
Command Mode	Interface Configuration
Syntax	static-channel-group <1-12> no static-channel-group
Parameters	<1-12> : Channel group number.
Example usage	switch_a(config-if) # static-channel-group 2

LACP Trunking

channel-group mode	
Purpose	Add a port to a channel group specified by the channel group number (<1-12>). This command enables link aggregation on a port, so that it may be selected for aggregation by the local system.
Command Mode	Interface Configuration
Syntax	channel-group mode <active passive> no channel-group
Parameters	<1-65535> : Channel group number. mode : Channel mode. active : enable initiation of LACP negotiation on a port. passive : disable initiation of LACP negotiation on a port.
Example usage	switch_a(config-if) # channel-group 4 mode active

show lacp-counter	
Purpose	Display the packet traffic on all ports of all present LACP aggregators, or a given LACP aggregator.
Command Mode	Exec and Privileged Exec
Syntax	show lacp-counter <1-65535>
Parameters	<1-65535> : channel-group number.
Example usage	switch_a# show lacp-counter 555

show lacp sys-id	
Purpose	Display LACP system id and priority
Command Mode	Exec and Privileged Exec
Syntax	show lacp sys-id
Parameters	None
Example usage	switch_a# show lacp sys-id

clear lacp	
Purpose	Clear all counters of all present LACP aggregators or a given LACP aggregator.
Command Mode	Exec and Privileged Exec
Syntax	clear lacp <1-65535> counters clear lacp counters
Parameters	<1-65535> : channel-group number.
Example usage	switch_a# clear lacp counters

debug LACP	
Purpose	Turn on/off LACP debugging at various levels.
Command Mode	Exec and Privileged Exec
Syntax	[no] debug lacp (event cli timer packet sync ha all) [no] debug lacp timer detail
Parameters	all : enable all LACP debugging. cli : echo commands to console. event : set the debug options for LACP events. ha : echo High Availability events to console. packet : set the debug option for LACP packets. sync : echo synchronization to console. timer : echo timer expiry to console. detail : echo timer start/stop to console.
Example usage	switch_a# debug lacp all

lACP port-priority	
Purpose	Set the priority of a channel. Channels are selected for aggregation based on their priority with the higher priority (numerically lower) channels selected first.
Command Mode	Interface Configuration
Syntax	lACP port-priority <1-65535> no lACP port-priority
Parameters	<1-65535> : LACP port priority
Example usage	switch_a(config-if)# lACP port-priority 34

lACP system-priority	
Purpose	Set the system priority of a local system. This determines the system responsible for resolving conflicts in choice of aggregation groups.
Command Mode	Global Configuration
Syntax	lACP system-priority <1-65535> no lACP system-priority
Parameters	<1-65535> : LACP system priority
Example usage	switch_a(config)# lACP system-priority 6700
Note	Lower numerical values have higher priorities. Default system priority is 32768.

lACP timeout	
Purpose	Set either a short or long timeout value on a port. The timeout value is the number of seconds before invalidating a received LACP data unit.
Command Mode	Interface Configuration
Syntax	lACP timeout (short long)
Parameters	short : LACP short timeout. Short timeout value is 3 seconds. long : LACP long timeout. Long timeout value is 90 seconds.
Example usage	switch_a(config-if)# lACP timeout short

port-channel load-balance	
Purpose	Configure LACP port-channel load-balancing and set port selection criteria (PSC) on an interface.
Command Mode	Interface Configuration
Syntax	port-channel load-balance (dst-mac src-mac src-dst-mac dst-ip src-ip src-dstip dst-port src-port src-dst-port) no port-channel load-balance
Parameters	dst-ip: Destination IP address-based load balancing. dst-mac: Destination MAC address-based load balancing. dst-port: Destination TCP/UDP address-based load balancing. src-dst-ip: Source and Destination IP address-based load balancing. src-dst-mac: Source and Destination MAC address-based load balancing. src-dst-port: Source and Destination TCP/UDP address-based load balancing. src-ip: Source IP address-based load balancing. src-mac: Source MAC address-based load balancing. src-port: Source port address-based load balancing.
Example usage	<pre>switch_a(config-if)# port-channel load-balance src-dst-mac</pre>

GVRP

show gvrp	
Purpose	Display GVRP configuration, finite state machine, statistics, and timer.
Command Mode	Privileged Exec
Syntax	show gvrp configuration show gvrp machine show gvrp statistics show gvrp timer
Parameters	None
Example usage	<pre>switch_a# show gvrp configuration</pre>

clear gvrp	
Purpose	Clear GVRP statistics for all VLANS in a bridge or interface,
Command Mode	Privileged Exec
Syntax	clear gvrp statistics clear gvrp statistics all clear gvrp statistics bridge BRIDGE_NAME clear gvrp statistics IFNAME
Parameters	all : Clears a port name. BRIDGE_NAME : Bridge identifier. IFNAME : Interface name.
Example usage	switch_a# clear gvrp statistics all

set gvrp enable/disable	
Purpose	Enable/disable GVRP globally for a default bridge instance, not for all ports of the bridge. After enabling GVRP globally, use set port gvrp to enable GVRP on individual ports of the bridge.
Command Mode	Global Configuration
Syntax	set gvrp [enable disable] set gvrp enable bridge BRIDGE_NAME set gvrp disable bridge BRIDGE_NAME
Parameters	BRIDGE_NAME : Bridge identifier.
Example usage	switch_a(config)# set gvrp disable bridge 12

set gvrp dynamic-vlan-creation	
Purpose	Enable/disable dynamic VLAN creation for default bridge instance.
Command Mode	Global Configuration
Syntax	set gvrp dynamic-vlan-creation enable set gvrp dynamic-vlan-creation enable bridge BRIDGE_NAME set gvrp dynamic-vlan-creation disable set gvrp dynamic-vlan-creation disable bridge BRIDGE_NAME
Parameters	BRIDGE_NAME : Bridge identifier.
Example usage	switch_a(config)# set gvrp dynamic-vlan-creation enable bridge 2

set gvrp registration	
Purpose	Set GVRP registration type to fixed, forbidden, or normal.
Command Mode	Global Configuration
Syntax	set gvrp registration <fixed forbidden normal> IF_NAME
Parameters	fixed: Determine that registered multicast groups are applied to the port, but that subsequent registrations or de-registrations do not affect the port. This means that none of the registered multicast groups on the port are to be de-registered based on GARP timers. forbidden: All GVRP multicasts are de-registered, and prevents further GVRP multicast registration on the port. normal: Sets dynamic GVRP multicast registration and de-registration on the port. IF_NAME: Name of the interface. 1 to 16 characters in length.
Example usage	switch_a(config)# set gvrp registration fixed eth0

set gvrp applicant	
Purpose	Set the GVRP applicant state to normal or active.
Command Mode	Global Configuration
Syntax	set gvrp applicant state normal IF_NAME set gvrp applicant state active IF_NAME
Parameters	active: Sets the active state. normal: Sets the normal state. IF_NAME: Name of the interface.
Example usage	switch_a(config)# set gvrp applicant state active eth0

set gvrp timer	
Purpose	Set the GVRP timers.
Command Mode	Global Configuration
Syntax	set gvrp timer join TIMER_VALUE IF_NAME set gvrp timer leave TIMER_VALUE IF_NAME set gvrp timer leaveall TIMER_VALUE IF_NAME
Parameters	join: the timer for joining the group. leave: the timer for leaving a group. leaveall: the timer for leaving all groups. TIMER_VALUE: timer value in hundredths of a second. IF_NAME: name of the interface.
Example usage	switch_a(config)# set gvrp timer leave 245 eth0

set port gvrp	
Purpose	Enable or disable GVRP on a port or all ports in a bridge.
Command Mode	Global Configuration
Syntax	set port gvrp enable (IF_NAME all) set port gvrp disable (IF_NAME all)
Parameters	enable: Enables GVRP on a port. disable: Disables GVRP on a port. all: All ports added to recently configured bridge. IF_NAME: name of the interface.
Example usage	switch_a(config)# set port gvrp enable eth0

GMRP

show gmrp	
Purpose	Show GMRP configurations, GMRP finite state machine, GMRP statistics, and GMRP timer.
Command Mode	Privileged exec
Syntax	show gmrp configuration show gmrp machine show gmrp statistics show gmrp timer
Parameters	None
Example usage	switch_a# show gmrp configuration

clear gmrp statistics	
Purpose	Clear GMRP statistics for a given VLAN or all the VLANs .
Command Mode	Privileged exec
Syntax	clear gmrp statistics all clear gmrp statistics all bridge BRIDGE_NAME clear gmrp statistics vlanid <1-4094> clear gmrp statistics vlanid <1-4094> bridge <1-32>
Parameters	BRIDGE_NAME: Bridge identifier. <1-4094>: VLAN identifiers, <1-32>: bridge identifier.
Example usage	switch_a# clear gmrp statistics vlan 12 bridge 2

set gmrp enable	
Purpose	Enable GMRP globally on a switch for the default bridge. This command does not enable GMRP for all ports of the bridge. After enabling GMRP globally, use the set port gmrp command to enable GMRP on individual ports. GMRP cannot be enabled if IGMP Snooping is enabled or if GMRP is configured for a VLAN.
Command Mode	Global Configuration
Syntax	set gmrp enable set gmrp enable bridge BRIDGE_NAME set gmrp enable bridge BRIDGE_NAME vlan VLANID set gmrp enable vlan VLANID
Parameters	BRIDGE_NAME : Bridge identifier. VLANID : VLAN identifier <1-4094>.
Example usage	switch_a(config)# set gmrp enable bridge 2

set gmrp disable	
Purpose	Disable GMRP globally on a switch for the default bridge. This command does not disable GMRP in all ports of the bridge.
Command Mode	Global Configuration
Syntax	set gmrp disable set gmrp disable bridge BRIDGE_NAME set gmrp disable bridge BRIDGE_NAME vlan VLANID set gmrp disable vlan VLANID
Parameters	BRIDGE_NAME : Bridge identifier. VLANID : VLAN identifier <1-4094>.
Example usage	switch_a(config)# set gmrp disable bridge 2 vlan 2

set gmrp extended-filtering	
Purpose	Enable or disable extended filtering on a bridge as per Table 8-7 of IEEE802.1Q-2003.
Command Mode	Global Configuration
Syntax	set gmrp extended-filtering enable set gmrp extended-filtering enable bridge BRIDGE_NAME set gmrp extended-filtering disable set gmrp extended-filtering disable bridge BRIDGE_NAME
Parameters	enable: Enables GMRP on a switch. disable: Disables GMRP on a switch. BRIDGE_NAME: Bridge identifier.
Example usage	switch_a(config)#set gmrp extended-filtering enable

set gmrp fwdall	
Purpose	Set the GMRP forward all option for an interface.
Command Mode	Global Configuration
Syntax	set gmrp fwdall disable IF_NAME set gmrp fwdall enable IF_NAME
Parameters	enable: Enables GMRP on a switch. disable: Disables GMRP on a switch. IF_NAME: Interface name.
Example usage	switch_a(config)# set gmrp fwdall enable ge5

set gmrp registration	
Purpose	Set GMRP registration type. To de-register a multicast port, the port must be in the normal registration mode.
Command Mode	Global Configuration
Syntax	set gmrp registration fixed IF_NAME set gmrp registration forbidden IF_NAME set gmrp registration normal IF_NAME set gmrp registration restricted IF_NAME
Parameters	fixed: Determine that the multicast groups currently registered on the switch are applied to the port, but that subsequent registrations or de-registrations do not affect the port. This means that none of the registered multicast groups on the port are to be de-registered based on GARP timers. forbidden: All GMRP multicasts are de-registered, and prevents further GMRP multicast registration on the port. normal: dynamic GMRP multicast registration and de-registration on the port. restricted: Restricted registration. IF_NAME: Interface name, from 1 to 16 characters in length
Example usage	switch_a(config)# set gmrp registration normal ge5 bridge 2

set gmrp timer	
Purpose	Set the values for the GMRP Join, Leave, and Leaveall timers for a specified bridge. The relationship for the timer values are as follows: • Leave timer must be greater than, or equal to, three times the join timer. • Leaveall timer must be greater than the leave timer.
Command Mode	Global Configuration
Syntax	set gmrp timer join TIMER_VALUE IF_NAME set gmrp timer leave TIMER_VALUE IF_NAME set gmrp timer leaveall TIMER_VALUE IF_NAME
Parameters	join: The timer for joining the group. leave: The timer for leaving a group. leaveall: The timer for leaving all groups. TIMER_VALUE: Timer value in hundredths of a second. IF_NAME: Interface name.
Example usage	switch_a(config)# set gmrp timer join 100 eth0
Note	Default for the join timer is 200 milliseconds (ms). Default for the leave timer is 600 milliseconds. Default for the leaveall timer is 10000 ms.

set port gmrp	
Purpose	Enable or disable GMRP on a particular port in all VLANs or all ports in a bridge. GMRP on a port cannot be enabled for all VLANs if GMRP has already been configured for a particular VLAN for the port.
Command Mode	Global Configuration
Syntax	set port gmrp disable (IF_NAME all) set port gmrp enable (IF_NAME all) set port gmrp disable IF_NAME vlan VLANID set port gmrp enable IF_NAME vlan VLANID
Parameters	enable: Enables GMRP on a switch. disable: Disables GMRP on a switch. all: All ports added to recently configured bridge. IFNAME: Interface name VLANID: VLAN identifier <1-4094>.
Example usage	switch_a(config)# set port gmrp enable eth0

VLAN Translation

vlan translate

Purpose	Turn VLAN translation on/off
Command Mode	Global Configuration
Syntax	vlan translate on vlan translate off
Parameters	None
Example usage	<code>switch_a(config-if)# vlan translate on</code>

switchport vlantrans

Purpose	Set the ingress/egress VLAN translation from VLAN_ID to VLAN_ID
Command Mode	Interface Configuration
Syntax	switchport vlantrans ingress vlan VLAN_ID vlan VLAN_ID switchport vlantrans egress vlan VLAN_ID vlan VLAN_ID no switchport vlantrans ingress vlan VLAN_ID no switchport vlantrans egress vlan VLAN_ID
Parameters	VLAN_ID: VLAN ID
Example usage	<code>switch_a(config-if)# no switchport vlantrans ingress vlan 20</code>

IGMP Information

show ip igmp	
Purpose	Show multicast groups with receivers connected and learned through IGMP. Show state of IGMP, IGMP Proxy service for specified interface, or all interfaces. Show state of IGMP Proxy services for specified interface or for all interfaces. Show Source-Specific-Multicast Mapping, VPN Routing/Forwarding instance.
Command Mode	Privileged exec
Syntax	show ip igmp groups show ip igmp interface (IFNAME) show ip igmp proxy show ip igmp ssm-map
Parameters	
Example usage	switch_a# show ip igmp groups

clear ip igmp	
Purpose	Clear IGMP local-memberships on interfaces.
Command Mode	Privileged exec
Syntax	clear ip igmp clear ip igmp group * clear ip igmp group A.B.C.D clear ip igmp group A.B.C.D IFNAME clear ip igmp interface IFNAME
Parameters	*: Clears all groups on all interfaces. A.B.C.D : Group address's local-membership cleared from all interfaces. interface : All groups learned from this interface are deleted. group : Deletes IGMP group cache entries.
Example usage	switch_a# clear ip igmp interface eth1

ip multicast-routing	
Purpose	Turn on/off multicast routing on the router
Command Mode	Global configuration
Syntax	[no] ip multicast-routing
Parameters	
Example usage	switch_a(config)# no ip multicast-routing

ip igmp	
Purpose	Enable the IGMP protocol operation on an interface. This command enables IGMP protocol operation in stand-alone mode, and can be used to learn local-membership information prior to enabling a multicast routing protocol on the interface. This command will have no effect on interfaces configured for IGMP Proxy. Use the no parameter to return all IGMP related configuration to the default (including IGMP Snooping or IGMP Proxy service).
Command Mode	Interface Configuration
Syntax	[no] ip igmp
Parameters	none
Example usage	switch_a(config-if)# ip igmp

ip igmp version	
Purpose	Set the current IGMP protocol version on an interface. This command applies to interfaces configured for IGMP Layer-3 multicast protocols, IGMP Snooping, or IGMP Proxy. Use the no parameter to return to the default version.
Command Mode	Interface Configuration
Syntax	ip igmp version <1-3> no ip igmp version
Parameters	<1-3>: IGMP version number.
Example usage	switch_a(config-if)# ip igmp version 2

ip igmp join-group	
Purpose	Configure a join multicast group. Use the no parameter to delete group membership entry.
Command Mode	Global Configuration
Syntax	ip igmp join-group A.B.C.D {(source (A.B.C.D))} no ip igmp join-group A.B.C.D {(source (A.B.C.D))}
Parameters	A.B.C.D: Standard IP multicast group address to be configured as a group member. source: Static source to be joined. A.B.C.D: Standard IP source address to be configured as a source from where multicast packets originate.
Example usage	switch_a(config-if)# ip igmp join-group 1.1.1.1 source 1.1.1.2

ip igmp proxy-service	
Purpose	Designate an interface to be the IGMP proxy-service (upstream host-side) interface, thus enabling IGMP host-side protocol operation on this interface. All associated downstream router-side interfaces will have their memberships consolidated on this interface, according to IGMP host-side functionality.
Command Mode	Interface Configuration
Syntax	[no] ip igmp proxy-service
Parameters	None
Example usage	switch_a(config-if)# ip igmp join-group 1.1.1.1 source 1.1.1.2
Note	This command should not be used when configuring interfaces enabled for IGMP in association with a multicast-routing protocol, otherwise the behavior will be undefined.

ip igmp mroute-proxy	
Purpose	Specify the IGMP Proxy service (upstream host-side) interface with which to be associated. IGMP router-side protocol operation is enabled only when the specified upstream proxy-service interface is functional.
Command Mode	Interface Configuration
Syntax	ip igmp mroute-proxy IFNAME no ip igmp mroute-proxy
Parameters	IFNAME: Interface name
Example usage	switch_a(config-if)# ip igmp mroute-proxy ge5
Note	This command should not be used when configuring interfaces enabled for IGMP in association with a multicast-routing protocol, otherwise the behavior will be undefined.

ip igmp immediate-leave	
Purpose	In IGMP version 2, use this command to minimize the leave latency of IGMP memberships. This command is used when only one receiver host is connected to each interface. This command applies to interfaces configured for IGMP Layer-3 multicast protocols, IGMP Snooping, or IGMP Proxy.
Command Mode	Interface Configuration
Syntax	ip igmp immediate-leave group-list (<1-99> <1300-1999> WORD) no ip igmp immediate-leave
Parameters	group-list: Standard access-list name or number that defines multicast groups in which the immediate leave feature is enabled. <1-99>: Access-list number. <1300-1999>: Access-list number (expanded range). WORD: Standard IP access-list name.
Example usage	switch_a(config-if)# ip igmp immediate-leave group-list 34

ip igmp access-group	
Purpose	Control the multicast local-membership groups learnt on an interface. This command applies to interfaces configured for IGMP Layer-3 multicast protocols, IGMP Snooping, or IGMP Proxy.
Command Mode	Interface Configuration
Syntax	ip igmp access-group (<1-99> WORD) no ip igmp access-group
Parameters	<1-99> : Access-list number. WORD : Standard IP access-list name.
Example usage	In this example, hosts serviced by interface ge5 can only join the group 225.2.2.2:
	<pre> switch_a#configure terminal switch_a(config)#access-list 1 permit 225.2.2.2 0.0.0.0 switch_a(config)#interface ge5 switch_a(config-if)#ip igmp access-group 1 </pre>

ip igmp limit	
Purpose	Configure limit for maximum number of group membership states, at router level, or for the specified interface. Once the specified number of group memberships is reached, additional local memberships are ignored. An exception access-list can be used to specify group-addresses to be excluded from the limit. This command is for interfaces configured for IGMP Layer-3 multicast protocols, IGMP Snooping, or IGMP Proxy. When configured for IGMP Snooping, this command can be issued on only VLAN interfaces. The limit applies, individually, to each of its constituent interfaces.
Command Mode	Global configuration and Interface Configuration
Syntax	ip igmp limit (<1-2097152> (except (<1-99> <1300-1999> WORD))) no ip igmp limit
Parameters	<1-2097152> : Max number of group membership states. except : Multicast groups that are exempted from limit. <1-99> : Access-list number, <1300-1999> : Access-list number (expanded range), WORD : Standard IP access-list name.
Example usage	Set IGMP limit of 100 group-membership states across all interfaces on which IGMP is enabled, and excludes group 224.1.1.1 from this limitation.
	<pre> switch_a(config)# access-list 1 permit 224.1.1.1 0.0.0.0 switch_a(config)# ip igmp limit 100 except 1 </pre>

IGMP Snooping

show igmp snooping

Purpose	Show multicast groups with receivers connected and learned through IGMP. Show state of IGMP, IGMP Proxy service for specified interface, or all interfaces. Show state of IGMP Proxy services for specified interface or for all interfaces. Show Source-Specific-Multicast Mapping, VPN Routing/Forwarding instance.
Command Mode	Privileged exec
Syntax	show igmp snooping group show igmp snooping interface show igmp snooping mrouter show igmp snooping statistics
Parameters	None
Example usage	switch_a# show igmp snooping statistics

show igmp snooping

Purpose	Show IGMP multicast group membership, interface information, multicast router information, and statistics.
Command Mode	Privileged exec
Syntax	show igmp snooping group show igmp snooping interface show igmp snooping mrouter show igmp snooping statistics
Parameters	None
Example usage	switch_a# show igmp snooping statistics

ip igmp snooping enable

Purpose	Enable IGMP Snooping. (non-querier role)
Command Mode	Global configuration
Syntax	ip igmp snooping enable no ip igmp snooping
Parameters	None
Example usage	switch_a(config)# ip igmp snooping enable

ip igmp snooping querier

Purpose	Enable IGMP snooping querier role.
Command Mode	Global configuration
Syntax	ip igmp snooping querier no ip igmp snooping querier
Parameters	None
Example usage	switch_a(config)# igmp snooping querier

igmp snooping report-suppression

Purpose	Enable Report suppression on global level.
Command Mode	Global configuration
Syntax	igmp snooping report-suppression no igmp snooping report-suppression
Parameters	None
Example usage	switch_a(config)# igmp snooping report-suppression

ip igmp snooping force-forward

Purpose	Control how the switch will forward unknown multicast packets when the switch is in IGMP Passive mode, both with or without a Querier Port present.
Command Mode	Global configuration
Syntax	ip igmp snooping force-forward (LINE all none)
Parameters	LINE: Do not forward multicast packets to any interface all: Flood all unknown multicast packets none: Forward all multicast packets to all interfaces
Example usage	switch_a(config-)# igmp snooping force-forward all

ip igmp snooping passive-forward	
Purpose	Control how the switch will forward unknown multicast packets when the switch is in IGMP Passive mode and also without a Querier Port present.
Command Mode	Global configuration
Syntax	ip igmp snooping passive-forward (LINE all none)
Parameters	LINE: Do not forward multicast packets to any interface all: Flood all unknown multicast packets none: Drop all unknown multicast packets
Example usage	switch_a(config-if)# igmp snooping passive-forward none

ip igmp snooping	
Purpose	Enable IGMP Snooping in the VLAN interface.
Command Mode	Interface mode for VLAN
Syntax	[no] ip igmp snooping
Parameters	None
Example usage	switch_a(config-if)# ip igmp snooping

igmp snooping fast-leave	
Purpose	Enable IGMP Snooping fast-leave processing. Fast-leave processing is analogous to immediate leave processing; the IGMP group-membership is removed as soon as an IGMP leave group message is received without sending out a group-specific query.
Command Mode	Interface mode for VLAN
Syntax	[no] igmp snooping fast-leave
Parameters	None
Example usage	switch_a(config-if)# ip igmp snooping fast-leave

igmp snooping mrouter	
Purpose	Configure the specified VLAN constituent interface as a multicast router interface for IGMP Snooping in that VLAN.
Command Mode	Interface mode for VLAN
Syntax	[no] igmp snooping mrouter interface IFNAME
Parameters	IFNAME: Name of the interface
Example usage	switch_a(config-if)# igmp snooping mrouter interface ge8

ip igmp snooping querier	
Purpose	Enable IGMP snooping querier functionality in VLAN interface.
Command Mode	Interface mode for VLAN
Syntax	ip igmp snooping querier no ip igmp snooping querier
Parameters	None
Example usage	switch_a(config-if)# ip igmp snooping querier

igmp snooping report-suppression	
Purpose	Enable report suppression for IGMP version 1, 2 and 3 reports.
Command Mode	Interface mode for VLAN
Syntax	igmp snooping report-suppression no igmp snooping report-suppression
Parameters	None
Example usage	switch_a(config-if)# igmp snooping report-suppression

igmp snooping static-group

Purpose	Configure an interface belonging to a VLAN as a static member of a multicast group. Interface can be specified by type and number.
Command Mode	Interface mode for VLAN
Syntax	[no] igmp snooping static-group A.B.C.D [source A.B.C.D] interface IFNAME
Parameters	None
Example usage	<pre>switch_a(config-if)# igmp snooping static-group 230.0.0.1 interface ge10</pre>

STP Information

show spanning-tree	
Purpose	Show the state of the spanning tree for all STP or RSTP bridge-groups, including named interface and VLANs.
Command Mode	Privileged exec
Syntax	show spanning-tree show spanning-tree interface IFNAME show spanning-tree mst show spanning-tree mst config show spanning-tree mst interface IFNAME show spanning-tree mst detail show spanning-tree mst detail interface IFNAME show spanning-tree mst instance (<1-63> spbm) interface IFNAME show spanning-tree mst instance (<1-63> spbm te-msti) show spanning-tree rpvtst+ show spanning-tree rpvtst+ config show spanning-tree rpvtst+ detail show spanning-tree rpvtst+ detail interface IFNAME show spanning-tree rpvtst+ interface IFNAME show spanning-tree rpvtst+ vlan <1-4094> show spanning-tree rpvtst+ vlan <1-4094> interface IFNAME show spanning-tree statistics bridge <1-32> show spanning-tree statistics interface IFNAME (instance (<1-63> spbm) vlan <2-4094>) bridge <1-32> show spanning-tree statistics (interface IFNAME (instance (<1-63> spbm) vlan <1-4094>)) bridge <1-32> show spanning-tree vlan range-index
Parameters	interface: interface information IFNAME: Interface name mst: Display MST information rpvtst+: Display RPVST information statistics: Display statistics of the BPDUs vlan range-index: Display a VLAN range-index value
Example usage	switch_a# show spanning-tree

Global Configuration

bridge protocol ieee

Purpose	Add an IEEE 802.1d Spanning Tree Protocol bridge. After creating a bridge instance, add interfaces to the bridge using the bridge-group command. Bring the bridge instance into operation with the no shutdown command in interface mode.
Command Mode	Global Configuration
Syntax	bridge <1-32> protocol ieee (vlan-bridge) no bridge <1-32> protocol ieee
Parameters	<1-32> : Bridge group ID, vlan-bridge : Specify VLAN-aware bridge.
Example usage	switch_a(config)# bridge <1-32> protocol ieee

bridge spanning-tree

Purpose	Enable/disable Spanning Tree Protocol on a bridge.
Command Mode	Global Configuration
Syntax	bridge <1-32> spanning-tree enable no bridge <1-32> spanning-tree enable (bridge-forward)
Parameters	<1-32> : Bridge group ID. enable : Enable spanning tree protocol on this bridge. bridge-forward : Puts all ports of bridge into forwarding state.
Example usage	switch_a(config)# bridge 2 spanning-tree enable

bridge spanning-tree errdisable-timeout

Purpose	Enable the error-disable-timeout facility, which sets a timeout for ports disabled by the BPDU guard feature. The timer sets the interval for the port to be enabled back.
Command Mode	Global Configuration
Syntax	bridge <1-32> spanning-tree errdisable-timeout enable bridge <1-32> spanning-tree errdisable-timeout interval <10-1000000> no bridge <1-32> spanning-tree errdisable-timeout enable no bridge <1-32> spanning-tree errdisable-timeout interval
Parameters	enable : Enable the timeout mechanism for the port interval : The interval after which port shall be enabled. <10-1000000> : Error-disable-timeout interval in seconds.
Example usage	switch_a(config)# bridge 1 spanning-tree errdisable-timeout enable

bridge spanning-tree force-version	
Purpose	Set the version for the bridge. A version identifier of less than a value of 2 enforces the spanning tree protocol. Although the command supports an input range of 0-4, for RSTP, the valid range is 0-2. When the forceversion is set for a bridge, all ports of the bridge have the same spanning tree version set. Use the show spanning tree command to display administratively configured and currently running values of the BPDU filter parameter for the bridge and port.
Command Mode	Global Configuration
Syntax	bridge <1-32> spanning-tree force-version <0-4> no bridge <1-32> spanning-tree force-version
Parameters	<1-32>: Bridge group ID. force-version: Specify a force version identifier: 0 STP 1 Not supported 2 RSTP 3 MSTP 4 SPB
Example usage	<pre>switch_a(config)# bridge 1 spanning-tree force-version 0</pre>

bridge spanning-tree pathcost	
Purpose	Set a spanning-tree path cost method. If the short parameter is used, the switch uses a value for the default path cost a number in the range 1 through 65,535. If the long parameter is used, the switch uses a value for the default path cost a number in the range 1 through 200,000,000. Use the no option to return the path cost method to the default setting. The default path cost method for STP is short and for MSTP/RSTP is long.
Command Mode	Global Configuration
Syntax	bridge <1-32> spanning-tree pathcost method (short long) no bridge <1-32> spanning-tree pathcost method
Parameters	<1-32>: The bridge group ID. method: Method used to calculate default port path cost. long: 16-bit values for default port path costs. short: 32-bit values for default port path costs.
Example usage	<pre>switch_a(config)#bridge 1 spanning-tree pathcost method short</pre>

bridge spanning-tree portfast

Purpose	Set the portfast BPDU (Bridge Protocol Data Unit) guard or filter for the bridge. Use the show spanning tree command to display administratively configured and currently running values of the BPDU filter parameter. BPDU Filter — All ports that have their BPDU filter set to default take the same value of BPDU filter as that of the bridge. The Spanning Tree Protocol sends BPDUs from all ports. Enabling the BPDU Filter feature ensures that PortFast-enabled ports do not transmit or receive any BPDUs. BPDU Guard — When the BPDU guard feature is set for a bridge, all portfast-enabled ports of the bridge that have the BPDU guard set to default shut down the port on receiving a BPDU. In this case, the BPDU is not processed. The port can be brought back up manually with the no shutdown command, or the errdisable-timeout feature can be used to re-enable the port after a specified time interval.
Command Mode	Global Configuration
Syntax	[no] bridge <1-32> spanning-tree portfast bpdu-guard [no] bridge <1-32> spanning-tree portfast bpdu-filter
Parameters	<1-32> : Bridge group ID. bpdu-filter : Filter the BPDUs on portfast enabled ports. bpdu-guard : Guard the portfast ports against BPDU receive.
Example usage	<pre>switch_a(config)# bridge 3 spanning-tree portfast bpdu-filter</pre>

bridge vlan priority

Purpose	Create or delete a mapping between an MSTI and VLAN for RPVST+ operation. The bridge instance must already be configured for RPVST+ operation. This command sets the priority value for the spanning-tree on the bridge. The lower the priority of the VLAN on a bridge, the better the chances of the bridge becoming a root bridge, or a designated bridge for the VLAN. The permitted range of values is 0-61440. The no command resets to default priority (32768).
Command Mode	Global Configuration
Syntax	bridge <1-32> vlan <2-4094> priority <0-61440> no bridge <1-32> vlan <2-4094> priority
Parameters	<1-32> : Bridge group ID, vlan : Identity of VLAN <2-4094>. priority : The bridge priority for the common instance. <0-61440> : Bridge priority in increments of 4096
Example usage	<pre>switch_a(config)# bridge 1 vlan 2 priority 80</pre>

bridge hello-time	
Purpose	Set the hello-time, the time in seconds after which (if this bridge is the root bridge) all the bridges in a bridged LAN exchange Bridge Protocol Data Units (BPDUs). A very low value of this parameter leads to excessive traffic on the network, while a higher value delays the detection of topology change. This value is used by all instances. Configure the bridge instance name before using this command. The allowable range of values is 1-10 seconds. Make sure that the value of hello time is always greater than the value of hold time (2 seconds by default). Use the no parameter to restore the default value of the hello time. Default hello time value is 2 seconds.
Command Mode	Global Configuration
Syntax	<pre>bridge <1-32> hello-time <1-10> no bridge <1-32> hello-time</pre>
Parameters	<1-32>: Bridge group ID. <1-10>: Hello BPDU interval in seconds.
Example usage	<code>switch_a(config)# bridge 3 hello-time 3</code>

bridge priority	
Purpose	Set the bridge priority for the common instance. Using a lower priority indicates a greater likelihood of the bridge becoming root. The priority values can be set only in increments of 4096. Use the no parameter to reset it to the default value. The default priority is 32768 (or hex 0x8000).
Command Mode	Global Configuration
Syntax	<pre>bridge (<1-32>) priority <0-61440> no bridge (<1-32>)</pre>
Parameters	<1-32>: Bridge group ID. <0-61440>: Bridge priority
Example usage	<code>switch_a(config)# bridge 2 priority 4096</code>

bridge max-age	
Purpose	Set the maximum age for a bridge. This value is used by all instances. Maximum age is the maximum time in seconds for which (if a bridge is the root bridge) a message is considered valid. This prevents the frames from looping indefinitely. The value of maximum age should be greater than twice the value of hello time plus 1, but less than twice the value of forward delay minus 1. The allowable range for max-age is 6-40 seconds. Configure this value sufficiently high, so that a frame generated by root can be propagated to the leaf nodes without exceeding the maximum age. Use the no parameter to restore the default value of the maximum age (20 seconds).
Command Mode	Global Configuration
Syntax	bridge <1-32> max-age <6-40> no bridge <1-32> max-age
Parameters	<1-32>: Bridge group ID. <6-40>: Maximum time, in seconds, to listen for the root bridge.
Example usage	switch_a(config)# bridge 2 max-age 12

bridge forward-time	
Purpose	Set the time (in seconds) after which (if this bridge is the root bridge) each port changes states to learning and forwarding. This value is used by all instances. Use the no parameter to restore the default value (15 seconds).
Command Mode	Global Configuration
Syntax	bridge <1-32> forward-time <4-30> no bridge <1-32> forward-time
Parameters	<1-32>: Bridge group ID. <6-40>: Maximum time, in seconds, to listen for the root bridge.
Example usage	switch_a(config)# bridge 2 max-age 12
Note	Be careful when setting this value lower than 7 seconds

spanning-tree acquire	
Purpose	Enable the default bridge to learn station location information for an instance. This helps in making forwarding decisions.
Command Mode	Global Configuration
Syntax	[no] spanning-tree acquire
Parameters	None
Example usage	<code>switch_a(config)# spanning-tree acquire</code>
Note	Learning is enabled by default for all instances.

bridge-group spanning-tree	
Purpose	Enable or disable the spanning-tree on a configured bridge.
Command Mode	Interface Configuration
Syntax	bridge-group <1-32> spanning-tree (disable enable)
Parameters	<1-32> : Bridge group ID. disable : Disable spanning tree on the interface. enable : Enable spanning tree on the interface.
Example usage	<code>switch_a(config-if)# bridge-group 1 spanning-tree enable</code>
Note	Spanning-tree is enabled by default.

bridge-group path-cost	
Purpose	Set the cost of a path. Before setting a path-cost in a VLAN configuration, add an MST instance to a port using the bridge-group instance command. Use the no parameter to restore the default cost value of the path, which varies according to bandwidth.
Command Mode	Interface Configuration
Syntax	bridge-group <1-32> path-cost <1-200000000> no bridge-group <1-32> path-cost
Parameters	<1-32> : Bridge group ID. <1-200000000> : Cost of the path (lower means a greater likelihood of the interface becoming root).
Example usage	<code>switch_a(config-if)# bridge-group 4 path-cost 1000</code>
Note	Assuming a 10 Mb/s link speed, the default value is 200,000.

bridge-group priority	
Purpose	Set the port priority for a bridge. A lower priority indicates a greater likelihood of the bridge becoming root.
Command Mode	Interface Configuration
Syntax	bridge-group <1-32> priority <0-240>
Parameters	<1-32> : Bridge group ID. <0-240> : Port priority, . The priority values can only be set in increments of 16.
Example usage	switch_a(config-if)# bridge-group 4 priority 32

bridge-group instance	
Purpose	Assign a Multiple Spanning Tree (MST) instance to a port.
Command Mode	Interface Configuration
Syntax	[no] bridge-group (<1-32> backbone) instance (<1-63> spbm te-msti)
Parameters	<1-32> : Bridge identifier. <1-63> : Multiple spanning tree instance identifier. spbm : Shortest Path Bridging - MAC instance. te-msti : Traffic engineering MSTI instance.
Example usage	switch_a(config-if)# bridge-group 1 instance te-msti

bridge-group instance path-cost	
Purpose	Set a path cost for a multiple spanning tree instance. Before using this command, add an MST instance to a port using the bridge-group instance command. Use the no form to set the path cost to default, which varies according to bandwidth.
Command Mode	Interface Configuration
Syntax	bridge-group (<1-32> backbone) instance <1-63> path-cost <1-200000000> no bridge-group (<1-32> backbone) instance <1-63> path-cost
Parameters	<1-32> : Bridge identifier. <1-63> : Multiple spanning tree instance identifier. <1-200000000> : Path cost for a port (lower path cost means greater likelihood of becoming root).
Example usage	switch_a(config-if)# bridge-group 4 instance 3 path-cost 1000

bridge-group instance priority	
Purpose	Set the priority of a multiple spanning tree instance. The Multiple Spanning Tree Protocol uses port priority as a tiebreaker to determine which port should forward frames for a particular instance on a LAN, or which port should be the root port for an instance. A lower value implies a better priority. In the case of the same priority, the interface index will serve as the tiebreaker, with the lower-numbered interface being preferred over others.
Command Mode	Interface Configuration
Syntax	bridge-group (<1-32>) instance (<1-63>) priority <0-240>
Parameters	<1-32> : Bridge identifier. <1-63> : Multiple spanning tree instance identifier. <0-240> : Port priority, set in increments of 16.
Example usage	<pre>switch_a(config-if)# bridge-group 2 switch_a(config-if)# bridge-group 2 instance 4 switch_a(config-if)# bridge-group 2 instance 4 priority 64</pre>
Note	Default value of port priority is 128.

spanning tree autoedge	
Purpose	Set automatic identification of the edge port.
Command Mode	Interface Configuration
Syntax	[no] spanning-tree autoedge
Parameters	None
Example usage	switch_a(config-if)# spanning tree autoedge

spanning tree edgeport	
Purpose	Set a port as an edge-port and to enable rapid transitions. Use the no parameter to set port to default state (not an edge-port) and to disable rapid transitions. This command is an alias to the spanning-tree portfast command, can be used interchangeably.
Command Mode	Interface Configuration
Syntax	[no] spanning-tree edgeport
Parameters	None
Example usage	switch_a(config-if)# spanning tree edgeport

spanning tree guard root	
Purpose	Enable the root guard feature for the port. This feature disables reception of superior BPDUs. The root guard feature makes sure that the port on which it is enabled is a designated port. If the root guard enabled port receives a superior BPDU, it goes to a Listening state (for STP) or discarding state (for RSTP and MSTP).
Command Mode	Interface Configuration
Syntax	[no] spanning-tree guard root
Parameters	None
Example usage	<code>switch_a(config-if)# spanning tree guard root</code>

spanning tree portfast	
Purpose	Enable fast transitions, with port placed in the forwarding state immediately. Port does not go through listening, learning, and forwarding states.
Command Mode	Interface Configuration
Syntax	[no] spanning-tree portfast
Parameters	None
Example usage	<code>switch_a(config-if)# spanning tree portfast</code>

spanning tree bpdu-guard	
Purpose	Enable or disable the BPDU Guard feature on a port. This command supersedes the bridge level configuration for the BPDU Guard feature. When the enable or disable parameter is used with this command, this configuration takes precedence over bridge configuration. However, when the default parameter is used with this command, the bridge-level BPDU Guard configuration takes effect. Use the show spanning tree command to display currently running values of the BPDU filter parameter.
Command Mode	Interface Configuration
Syntax	spanning-tree bpdu-guard (enable disable default) no spanning-tree bpdu-guard
Parameters	None:
Example usage	<code>switch_a(config-if)# spanning-tree bpdu-guard enable</code>

spanning tree hello-time	
Purpose	Set the hello-time, the time in seconds after which (if this bridge is the root bridge) all the default bridges in a bridged LAN exchange Bridge Protocol Data Units (BPDUs). A very low value of this parameter leads to excessive traffic on the network, while a higher value delays the detection of topology change. This value is used by all instances. Use the no parameter to return to the default value for the hello time.
Command Mode	Interface Configuration
Syntax	spanning-tree hello-time <1-10> no spanning-tree hello-time
Parameters	<1-10>: BPDU in seconds
Example usage	<code>switch_a(config-if)# spanning-tree hello-time 5</code>
Note	Default hello time is 2. The value of the hello time must always be greater than the value of the hold time.

spanning tree enable/disable	
Purpose	Enable or disable spanning tree on an interface for the default bridge.
Command Mode	Interface Configuration
Syntax	spanning-tree enable spanning-tree disable
Parameters	None
Example usage	<code>switch_a(config-if)# spanning-tree enable</code>
Note	Spanning-tree is enabled by default if the switchport command is configured.

spanning-tree instance restricted-role	
Purpose	Set the restricted role value for the instance to TRUE. Use the no parameter to set the restricted role to default (FALSE).
Command Mode	Interface Configuration
Syntax	[no] spanning-tree instance <1-63> restricted-role
Parameters	<1-63>: Instance ID
Example usage	<code>switch_a(config-if)# spanning-tree instance 2 restricted-role</code>

spanning-tree instance restricted-tcn	
Purpose	Set the restricted Topology Change Notification (TCN) value for the instance to TRUE. Use the no parameter to set the restricted role value for the instance to default (FALSE).
Command Mode	Interface Configuration
Syntax	[no] spanning-tree instance <1-63> restricted-tcn
Parameters	<1-63> : Instance ID
Example usage	<pre>switch_a(config-if)# spanning-tree instance 2 restricted-tcn</pre>

spanning-tree link-type	
Purpose	Enable or disable point-to-point or shared link types. RSTP has a backward-compatible STP mode, spanning-tree link-type shared . An alternative is the spanning-tree force-version 0 .
Command Mode	Interface Configuration
Syntax	spanning-tree link-type (auto point-to-point shared) no spanning-tree link-type
Parameters	auto : Sets to either point-to-point or shared based on duplex state. point-to-point : Enables rapid transition. shared : Disables rapid transition.
Example usage	<pre>switch_a(config-if)# spanning-tree link-type point-to-point</pre>

spanning-tree bpdu-filter	
Purpose	Set the BPDU filter value for individual ports. The enable or disable parameters cause this configuration to take precedence over bridge configuration. The default parameter causes the bridge level BPDU filter configuration to take effect for the port. Use the show spanning tree command to display currently running values of the BPDU filter parameter.
Command Mode	Interface Configuration
Syntax	[no] spanning-tree bpdu-filter (enable disable default)
Parameters	default : Sets the bpdu-filter to the default level. disable : Disables the BPDU-filter. enable : Enables the BPDU-filter.
Example usage	<pre>switch_a(config-if)# spanning-tree bpdu-filter enable</pre>

spanning-tree restricted-role	
Purpose	Set the restricted role value for the instance to TRUE. Use the no parameter to set the restricted role value for the instance to FALSE.
Command Mode	Interface Configuration
Syntax	[no] spanning-tree restricted-role
Parameters	None
Example usage	switch_a(config-if) # spanning-tree restricted-role
Note	Default restricted role value is FALSE.

spanning-tree restricted-tcn	
Purpose	Set the restricted TCN value for the instance to TRUE, restricting the Topology Change Notification (TCN) BPDUs sent on the port. Use the no parameter to set the restricted role value for the instance to FALSE.
Command Mode	Interface Configuration
Syntax	[no] spanning-tree restricted-tcn
Parameters	None
Example usage	switch_a(config-if) # spanning-tree restricted-tcn
Note	Default restricted tcn value is FALSE.

spanning-tree vlan	
Purpose	Set restrictions for the port of a particular VLAN.
Command Mode	Interface Configuration
Syntax	spanning-tree vlan <2-4094> restricted-role spanning-tree vlan <2-4094> restricted-tcn no spanning-tree vlan <2-4094> restricted-role no spanning-tree vlan <2-4094> restricted-tcn
Parameters	<2-4094> : VLAN identifier. restricted-role : Restrict the role of the port restricted-tcn : Restrict propagation of topology change notifications from the port
Example usage	switch_a(config-if) # spanning-tree vlan 3 restricted-role

traffic-class-table	
Purpose	Set the user priority and number of supported traffic classes.
Command Mode	Interface Configuration
Syntax	traffic-class-table user-priority <0-7> num-traffic-classes <1-8> value <0-7> traffic-class-table user-priority <0-7> value <0-3>
Parameters	user-priority: User priority associated with the traffic class table <0-7>: User priority value num-traffic-classes: Number of traffic classes <1-8>: Number of traffic classes value: Value for the given user priority/num traffic classes <0-7>: Value for the given user priority classes <0-3>: Value for the given user priority classes
Example usage	switch_a(config-if)# traffic-class-table user-priority 3 num-traffic-classes 4 value 5

user-priority	
Purpose	Set the default user priority associated with the interface.
Command Mode	Interface Configuration
Syntax	user-priority <0-7> no user-priority
Parameters	<0-7>: User priority value
Example usage	switch_a(config-if)# user-priority 3

user-priority-regen-table	
Purpose	Set the value for the mapping of user-priority to regenerated user-priority.
Command Mode	Interface Configuration
Syntax	user-priority-regen-table user-priority <0-7> regenerated-user-priority <0-7>
Parameters	user-priority: Port priority that has to be mapped. <0-7>: User priority value. regenerated-user-priority: Regenerated values used for the user priority. <0-7>: Regenerated user priority value.
Example usage	switch_a(config-if)# user-priority-regen-table user-priority 3 regenerateduser-priority 5

RSTP Port Setting

bridge protocol rstp	
Purpose	Add an IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) bridge. After creating a bridge instance, add interfaces to the bridge using the bridge-group command. Bring the bridge instance into operation with the no shutdown command in Interface mode. Use the no parameter to remove the bridge.
Command Mode	Global Configuration
Syntax	bridge <1-32> protocol rstp (ring) bridge <1-32> protocol rstp (vlan-bridge)(ring) no bridge <1-32>
Parameters	<1-32>:: Bridge group ID. ring: Add an RSTP bridge for a ring topology. vlan-bridge: Add a VLAN-aware bridge.
Example usage	switch_a(config)# bridge 3 protocol rstp vlan-bridge

bridge rapid-spanning-tree	
Purpose	Enable or disable RSTP on a specific bridge. Use the bridge-forward option with the no form of the command to place all ports on the specified bridge into the forwarding state.
Command Mode	Global Configuration
Syntax	bridge (<1-32> backbone) rapid-spanning-tree enable no bridge <1-32> rapid-spanning-tree enable (bridge-forward)
Parameters	<1-32>:: Bridge group ID. enable: Enable the spanning tree protocol. bridge-forward: Put all ports of specified bridge in forwarding state.
Example usage	switch_a(config)# bridge 2 rapid-spanning-tree enable
Note	When the bridge-forward option is not used with the no parameter, the default behavior puts all bridge ports in the blocking state.

MSTP Properties

bridge protocol mstp

Purpose	Create a multiple spanning-tree protocol (MSTP) bridge of a specified parameter. This command creates an instance of the spanning tree and associates the VLANs specified with that instance. The MSTP bridges can have different spanning-tree topologies for different VLANs inside a region of “similar” MSTP bridges. The multiple spanning tree protocol, like the rapid spanning tree protocol, provides rapid reconfiguration capability, while providing load balancing ability. A bridge created with this command forms its own separate region unless it is added explicitly to a region using the region name command.
Command Mode	Global Configuration
Syntax	bridge <1-32> protocol mstp (ring) no bridge <1-32>
Parameters	<1-32> : Bridge group ID. ring : (Optional) Enable rapid ring spanning-tree.
Example usage	<code>switch_a(config)# bridge 2 protocol mstp ring</code>

bridge multiple-spanning-tree

Purpose	Enable MSTP on a bridge.
Command Mode	Global Configuration
Syntax	bridge <1-32> multiple-spanning-tree enable no bridge <1-32> multiple-spanning-tree enable (bridge-forward)
Parameters	<1-32> : Bridge group ID. enable : Enable the spanning tree protocol. bridge-forward : Put all ports of specified bridge in forwarding state.
Example usage	<code>switch_a(config)# bridge 2 multiple-spanning-tree enable</code>
Note	When the bridge-forward option is not used with the no parameter, the default behavior puts all bridge ports in the blocking state.

MSTP Instance Setting

bridge max-hops	
Purpose	Set the maximum allowed hops for a BPDU in an MST region
Command Mode	Global Configuration
Syntax	[no] <1-32> max-hops <1-40>
Parameters	<1-32> : Bridge group ID <1-40> : Maximum hops for which the BPDU will be valid.
Example usage	<code>switch_a(config)# bridge 2 max-hops 25</code>
Note	Default maximum hops in an MST region are 20.

spanning-tree mst configuration	
Purpose	Enter the Multiple Spanning Tree Configuration mode.
Command Mode	Global Configuration
Syntax	spanning-tree mst configuration
Parameters	None
Example usage	<code>switch_a(config)# spanning-tree mst configuration</code> <code>switch_a(config-mst)#</code>

bridge instance	
Purpose	Add an MST instance to a bridge.
Command Mode	MST Configuration mode
Syntax	[no] bridge (<1-32> backbone) instance (<1-63> spbm spbv)
Parameters	<1-32> : Bridge identifier. backbone : Backbone bridge. <1-63> : MST instance identifier. spbm : Shortest Path Bridging - MAC instance. spbv : Shortest Path Bridging - VID instance.
Example usage	<code>switch_a(config-mst)# bridge 4 instance 3</code>

bridge instance priority	
Purpose	Set the bridge instance priority. The lower the priority of the bridge, the better the chances is of the bridge becoming a root bridge or a designated bridge for the LAN.
Command Mode	Global Configuration
Syntax	bridge (<1-32> backbone) instance <1-63> priority <0-61440> no bridge (<1-32> backbone) instance <1-63> priority
Parameters	<1-32> : Bridge group ID <1-63> : The instance identifier. <0-61440> : Bridge priority value.
Example usage	switch_a(config)# bridge 4 instance 3 priority 16384
Note	The priority values can be set only in increments of 4096. The default value is 32768.

bridge instance vlan	
Purpose	Add multiple VLANs for the corresponding instance of a bridge. The VLANs must already be created. Use the no form to simultaneously remove multiple VLANs for the corresponding instance of a bridge.
Command Mode	MST Configuration mode
Syntax	bridge (<1-32> backbone) instance (<1-63> spbm spbv) vlan VLANID no bridge (<1-32> backbone) instance (<1-63> spbm spbv) vlan VLANID
Parameters	<1-32> : Bridge identifier. backbone : Backbone bridge. <1-63> : MST instance identifier. spbm : Shortest Path Bridging - MAC instance. spbv : Shortest Path Bridging - VID instance. VLANID : <2-4094>. Specify a single VLAN, a range, or a list.
Example usage	Associate VLANs 10 and 20 to instance 1 of bridge 1:
	switch_a(config-mst)# bridge 1 instance 1 vlan 10,20
	Add VLANs 10, 11, 12, 13, 14, and 15 to instance 1 of bridge 1:
	switch_a(config-mst)# bridge 1 instance 1 vlan 10-15
	Delete VLANs 10 and 11 from instance 1 of bridge 1:
	switch_a(config-mst)# no bridge 1 instance 1 vlan 10,11
Note	For a VLAN range, specify two VLAN identifiers: lowest then highest separated by hyphen. For a VLAN list, specify VLAN identifiers separated by commas. Do not enter spaces between the hyphens or commas.

instance vlan	
Purpose	Create an instance(s) of a VLAN for the default bridge (0). This command can be used only after the VLANs are defined; that is, LANs must be created before being associated with an MST instance (MSTI).
Command Mode	MST Configuration mode
Syntax	instance <1-63> vlan VLANID no instance <1-63> vlan VLANID
Parameters	<1-63> : MST instance identifier. VLANID : VLAN identifier(s)
Example usage	<code>switch_a(config-mst)# instance 2 vlan 30</code>

bridge region	
Purpose	Use this command to create an MST region and specify its name. MST bridges of a region form different spanning trees for different VLANs.
Command Mode	MST Configuration mode
Syntax	bridge <1-32> region REGION_NAME no bridge <1-32> region
Parameters	<1-32> : The bridge group ID. REGION_NAME : The name of the region.
Example usage	<code>switch_a(config-mst)# bridge 3 region IPI</code>
Note	By default, each MST bridge starts with the region name as its bridge address. This means each MST bridge is a region by itself, unless specifically added to one.

bridge revision	
Purpose	Specify the revision number, to be used for configuration information tracking.
Command Mode	MST Configuration mode
Syntax	bridge <1-32> revision <0-65535> no bridge <1-32>
Parameters	<1-32> : The bridge group ID <0-65535> : Revision number
Example usage	<code>switch_a(config-mst)# bridge 3 revision 25</code>
Note	The default value of revision number is 0.

region	
Purpose	Create an MST region of the default bridge, and specify a name to it.
Command Mode	MST Configuration mode
Syntax	[no] region REGION_NAME
Parameters	REGION_NAME: Name of the region
Example usage	<code>switch_a(config-mst)# region IPI</code>

9 VLAN

VLAN Information

show vlan	
Purpose	Show information for VLANs globally and per port.
Command Mode	Privileged exec
Syntax	show vlan brief show vlan private-valn show vlan classifier show vlan access-list show vlan access-map show vlan all show vlan auto show vlan filter show vlan static
Parameters	None
Example usage	switch_a# show vlan brief

VLAN Setting

vlan database	
Purpose	Enter the VLAN configuration mode
Command Mode	Global configuration
Syntax	vlan database
Parameters	None
Example usage	switch_a(config)# vlan database

vlan bridge	
Purpose	Add or remove a vlan under a bridge.
Command Mode	VLAN database
Syntax	<pre> vlan <1-3999> bridge<1-32> state [enable disable] no vlan <2-4094> bridge <1-32> </pre>
Parameters	<1-3999>: VLAN ID <1-32>: Bridge ID
Example usage	<pre> switch_a(config-vlan)# vlan 100 bridge 1 enable </pre>

vlan mtu	
Purpose	Set the Maximum Transmission Unit (MTU) for a specified VLAN. Packets larger than the set MTU size are discarded.
Command Mode	VLAN database
Syntax	<pre> vlan <2-4094> mtu MTU_VAL vlan <2-4094> mtu MTU_VAL bridge <1-32> no vlan <2-4094> mtu no vlan <2-4094> mtu bridge <1-32> </pre>
Parameters	MTU_VAL: Value of the Maximum Transmission Unit bridge: Bridge group ID
Example usage	<pre> switch_a(config-vlan)# vlan 2 mtu 1000 bridge 1 </pre>

vlan name	
Purpose	Enable or disable the name of a VLAN on the default bridge.
Command Mode	VLAN database
Syntax	<pre> vlan <2-4094> name WORD [state (enable disable)] </pre>
Parameters	enable: Sets VLAN into enable state disable: Sets VLAN into disable state
Example usage	<pre> switch_a(config-vlan)# vlan 100 name dilvish state enable </pre>

Port Settings

switchport mode access

Purpose	Set the interface to access mode, and classify untagged frames only. Received frames are classified based on the VLAN characteristics, then accepted or discarded based on the filtering criteria.
Command Mode	Interface Configuration
Syntax	switchport mode access [ingress-filter (enable disable)]
Parameters	ingress-filter: Set the ingress filtering for the received frames. enable: Set the ingress filtering for received frames disable: Turn off ingress filtering to accept frames that do not meet the classification criteria. This is the default value.
Example usage	<pre>switch_a(config-if)# switchport mode access ingress-filter enable</pre>

switchport access

Purpose	Change the default VLAN on the current interface.
Command Mode	Interface Configuration
Syntax	switchport access vlan VLAN_ID no switchport access vlan
Parameters	None
Example usage	<pre>switch_a(config-if)# switchport access vlan 30</pre>

switchport mode trunk

Purpose	Set the interface as trunk, and specify only tagged frames.
Command Mode	Interface Configuration
Syntax	switchport mode trunk [ingress-filter (enable disable)]
Parameters	ingress-filter: Set the ingress filtering for the received frames. enable: Set the ingress filtering for received frames. disable: Turn off ingress filtering to accept frames that do not meet the classification criteria. This is the default value.
Example usage	<pre>switch_a(config-if)# switchport mode trunk ingress-filter enable</pre>

switchport trunk allowed	
Purpose	Set the interface to trunk and add VLANs. For a VLAN range, specify two VLAN identifiers: the lowest and then the highest separated by a hyphen. For a VLAN list, specify the VLAN identifiers separated by commas. Do not enter spaces between the hyphens or commas. Use the no parameter to remove all VLAN identifiers configured on this port.
Command Mode	Interface Configuration
Syntax	<pre>switchport trunk allowed vlan all switchport trunk allowed vlan none switchport trunk allowed vlan add VLAN_ID switchport trunk allowed vlan except VLAN_ID switchport trunk allowed vlan remove VLAN_ID no switchport trunk</pre>
Parameters	all: Allow all VLANs to transmit and receive through the interface. none: Allow no VLANs to transmit and receive through the interface. add: Add these VLANs to the member set. VLAN_ID: VLAN identifier(s) <2-4094>. Specify a single VLAN, a VLAN range, or a VLAN list. except: All VLANs except these VLANs are part of the member set. remove: Remove these VLANs from the member set.
Example usage	<pre>switch_a(config-if)# switchport trunk allowed vlan add V2</pre>
Note	The result of not using this command is that ingress filtering is off, and that all frame types are classified and accepted.

switchport mode hybrid	
Purpose	Set the switching characteristics of the Layer 2 interface as hybrid, and classify both tagged and untagged frames. Set the interface acceptable frame types. This processing occurs after VLAN classification.
Command Mode	Interface Configuration
Syntax	<pre>switchport mode hybrid no switchport hybrid switchport mode hybrid acceptable-frame-type (all vlan-tagged) switchport mode hybrid ingress-filter (enable disable)</pre>
Parameters	None
Example usage	<pre>switch_a(config-if)# switchport mode hybrid acceptable-frame-type all</pre>

switchport hybrid	
Purpose	Set the switching characteristics of the Layer 2 interface as hybrid, and set the VLANs that will transmit/receive through the Layer 2 interface. Set the default VLAN for the interface.
Command Mode	Interface Configuration
Syntax	switchport hybrid allowed vlan all switchport hybrid allowed vlan none switchport hybrid allowed vlan except VLAN_ID switchport (hybrid) allowed vlan remove VLAN_ID switchport (hybrid) allowed vlan add VLAN_ID egress-tagged (enable disable) no switchport hybrid switchport hybrid vlan VLAN_ID
Parameters	all : All VLANs can transmit and receive through the interface. none : No VLANs can transmit and receive through the interface. except : Allow all VLANs except these VLANs to transmit and receive through the interface. VLAN_ID : VLAN identifier <2-4094>. Specify a single VLAN, a VLAN range, or a VLAN list. remove : Remove these VLANs from the member set. add : Add these VLANs to the member set. egress-tagged : Tag outgoing frames. enable : Enable egress tagging for outgoing frames. disable : Disable egress tagging for outgoing frames.
Example usage	<pre>switch_a(config-if)# switchport hybrid allowed vlan add 2 egress-tagged enable</pre>

Private VLAN

private-vlan primary	
Purpose	Create a primary VLAN.
Command Mode	VLAN Configuration
Syntax	[no] private-vlan <2-4094> primary bridge <1-32>
Parameters	<2-4094> : Private VLAN identifier. <1-32> : Bridge ID
Example usage	<pre>switch_a(config-vlan)# private-vlan 2 primary bridge 1</pre>

private-vlan association	
Purpose	Associate a secondary VLAN to a primary VLAN. Only one isolated VLAN can be associated to a primary VLAN. Multiple community VLANs can be associated to a primary VLAN.
Command Mode	VLAN Configuration
Syntax	private-vlan <2-4094> association add VLAN_ID bridge <1-32> private-vlan <2-4094> association remove VLAN_ID bridge <1-32> no private-vlan <2-4094> association bridge <1-32>
Parameters	<2-4094> : Private VLAN identifier. add : Add values associated with a single VLAN. remove : Remove values associated with a single VLAN. VLAN_ID : Secondary VLAN identifier <2-4094>. <1-32> : Bridge group ID.
Example usage	switch_a(config-vlan)# private-vlan 2 association add 3-4 bridge

private-vlan isolated	
Purpose	Create an isolated VLAN. Use the no form to remove the specified private VLAN.
Command Mode	VLAN Configuration
Syntax	private-vlan <2-4094> isolated bridge <1-32> no private-vlan <2-4094> isolated bridge <1-32>
Parameters	<2-4094> : Private VLAN identifier. <1-32> : Bridge identifier.
Example usage	switch_a(config-vlan)# private-vlan 3 isolated bridge 1

private-vlan community	
Purpose	Set a VLAN type for a private (community) VLAN. Use the no form to remove the specified private VLAN.
Command Mode	VLAN Configuration
Syntax	private-vlan <2-4094> community bridge <1-32> no private-vlan <2-4094> community bridge <1-32>
Parameters	<2-4094> : Private VLAN identifier. <1-32> : Bridge identifier.
Example usage	switch_a(config-vlan)# private-vlan 4 community bridge 1

switchport mode private-vlan	
Purpose	Make a Layer 2 port a host port or promiscuous port.
Command Mode	Interface Configuration
Syntax	[no] switchport mode private-vlan (host promiscuous)
Parameters	host: Port can communicate with all other host ports assigned to the same community VLAN, but it cannot communicate with the ports in the same isolated VLAN. All communications outside of this VLAN must pass through a promiscuous port in the associated primary VLAN. promiscuous: Port can communicate with all interfaces, including the community and isolated ports within a private VLAN
Example usage	<pre>switch_a(config-if)# switchport mode private-vlan promiscuous</pre>

switchport private-vlan host-association	
Purpose	Associate a primary VLAN and a secondary VLAN to a host port. Only one primary and secondary VLAN can be associated to a host port.
Command Mode	Interface Configuration
Syntax	<pre>switchport private-vlan host-association <2-4094> add <2-4094> no switchport private-vlan host-association</pre>
Parameters	<2-4094>: VLAN identifier of the primary VLAN. add: Add the secondary VLAN. <2-4094>: VLAN identifier of the secondary VLAN (either isolated or community).
Example usage	<pre>switch_a(config-if)# switchport private-vlan host-association 2 add 3</pre>

MAC/Subnet/Protocol Based VLAN

vlan classifier rule ipv4

Purpose	Create a subnet-based VLAN classifier rule and map it to a specific VLAN. If the source IP address matches the IP subnet specified in the VLAN classifier rule, received packets are mapped to the designated VLAN.
Command Mode	Global Configuration
Syntax	vlan classifier rule <1-256> ipv4 <A.B.C.D/M> vlan <2-4094> no vlan classifier rule <1-256> ipv4 <A.B.C.D/M>
Parameters	A.B.C.D/M : The IPv4 address classification in A.B.C.D/M format. vlan : The VLAN to which an untagged packet is mapped <2-4094> : VLAN ID
Example usage	<pre>switch_a(config)# vlan classifier rule 2 ipv4 20.20.20.2/24 vlan 2</pre>

vlan classifier rule mac

Purpose	Create a subnet-based VLAN classifier rule and map it to a specific VLAN. If the source IP address matches the IP subnet specified in the VLAN classifier rule, received packets are mapped to the designated VLAN.
Command Mode	Global Configuration
Syntax	vlan classifier rule <1-256> mac WORD vlan <2-4094> no vlan classifier rule <1-256>
Parameters	WORD : Mac address classification. Enter the address in HHHH.HHHH.HHHH format. vlan : The VLAN to which an untagged packet is mapped <2-4094>.
Example usage	<pre>switch_a(config)# vlan classifier rule 2 mac fe80::22e::b5ff:fee8:6/64 vlan 2</pre>

vlan classifier rule proto	
Purpose	Create a subnet-based VLAN classifier rule for a protocol and map it to a specific VLAN. If the source IP address matches the IP subnet specified in the VLAN classifier rule, received packets are mapped to the designated VLAN.
Command Mode	Global Configuration
Syntax	<pre> vlan classifier rule <1-256> proto (ip ipv6 ipx x25 arp rarp atalkddp atalkaarp atmmulti atmtransport pppdiscovery pppsession xeroxpup xeroxaddrtrans g8bpqx25 ieeepup ieeeaddrtrans dec decdnadumpload decdnareMOTEconsole decdnarouting declat decdiagnostics deccustom decsyscomm <0-65535>) encap (ethv2 snapllc nosnapllc) (vlan <2-4094>) no vlan classifier rule <1-256> </pre>
Parameters	<0-65535>: Ethernet decimal arp: Address Resolution Protocol atalkaarp: Appletalk AARP atalkddp: Appletalk DDP atmmulti: MultiProtocol Over ATM atmtransport: Frame-based ATM Transport dec: DEC Assigned deccustom: DEC Customer use decdiagnostics: EC Diagnostics decdnadumpload: DEC DNA Dump/Load decdnareMOTEconsole: DEC DNA Remote Console decdnarouting: DEC DNA Routing declat: DEC LAT decsyscomm: DEC Systems Comms Arch g8bpqx25: G8BPQ AX.25 ieeepup: Xerox IEEE802.3 PUP Address Translation ieeeaddrtrans: Xerox IEEE802.3 PUP ip: IP address ipv6: IPv6 address ipx: IPX address pppdiscovery: PPPoE discovery pppsession: PPPoE session rarp: Reverse Address Resolution x25: CCITT X.25 xeroxaddrtrans: Xerox PUP Address Translation Xerox: PUP encap: packet encapsulation ethv2: Ethernet v2 nosnapllc: LLC without snap encapsulation snapllc: LLC snap encapsulation vlan: The VLAN to which an untagged packet is mapped <2-4094>.
Example usage	<pre> switch_a(config)# vlan classifier rule 2 proto ip encap ethv2 vlan 2 </pre>

vlan classifier group	
Purpose	Create a subnet-based VLAN classifier group. A group indicates a VLAN classifier group ID.
Command Mode	Global Configuration
Syntax	<pre> vlan classifier group <1-16> (add delete) rule <1-256> no vlan classifier group <1-16> </pre>
Parameters	add: Adds a rule to a group. delete: Deletes a rule from a group. rule: Indicates the VLAN classifier rule identifier <1-256>.
Example usage	<pre> switch_a(config)# vlan classifier group 1 delete rule 1 </pre>

vlan classifier activate	
Purpose	Activate VLAN classifier
Command Mode	Interface Configuration
Syntax	<pre> vlan classifier activate <1-16> vlan <1-3999> no vlan classifier activate <1-16> </pre>
Parameters	add: Adds a rule to a group. delete: Deletes a rule from a group. rule: Indicates the VLAN classifier rule identifier <1-256>.
Example usage	<pre> switch_a(config-if)# vlan classifier activate 1 vlan 100 </pre>

Global Configuration

show mls qos	
Purpose	Display various QoS configuration and statistics.
Command Mode	Privileged Exec
Syntax	show mls qos show mls qos aggregate-policer <NAME> show mls qos cosq-stats <IFNAME> <0-7> show mls qos interface <IFNAME> show mls qos map dscp-queue show qos tail-drop counters <IFNAME> <0-7> show user-priority interface <IFNAME>
Parameters	NAME : aggregator policer name <0-7> : queue number
Example usage	switch_a# show mls qos

mls qos	
Purpose	Enable/disable QoS
Command Mode	Global Configuration
Syntax	mls qos enable no mls qos
Parameters	None
Example usage	switch_a(config)# mls qos enable

mls qos aggregate-police	
Purpose	Specify policer parameters to apply to multiple traffic classes in the same policy map.
Command Mode	Global Configuration
Syntax	mls qos aggregate-police NAME <1-1000000> <1-20000> no mls qos aggregate-police NAME
Parameters	NAME : Name of the aggregate policer. <1-1000000> : Average traffic rate in bits per second (kbps). <1-20000> : Normal burst size in kilobytes (bytes).
Example usage	switch_a(config)# mls qos aggregate-police transmit1 48000 8000

mls qos cos-queue	
Purpose	Configure CoS (Class of Service) queue.
Command Mode	Global Configuration
Syntax	mls qos cos-queue <0-7> <0-3> no mls qos cos-queue <0-7> <0-3>
Parameters	<0-7> : Priority for the queue. <0-3> : Queue identifier
Example usage	switch_a(config)# mls qos cos-queue 5 3

mls qos trust	
Purpose	Configure the port trust state
Command Mode	Global Configuration
Syntax	mls qos trust cos no mls qos trust cos mls qos trust dscp no mls qos trust dscp mls qos trust cos dscp no mls qos trust no mls qos trust cos dscp
Parameters	None
Example usage	switch_a(config)# mls qos trust cos dscp

priority-queue	
Purpose	Set the egress expedite queue or weighted deficit round robin.
Command Mode	Global Configuration
Syntax	priority-queue strict priority-queue wdr no priority-queue out
Parameters	strict : egress expedite queue wdr : weighted deficit round robin
Example usage	switch_a(config)#priority-queue strict

wrr-queue bandwidth	
Purpose	Specify the bandwidth ratios of the transmit queues.
Command Mode	Global Configuration
Syntax	wrr-queue bandwidth <1-127> <1-127> <1-127> <1-127> <1-127> <1-127> <1-127> <1-127> no wrr-queue bandwidth
Parameters	<1-127>: Weight of queues 0-7. <0-7>: QoS queue ID.
Example usage	switch_a(config)# wrr-queue bandwidth 1 30 40 20 60 80 70 100

wrr-queue cos-map	
Purpose	Specify CoS values for a queue.
Command Mode	Global Configuration
Syntax	wrr-queue cos-map <0-7> (<0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7>) no wrr-queue cos-map <0-7>
Parameters	<0-7>: Queue identifier. <0-7>: 1-8 CoS values separated by spaces.
Example usage	switch_a(config)# wrr-queue bandwidth 1 30 40 20 60 80 70 100

DSCP

mls qos map dscp-queue	
Purpose	Set dscp to queue
Command Mode	Global Configuration
Syntax	mls qos map dscp-queue <0-63> <0-7> no mls qos map dscp-queue
Parameters	<0-63>: dscp value. <0-7>: CoS Queue ID
Example usage	switch_a(config)# mls qos map dscp-queue 10 5

Interface

tail-drop threshold	
Purpose	Configure the tail-drop threshold percentages for a queue. Use the no parameter return to the default setting.
Command Mode	Interface Configuration
Syntax	tail-drop threshold <0-7> <1-100> <1-100>
Parameters	<0-7> Queue identifier. <1-100> Minimum threshold percentage. <1-100> Maximum threshold percentage.
Example usage	switch_a(config-if)# tail-drop threshold 1 60 1005

11 Access Control Lists (ACL)

ACL Information

show class-map

Purpose	Display the QoS class maps to define the match criteria to classify traffic.
Command Mode	Privileged Exec
Syntax	show class-map NAME
Parameters	NAME: Name of the class map
Example usage	switch_a# show class-map cmap10

show policy-map

Purpose	Display the QoS class maps to define the match criteria to classify traffic.
Command Mode	Privileged Exec
Syntax	show policy-map show policy-map NAME
Parameters	NAME: Name of the policy map
Example usage	switch_a# show policy-map pmap10

show access-lists

Purpose	Display current access lists.
Command Mode	Privileged Exec
Syntax	show access-lists
Parameters	None
Example usage	switch_a# show access-lists

show ip access-lists	
Purpose	Display contents of all current IP access lists.
Command Mode	Privileged Exec
Syntax	show ip access-lists [<1-99> <100-199> <1300-1999> <2000-2699> WORD]
Parameters	<1-99> : Standard access list <100-199> : Extended access list <1300-1999> : Standard access list (expanded range) <2000-2699> : Extended access list (expanded range) WORD : Access list name
Example usage	switch_a# show ip access-lists 50

show qos-access-list	
Purpose	Display IP and MAC ACLs.
Command Mode	Privileged Exec
Syntax	show qos-access-list show qos-access-list [<1-99> <100-199> <1300-1999> <2000-2699> WORD]
Parameters	<1-99> : Standard access list <100-199> : Extended access list <1300-1999> : Standard access list (expanded range) <2000-2699> : Extended access list (expanded range) WORD : Access list name
Example usage	switch_a# show qos-access-list 1

ACL Configuration

access-list	
Purpose	Add an access list entry.
Command Mode	Global Configuration
Syntax	[no] access-list (<1-99> <1300-1999>) (deny permit) any [no] access-list (<1-99> <1300-1999>) (deny permit) host <A.B.C.D> [no] access-list (<1-99> <1300-1999>) (deny permit) <A.B.C.D> WILD [no] access-list (<1-99> <1300-1999>) remark <LINE>
Parameters	<1-99> : IP standard access list <1300-1999> : IP standard access list (expanded range). deny : Route to reject. permit : Route to permit. A.B.C.D : IP address to match WILD : Wildcard bits any : Allows any IP address or prefix to match. remark : Access list entry comment. LINE : Multi-line, access-list entry comment up to 100 characters.
Example usage	switch_a(config)# access-list 67 deny 1.1.1.0 0.0.0.255

ip-access-list (std)	
Purpose	Create a standard IP access-control list (ACL). Use the no parameter to delete the ACL. Enable QoS globally before using this command. Use the no parameter to delete the ACL.
Command Mode	Global Configuration
Syntax	[no] ip-access-list (<1-99> <1300-1999>) (deny permit) A.B.C.D [no] ip-access-list (<1-99> <1300-1999>) (deny permit) A.B.C.D WILD [no] ip-access-list (<1-99> <1300-1999>) (deny permit) [any host <A.B.C.D>]
Parameters	<1-99> : IP standard ACL. <100-199> : IP extended ACL. deny : Deny traffic if conditions matched. permit : Permit traffic if conditions matched. A.B.C.D : Address to match. WILD : Wildcard bits. any : Any source host. host : A single source host for extended ACLs.
Example usage	switch_a(config)#ip-access-list 1 permit 192.5.255.0 0.0.0.255

ip-access-list (extd)	
Purpose	Create an extended IP access-control list (ACL). Use the no parameter to delete the ACL. Enable QoS globally first.
Command Mode	Global Configuration
Syntax	<pre>[no] ip-access-list (<100-199> <2000-2699>) (deny permit) (PROTOCOL) any [any host <A.B.C.D> <A.B.C.D> <A.B.C.D>] [no] ip-access-list (<100-199> <2000-2699>) (deny permit) (PROTOCOL) host [<A.B.C.D> any <A.B.C.D> host <A.B.C.D> <A.B.C.D> WILD <A.B.C.D>] [no] ip-access-list (<100-199> <2000-2699>) (deny permit) (PROTOCOL) <A.B.C.D> WILD any [no] ip-access-list (<100-199> <2000-2699>) (deny permit) (PROTOCOL) <A.B.C.D> WILD host <A.B.C.D> [no] ip-access-list (<100-199> <2000-2699>) (deny permit) (PROTOCOL) <A.B.C.D> WILD <A.B.C.D> WILD</pre>
Parameters	<100-199>: Range for IP extended ACL. <2000-2699>: Range for IP extended access list (expanded range). PROTOCOL: ip, udp, tcp, gre, igmp, pim, rsvp, ospf, vrrp, ipcomp, any, <0-255> (IANA assigned protocol). deny: Deny traffic if conditions matched. permit: Permit traffic if conditions matched. A.B.C.D: Source / destination to match. WILD: Wildcard bits in A.B.C.D format. any: Any source host. host: A single source host for extended ACLs.
Example usage	<code>ip-access-list 199 deny gre any any</code>

ip-access-list standard	
Purpose	Create a named standard IP access-control list (ACL). Use the no parameter to delete the ACL. Enable QoS globally first.
Command Mode	Global Configuration
Syntax	<pre>[no] ip-access-list standard <NAME> (deny permit) any [no] ip-access-list standard <NAME> (deny permit) <A.B.C.D> [no] ip-access-list standard <NAME> (deny permit) <A.B.C.D> WILD</pre>
Parameters	NAME: Name of standard ACL. deny: Deny certain traffic if conditions matched. permit: Permit certain traffic if conditions matched. A.B.C.D: Address to match. WILD: Wildcard bits in A.B.C.D format. any: Any source host.
Example usage	<pre>switch_a(config)#ip-access-list standard test2 permit 192.5.255.0 0.0.0.255</pre>

ip-access-list extended	
Purpose	Create a named extended IP access-control list (ACL). Enable QoS globally first. Use no parameter to delete ACL.
Command Mode	Global Configuration
Syntax	<pre>[no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) any any [no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) any host <A.B.C.D> [no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) any <A.B.C.D> WILD [no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) host <A.B.C.D> any [no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) host <A.B.C.D> host <A.B.C.D> [no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) host <A.B.C.D> WILD <A.B.C.D> [no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) <A.B.C.D> WILD any [no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) <A.B.C.D> WILD host <A.B.C.D> [no] ip-access-list extended <NAME> (deny permit) (PROTOCOL) <A.B.C.D> WILD <A.B.C.D> WILD</pre>
Parameters	NAME: Name of extended ACL. PROTOCOL: ip, udp, tcp, gre, igmp, pim, rsvp, ospf, vrrp, ipcomp, any, <0-255> (IANA assigned protocol). deny: Deny traffic if conditions matched. permit: Permit traffic if conditions matched. A.B.C.D: Source / destination address. WILD: Wildcard bits in A.B.C.D format. any: Any source host. host: A single source host for extended ACLs.
Example usage	<pre>switch_a(config)# ip-access-list extended 2001 permit ip 192.5.255.0 0.0.0.255 any</pre>

mac-access-list	
Purpose	Create a MAC access-control list (ACL). Use the no parameter to delete the ACL. Enable QoS globally before using this command.
Command Mode	Global Configuration
Syntax	MAC ACL for any source and a destination specified by the MAC and MASK parameters: mac-access-list <2000-2699> (deny permit) any MAC MASK <1-8> MAC ACL for a source specified by the MAC and MASK parameters and any destination: mac-access-list <2000-2699> (deny permit) MAC MASK any <1-8> MAC ACL for a source specified by the first MAC and MASK parameters and a destination specified by the second MAC and MASK parameters: mac-access-list <2000-2699> (deny permit) MAC MASK MAC MASK <1-8> MAC ACL for a source or destination specified by the MAC parameter: mac-access-list <2000-2699> (source destination) MAC priority <0-7> no mac-access-list <2000-2699> (deny permit) any MAC MASK <1-8> no mac-access-list <2000-2699> (deny permit) MAC MASK any <1-8> no mac-access-list <2000-2699> (deny permit) MAC MASK MAC MASK <1-8> no mac-access-list <2000-2699> (source destination) MAC priority <0-7>
Parameters	<2000-2699>: Expanded range for IP extended ACL. deny: Deny certain traffic if conditions match. permit: Permit certain traffic if conditions match. any: Any source or destination. MAC: MAC address; in HHHH.HHHH.HHHH format. MASK: Part of the MAC address to ignore in hexadecimal format. <1-8>: Packet format: 1 Ethernet II, 2 802.3, 4 SNAP, 8 LLC source: Packets with source MAC address destination: Packets with destination MAC address. priority: Priority class. <0-7>: Priority value.
Example usage	<pre>switch_a(config)# mac-access-list 2002 permit 2222.2222.2222 8 any 2</pre>

class-map	
Purpose	Create a class map. Enable QoS globally before using this command. Use the no parameter to delete the class map. This command will put the switch into Class Map Configuration mode
Command Mode	Global Configuration
Syntax	[no] class-map NAME
Parameters	NAME: Name of class map
Example usage	<pre>switch_a(config)# class-map ahax switch_a(config-cmap) #</pre>

match access-group	
Purpose	Define match criterion for a class map. Enable QoS globally before using this command.
Command Mode	Class Map Configuration
Syntax	[no] match access-group (<1-199> <1300-2699> WORD)
Parameters	<1-99>: Number of standard ACL <1300-2699>: Number of extended ACL WORD: Name of the ACL
Example usage	Configure a class map named test10 with 1 match criterion: access list 103, which allows traffic from any source to any destination. <pre>switch_a(config)#ip-access-list 103 permit ip any any switch_a(config)#class-map test10 switch_a(config-cmap)#match access-group 103</pre>

match cos	
Purpose	Match packetS based on class of service (CoS). Enable QoS first.
Command Mode	Class Map Configuration
Syntax	<pre>match cos (<0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7>) no match cos match cos inner (<0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7>) no match cos inner</pre>
Parameters	<0-7>: IEEE 802.1Q/ISL CoS value inner: Match the inner cos of QinQ packets
Example usage	<pre>switch_a(config-cmap)# match cos 7</pre>

match ip-dscp	
Purpose	Define the list to match against incoming packets. Enable QoS globally before using this command. Use the no parameter to disable this configuration.
Command Mode	Class Map Configuration
Syntax	match ip-dscp (<0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63><0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63> <0-63>) no match ip-dscp
Parameters	<0-63> : 1-8 IP DSCP values separated by a space.
Example usage	switch_a(config-cmap)# match ip-dscp 56

match ip-precedence	
Purpose	Identify IP precedence values as match criteria. Use the no parameter to remove IP precedence values from a class map.
Command Mode	Class Map Configuration
Syntax	match ip-precedence (<0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7><0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7>) no match ip-precedence <0-7>
Parameters	<0-7> : 1-8 precedence values separated by a space.
Example usage	switch_a(config-cmap)# match ip-precedence 5 6 4 3

match layer4	
Purpose	Identify UDP or TCP ports as the match criteria. Use the no parameter to remove match criteria.
Command Mode	Class Map Configuration
Syntax	match layer4 (any tcp udp) (source-port destination-port) <1-65535> no match layer4 (any tcp udp) (source-port destination-port) <1-65535> match layer4-range (any tcp udp) (source-port destination-port) <1-65535> to <1-65535> no match layer4-range
Parameters	source-port: Source UDP or TCP port. destination-port: Destination UDP or TCP port.
Example usage	switch_a(config-cmap)# match layer4 source-port 20

match mpls exp-bit topmost	
Purpose	Define the match criterion of the MPLS (Multiprotocol Label Switching) experimental bit value in the topmost label for a class map. Use the no parameter to remove this criterion from a class map.
Command Mode	Class Map Configuration
Syntax	match mpls exp-bit topmost (<0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7>) no match mpls exp-bit topmost
Parameters	<0-7>: 1-8 experimental values separated by a space.
Example usage	switch_a(config-cmap)# match mpls exp-bit topmost 0 1 2 3 4 5 6 7

match traffic-type	
Purpose	Set the match criteria according to traffic type.
Command Mode	Class Map Configuration
Syntax	match traffic-type (TYPE) (traffic-type-and-queue traffic-type-or-queue) no match traffic-type [TYPE]
Parameters	TYPE: all, arp, broadcast, management, multicast, non-tcp-udp, queue0, queue1, queue2, queue3, tcp-control, tcp-data, udp, unicast, unknown-multicast, unknown-unicast
Example usage	switch_a(config-cmap)# match traffic-type all

match vlan	
Purpose	Define the VLAN identifier or a range of VLANs used as a match criteria to classify traffic. Use the no parameter to disable the VLAN ID used as match criteria.
Command Mode	Class Map Configuration
Syntax	match vlan <1-3999> no match vlan match vlan inner <1-3999> no match vlan inner match vlan-range <1-3999> to <1-3999> no match vlan-range match vlan-range inner <1-3999> no match vlan-range inner
Parameters	<1-3999> : VLAN identifier
Example usage	switch_a(config-cmap)# match vlan 1000

policy-map	
Purpose	Create a policy map. Use the no parameter to delete an existing policy map. This command will put the switch into Policy Map Configuration mode.
Command Mode	Global Configuration
Syntax	[no] policy-map NAME
Parameters	NAME : name of the policy map
Example usage	switch_a(config)# policy-map groo switch_a(config-pmap)#

class	
Purpose	Define a traffic classification. Enable QoS globally before using this command. Use the no parameter to delete an existing class-map. Using this command will put the switch into Policy Map Class configuration mode (pmap-c).
Command Mode	Policy Map Configuration
Syntax	[no] class NAME
Parameters	NAME : name of the class map
Example usage	switch_a(config-pmap)# class arcadio switch_a(config-pmap-c)#

set cos	
Purpose	Set a CoS value to assign to classified traffic or enable copying the priority bit (pbit) from the inner VLAN to the outer VLAN based on policy. Use the no parameter to remove a CoS value, or disable pbit copying.
Command Mode	Policy Map Class Configuration
Syntax	set cos <0-7> set cos <0-7> (map remark) set cos <0-7> cos-inner (map remark) no set cos set cos-inner (<0-7> cos) no set cos-inner
Parameters	<0-7> : CoS value to assign to classified traffic. cos-inner : Copy pbit from the inner VLAN to the outer VLAN based on policy. map : Map to cos value (default) remark : Remark to cos value
Example usage	switch_a(config-cmap-c)# set cos 2

set drr-priority	
Purpose	Set a deficit round-robin (DRR) priority. Use the no parameter to remove this priority.
Command Mode	Policy Map Class Configuration
Syntax	set drr-priority <0-7> quantum <1-255> no set drr-priority
Parameters	<0-7> : CoS value to assign to classified traffic. <1-255> : DRR quantum value.
Example usage	switch_a(config-cmap-c)# set drr-priority 1 quantum 1

set ip-dscp	
Purpose	Set a DSCP value to assign to classified traffic. Use the no parameter to remove a DSCP value.
Command Mode	Policy Map Class Configuration
Syntax	set ip-dscp <0-63> no set ip-dscp
Parameters	<0-63> : DSCP value.
Example usage	switch_a(config-cmap-c)# set ip-dscp 40

set ip-precedence	
Purpose	Set an IP-precedence value to assign to classified traffic. Use the no parameter to remove an IP-precedence value.
Command Mode	Policy Map Class Configuration
Syntax	set ip-precedence <0-7> no set ip-precedence
Parameters	<0-7> : IP precedence value
Example usage	switch_a(config-cmap-c)# set ip-precedence 2

set mirror-to-port	
Purpose	Set a new value in the packet redirect packet to new interface (interface name).
Command Mode	Policy Map Class Configuration
Syntax	set mirror-to-port <IFNAME> no set mirror-to-port
Parameters	IFNAME : Interface name
Example usage	switch_a(config-cmap-c)# set mirror-to-port ge7

set mpls exp-bit topmost	
Purpose	Set the MPLS experimental-bit value in the topmost label for a policy map. Set a new MPLS experimental-bit value in a packet to classify MPLS traffic. Use the no parameter to remove this setting from a policy map.
Command Mode	Policy Map Class Configuration
Syntax	set mpls exp-bit topmost <0-7> no set mpls exp-bit topmost
Parameters	<0-7> : Experimental value.
Example usage	switch_a(config-cmap-c)# set mpls exp-bit topmost 7

set redirect-to-port	
Purpose	Set a new value in the packet redirect packet to new interface (interface name).
Command Mode	Policy Map Class Configuration
Syntax	set redirect-to-port <IFNAME> no set redirect-to-port
Parameters	IFNAME : Interface name
Example usage	switch_a(config-cmap-c)# set redirect-to-port gel

set vlan	
Purpose	Set a new value in the packet VLAN (VLAN value), or set a new value in the packet VLAN (VLAN value) (CoS value)
Command Mode	Policy Map Class Configuration
Syntax	set vlan <1-3999> set vlan <1-3999> <0-7> no set vlan
Parameters	<1-3999> : new VLAN value <0-7> : CoS value.
Example usage	switch_a(config-cmap-c)# set vlan 1000 6

set vlan-priority	
Purpose	Set a VLAN priority for the queues.
Command Mode	Policy Map Class Configuration
Syntax	set vlan-priority <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> no set vlan-priority
Parameters	<0-7> : Priorities for queues.
Example usage	switch_a(config-cmap-c)# set vlan-priority 1 1 1 1 1 1 1 1

mode	
Purpose	Set operation mode (allow accept flow traffic) (deny drop flow traffic).
Command Mode	Policy Map Class Configuration
Syntax	mode (allow deny) no mode (allow deny)
Parameters	allow : Allow accept flow traffic (default mode) deny : Deny drop flow traffic
Example usage	switch_a(config-cmap-c)# mode deny

police	
Purpose	Specify a Single Rate Three Color Marker (srTCM) or Two Rate Three Color Marker (trTCM) policer.
Command Mode	Policy Map Class Configuration
Syntax	police [srtcm trtcm]<1-1000000> <1-20000> <1-20000> exceed-action (drop flow-control) resetflow-control-mode available-bucket-room (full cbs) no police [srtcm trtcm] <1-1000000> <0-20000000> <1-20000000> exceed-action (drop flow-control) reset-flow-control-mode available-bucket-room (full cbs)
Parameters	<1-1000000> : Average traffic rate in kbps. <1-20000> : Burst size in kbps. <1-20000> : Exceed burst size in kbps. exceed-action : Action when rates are exceeded. drop : Drop the frame. flow-control : Send a pause frame and pass the packet. reset-flow-control-mode : Generate flow control. available-bucket-room : When to de-assert flow control. full : When bucket room is full. cbs : When bucket has enough room.
Example usage	switch_a(config-cmap-c)# police 48000 8000 exceed-action drop

police-aggregate	
Purpose	Set add an access list entry standard access list (Address to match) (Wildcard bits)
Command Mode	Policy Map Class Configuration
Syntax	police-aggregate <NAME> no police-aggregate <NAME>
Parameters	NAME: Aggregate policer name
Example usage	switch_a(config-cmap-c) # police-aggregate grativo

policing meter	
Purpose	Set a policer meter for the classified traffic average traffic rate by burst rate (policing ratio).
Command Mode	Policy Map Class Configuration
Syntax	policing meter <1-255> no policing meter
Parameters	<1-255>: policing ratio
Example usage	switch_a(config-cmap-c) # policing meter 100

service-policy input/output	
Purpose	Apply a policy map to the input or output of an interface.
Command Mode	Interface Configuration
Syntax	service-policy input <NAME> no service-policy input <NAME> service-policy output <NAME> no service-policy output <NAME>
Parameters	NAME: Policy input or output name
Example usage	switch_a(config-if) # service-policy input pmap1

12 SNMP (Simple Network Management Protocol)

SNMP Configuration

snmp-server	
Purpose	Configure an SNMP server.
Command Mode	Global Configuration
Syntax	[no] snmp-server enable snmp-server community (get set) WORD snmp-server contact WORD snmp-server location WORD snmp-server description WORD snmp-server mac-notification (history-size interval) <1-65535> snmp-server trap-community <1-5> LINE snmp-server trap-ipaddr <1-5> <A.B.C.D> [no] snmp-server trap-type enable [linkdown linkup mac-notification]
Parameters	WORD: SNMP community name WORD: Contact string WORD: Location string WORD: Description string history size: Maximum number of entries in the MAC notification history table interval: the notification trap interval in seconds between each set of traps that are generated <1-65535> LINE: Community name
Example usage	switch_a(config)# snmp-server trap-community 1 Trap_Group_1

snmp-server trap mac-notification	
Purpose	Enable SNMP traps for MAC-notification events.
Command Mode	Interface Configuration
Syntax	[no] snmp-server trap mac-notification
Parameters	None
Example usage	switch_a(config-if)# snmp-server trap mac-notification

snmp v3-user	
Purpose	Configure SNMP version 3 user
Command Mode	Global Configuration
Syntax	snmp v3-usRD (ro rw) (auth noauth) ((md5 sha) WORD) snmp v3-user WORD (ro rw) priv (md5 sha) WORD des WORD no snmp v3-user WORD
Parameters	None
Example usage	switch_a(config-if)# snmp v3-user test ro auth

802.1x Information

show dot1x	
Purpose	Display dot1x configuration and settings
Command Mode	Privileged Exec
Syntax	show dot1x show dot1x all show dot1x diagnostics interface IFNAME show dot1x interface IFNAME show dot1x sessionstatistics interface IFNAME show dot1x statistics interface IFNAME
Parameters	IFNAME: Interface name
Example usage	switch_a# show dot1x interface ge5

802.1x Configuration

dot1x initialize	
Purpose	Unauthorize a port, and attempt reauthentication on the specified interface.
Command Mode	Privileged Exec
Syntax	dot1x initialize interface IFNAME
Parameters	IFNAME: Interface name
Example usage	switch_a# dot1x initialize interface ge5

dot1x keytxenabled	
Purpose	Enable or disable key transmission over an Extensible Authentication Protocol (EAP) packet between the authenticator and supplicant.
Command Mode	Interface Configuration
Syntax	dot1x keytxenabled (enable disable)
Parameters	None
Example usage	switch_a(config-if)# dot1x keytxenabled disable

dot1x port-control	
Purpose	Force a port state. Use the no parameter to remove a port from the 802.1x management.
Command Mode	Interface Configuration
Syntax	dot1x port-control dir (in both) dot1x port-control (force-unauthorized force-authorized auto) no dot1x port-control
Parameters	auto : Enable authentication on port. dir : Specify the packet control direction. both : Discard receive and transmit packets from the supplicant in : Discard receive packets from the supplicant force-authorized : Force a port to always be in an authorized state. force-unauthorized : Force a port to always be in an unauthorized state.
Example usage	switch_a(config-if)# dot1x port-control auto

dot1x reauthentication	
Purpose	Enable reauthentication on a port.
Command Mode	Interface Configuration
Syntax	[no] dot1x reauthentication
Parameters	None
Example usage	switch_a(config-if)# dot1x reauthentication

dot1x system-auth-ctrl	
Purpose	Enable authentication globally.
Command Mode	Interface Configuration
Syntax	[no] dot1x system-auth-ctrl
Parameters	None
Example usage	switch_a(config-if) # dot1x system-auth-ctrl

dot1x protocol-version	
Purpose	Set the protocol version of dot1x to 1 or 2. The protocol version must be synchronized with the Xsupplicant being used in that interface. Use the no parameter to set the protocol version to the default value (2).
Command Mode	Interface Configuration
Syntax	dot1x protocol-version <1-2> no dot1x protocol-version
Parameters	<1-2>: EAP Over LAN (EAPOL) version.
Example usage	switch_a(config-if) # dot1x protocol-version 2

dot1x quiet-period	
Purpose	Set the quiet-period time interval. When a switch cannot authenticate a client, the switch remains idle for a quiet-period interval of time, then tries again. By administratively changing the quiet-period interval, by entering a lower number than the default, a faster response time can be provided. Use the no parameter to set the configured quiet period to the default (60 seconds).
Command Mode	Interface Configuration
Syntax	dot1x quiet-period <1-65535> no dot1x quiet-period
Parameters	<1-65535>: Seconds between the retrieval of authentication.
Example usage	switch_a(config-if) # dot1x quiet-period 200

dot1x reauthMax	
Purpose	Set the maximum reauthentication value, which sets the maximum number of reauthentication attempts after which the port will be unauthorized. Use the no parameter to set the reauthentication maximum to the default value (2).
Command Mode	Interface Configuration
Syntax	dot1x reauthMax <1-10> no dot1x reauthMax
Parameters	<1-10> : Maximum number of reauthentication attempts after which the port will be unauthorized.
Example usage	switch_a(config-if)# dot1x reauthMax 5

dot1x timeout re-authperiod	
Purpose	Set the interval between reauthorization attempts. Use the no parameter to disable the interval between reauthorization attempts.
Command Mode	Interface Configuration
Syntax	dot1x timeout re-authperiod <1-4294967295> no dot1x timeout re-authperiod
Parameters	<1-4294967295> : Seconds between reauthorization attempts
Example usage	switch_a(config-if)# dot1x timeout re-authperiod 25

dot1x timeout server-timeout	
Purpose	Set the authentication sever response timeout.
Command Mode	Interface Configuration
Syntax	dot1x timeout server-timeout <1-65535> no dot1x timeout server-timeout
Parameters	<1-65535> : Authentication server response timeout
Example usage	switch_a(config-if)# dot1x timeout server-timeout 555

dot1x timeout supp-timeout	
Purpose	Set the interval for a supplicant to respond.
Command Mode	Interface Configuration
Syntax	dot1x timeout supp-timeout <1-65535> no dot1x timeout supp-timeout
Parameters	<1-65535> : Authentication supplicant response timeout
Example usage	switch_a(config-if)# dot1x timeout supp-timeout 40

dot1x timeout tx-period	
Purpose	Set the interval between successive attempts to request an ID.
Command Mode	Interface Configuration
Syntax	dot1x timeout tx-period <1-65535> no dot1x timeout tx-period
Parameters	<1-65535> : Interval between attempts.
Example usage	switch_a(config-if)# dot1x timeout tx-period 34

ip radius source-interface	
Purpose	Set the local address sent in packets to the radius server.
Command Mode	Global Configuration
Syntax	ip radius source-interface HOSTNAME PORT no ip radius source-interface
Parameters	HOSTNAME : Radius client in IP address or hostname format. PORT : Radius client port number. The default port number is 1812.
Example usage	switch_a(config)# ip radius source-interface groohost 1812

radius-server deadtime	
Purpose	Specify the time that a nonresponding radius server is passed over by requests for authentication. The no form sets the default (0).
Command Mode	Global Configuration
Syntax	radius-server deadtime MIN no radius-server deadtime
Parameters	MIN : Length of time (in minutes), maximum of 1440.
Example usage	switch_a(config)# radius-server deadtime 10

radius-server host	
Purpose	Specify the IP address or host name of the remote radius server host and assign authentication and accounting destination port numbers. Multiple radius-server host commands can be used to specify multiple hosts. The software searches for hosts in the order they are specified. If no host-specific timeout, retransmit, or key values are specified, the global values apply to that host. If the auth-port parameter is not specified, it will take the default value of the auth-port. If you do not specify the authport to unconfigure, and the default value of the auth-port does not match the port you are trying to unconfigure, the specified radius-server host will not be unconfigured.
Command Mode	Global Configuration
Syntax	<pre>radius-server host HOSTNAME radius-server host HOSTNAME {key STRING retransmit RETRIES timeout SEC auth-port PORTNO} no radius-server host HOSTNAME (auth-port PORTI)</pre>
Parameters	auth-port: (Optional) Specify the UDP destination port for authentication requests; the host is not used for authentication if set to 0. key: (Optional) Specify the authentication and encryption key for all radius communications between the router and the radius server. This key must match the encryption used on the radius daemon. All leading spaces are ignored, but spaces within and at the end of the string are used. If spaces are used in the string, do not enclose the string in quotation marks unless the quotation marks themselves are part of the key. retransmit: (Optional) The number of times a radius request is re-sent to a server, if that server is not responding or responding slowly. This setting overrides the global setting of the radiusserver retransmit command. Enter a value in the range 1 to 100. If no retransmit value is specified, the global value is used. timeout: (Optional) The time interval (in seconds) that the router waits for the radius server to reply before retransmitting. This setting overrides the global value of the radius-server timeout command. If no timeout value is specified, the global value is used. Enter a value in the range 1 to 1000.
Example usage	<pre>switch_a(config)# radius-server host 10.10.10.40 auth-port 1812 timeout 5 retransmit 3 key authd</pre>

radius-server key	
Purpose	Set the shared secret key between a Radius server and a client.
Command Mode	Global Configuration
Syntax	radius-server key KEY no radius-server key
Parameters	KEY: The secret key shared among the radius server and the 802.1x client.
Example usage	<code>switch_a(config)# radius-server key ipi</code>

radius-server retransmit	
Purpose	Specify the number of times the router transmits each radius request to the server before giving up.
Command Mode	Global Configuration
Syntax	radius-server retransmit RETRIES no radius-server retransmit
Parameters	RETRIES: The retransmit value from 1 to 100. If no retransmit value is specified, the global value is used.
Example usage	<code>switch_a(config)# radius-server retransmit 12</code>

radius-server timeout	
Purpose	Specify the number of seconds a router waits for a reply to a radius request before retransmitting the request. Use the no parameter to use the default value.
Command Mode	Global Configuration
Syntax	radius-server timeout SEC no radius-server timeout
Parameters	SEC: The number of seconds for a router to wait for a server host to reply before timing out. <1-1000>
Example usage	<code>switch_a(config)# radius-server timeout 20</code>

TACACS+

login tacplus

Purpose	Set login mode to TACACS+ (same as aaa authentication tacplus)"
Command Mode	Line Configuration
Syntax	login tacplus
Parameters	None
Example usage	switch_a(config-line)# login tacplus

tacplus-server

Purpose	Configure tacacs server. At most 3 servers can be set at once.
Command Mode	Global Configuration
Syntax	tacplus-server host HOSTNAME <key STRING> (ltimeout <SEC>) (lport <PORTNO>) (lprimary) (linactive) no tacplus-server host HOSTNAME
Parameters	HOSTNAME: TACACS+ server (hostname or dotted IP notation) Inactive: Set TACACS+ server to inactive Key: Set TACACS+ server key port: TACACS+ server port primary: Set TACACS+ server as primary server timeout: Set TACACS+ server timeout
Example usage	switch_a(config)# tacplus-server host myhost inactive

aaa authentication login tacplus

Purpose	Set login mode to TACACS+.
Command Mode	Global Configuration
Syntax	aaa authentication login tacplus no aaa authentication login tacplus
Parameters	None
Example usage	switch_a(config)# aaa authentication login tacplus

aaa authorization command tacplus	
Purpose	Set command authorization to TACACS+
Command Mode	Global Configuration
Syntax	aaa authorization command tacplus no aaa authorization command tacplus
Parameters	None
Example usage	switch_a(config)# aaa authorization command tacplus

14 LLDP (Link Layer Discovery Protocol)

LLDP Information

show lldp	
Purpose	Show statistics, status, and information for current LLDP configuration.
Command Mode	Privileged exec
Syntax	show lldp entry WORD show lldp statistics show lldp statistics IFNAME show lldp interface show lldp interface IFNAME show lldp neighbors show lldp neighbors-org show lldp neighbors IFNAME show lldp neighbors detailed
Parameters	IFNAME: Interface name WORD: System Name of LLDP neighbor entry
Example usage	switch_a# show lldp statistics

LLDP Configuration

lldp enable	
Purpose	Enable lldp.
Command Mode	Global Configuration
Syntax	[no] lldp enable
Parameters	None
Example usage	switch_a(config)# lldp enable

lldp holdtime multiplier	
Purpose	Set the holdtime multiplier value, which is multiplied by the transmit interval to calc Time To Live (TTL) that is advertised to neighbors
Command Mode	Global Configuration
Syntax	lldp holdtime multiplier <2-10> no lldp holdtime multiplier
Parameters	<2-10> : Multiplier factor
Example usage	switch_a(config)# lldp holdtime multiplier 5

lldp txinterval	
Purpose	Set interval at which LLDP frames are transmitted.
Command Mode	Global Configuration
Syntax	lldp txinterval <5-32768> no lldp txinterval
Parameters	<5-32768> : TxInterval, default is 30 sec
Example usage	switch_a(config)# lldp txinterval 100

lldp tlv-global	
Purpose	Configure the global TLV (Time – Length – Value) settings are advertised by the switch to other LLDP devices.
Command Mode	Global Configuration
Syntax	lldp tlv-global {all port-descr sys-name sys-descr sys-cap mgmt-addr port-vlan-id mac-phy protocol-identity vlan-name port-and-protocol link-aggregation max-frame}
Parameters	port-descr : Port Description sys-name : System Name TLV sys-descr : System Description TLV sys-cap : System Capabilities mgmt-addr : Management Address port-vlan-id : Port VLAN ID mac-phy : MAC/PHY Configuration/Status port-and-protocol : Port And Protocol VLAN ID vlan-name : VLAN Name protocol-identity : Protocol Identity link-aggregation : Link Aggregation max-frame : Maximum Frame Size
Example usage	switch_a(config)# lldp tlv-global sys-name

LLDP Port Settings

lldp tx-pkt	
Purpose	Enable LLDP transmit on a port.
Command Mode	Interface Configuration
Syntax	[no] lldp tx-pkt
Parameters	None
Example usage	switch_a(config-if)# lldp tx-pkt

lldp tx-rcv	
Purpose	Enable LLDP receive on a port.
Command Mode	Interface Configuration
Syntax	[no] lldp tx-rcv
Parameters	None
Example usage	switch_a(config-if)# lldp tx-rcv

lldp mgmt-ip vlan	
Purpose	Enable the transmission of the management IP address through a port.
Command Mode	Interface Configuration
Syntax	lldp mgmt-ip vlan <1-4094> no lldp mgmt-ip vlan
Parameters	<1-4094> : VLAN ID
Example usage	switch_a(config-if)# lldp mgmt-ip vlan 200

lldp notification	
Purpose	Enable LLDP notification
Command Mode	Interface Configuration
Syntax	[no] lldp notification
Parameters	None
Example usage	switch_a(config-if) # lldp notification

lldp-agent	
Purpose	Configure lldp agents for customer-bridge and non-TPMR-bridge.
Command Mode	Interface Configuration
Syntax	[no] lldp-agent customer-bridge [no] lldp-agent non-tpmr-bridge
Parameters	None
Example usage	switch_a(config-if) # lldp-agent customer-bridge

lldp tlv-global	
Purpose	Configure the global TLV (Time – Length – Value) settings are advertised by the switch to other LLDP devices.
Command Mode	Interface Configuration
Syntax	lldp tlv-global {all port-descr sys-name sys-descr sys-cap mgmt-addr port-vlan-id mac-phy protocol-identity vlan-name port-and-protocol link-aggregation max-frame}
Parameters	port-descr: Port Description sys-name: System Name TLV sys-descr : System Description TLV sys-cap: System Capabilities mgmt-addr: Management Address port-vlan-id: Port VLAN ID mac-phy: MAC/PHY Configuration/Status port-and-protocol: Port And Protocol VLAN ID vlan-name: VLAN Name protocol-identity: Protocol Identity link-aggregation: Link Aggregation max-frame: Maximum Frame Size
Example usage	switch_a(config-if) # lldp tlv-global sys-name

15 DHCP (Dynamic Host Configuration Protocol)

DHCP Server

show dhcp-client status

Purpose	Display DHCP-client Current Status
Command Mode	Privileged exec
Syntax	show dhcp-client status
Parameters	None
Example usage	switch_a# show dhcp-client status

show running-config dhcp

Purpose	Display DHCP-client Current Status
Command Mode	Global configuration
Syntax	show running-config dhcp
Parameters	None
Example usage	switch_a(config)# show running-config dhcp

feature dhcp

Purpose	Enable/disable dhcp on switch
Command Mode	Global configuration
Syntax	[no] feature dhcp
Parameters	none
Example usage	switch_a(config)#feature dhcp

ip address dhcp	
Purpose	Get an IP address from a DHCP server for this interface. Use the no form to disable the DHCP client for this interface.
Command Mode	Interface configuration
Syntax	[no] ip address dhcp
Parameters	none
Example usage	switch_a(config-if)# ip address dhcp

ip dhcp client request	
Purpose	Request a DNS nameserver or host name for DHCP client.
Command Mode	Interface configuration
Syntax	ip dhcp client request dns-nameserver no ip dhcp client request dns-nameserver ip dhcp client request host-name no ip dhcp client request host-name
Parameters	dns-nameserver: List of DNS name servers host-name: Name of the client
Example usage	switch_a(config-if)# ip dhcp client request dns-nameserver

Ipv6 address dhcp	
Purpose	Set the IPv6 address by DHCP
Command Mode	Interface configuration
Syntax	[no] ipv6 address dhcp
Parameters	none
Example usage	switch_a(config-if)# ipv6 address dhcp

ipv6 dhcp client request	
Purpose	Request for IPv6 DNS Nameserver.
Command Mode	Interface configuration
Syntax	ipv6 dhcp client request dns-nameserver no ipv6 dhcp client request dns-nameserver
Parameters	dns-nameserver: List of DNS name servers host-name: Name of the client
Example usage	switch_a(config-if)# ipv6 dhcp client request dns-nameserver

dhcp-server enable	
Purpose	Enable DHCP Server.
Command Mode	Global configuration and Interface configuration
Syntax	dhcp-server enable no dhcp-server enable
Parameters	None
Example usage	switch_a(config-if)# dhcp-server enable

dhcp-server restart	
Purpose	Enable DHCP Server.
Command Mode	Global configuration
Syntax	dhcp-server restart
Parameters	None
Example usage	switch_a(config-if)# dhcp-server restart

dhcp-server range	
Purpose	Set the default IP lease block for the DHCP server.
Command Mode	Interface configuration
Syntax	dhcp-server range <Start IP> <End IP> no dhcp-server range
Parameters	<Start IP> <End IP>: IP address range
Example usage	switch_a(config-if)# dhcp-server range 10.0.0.0 10.255.255.255

dhcp-server lease-time	
Purpose	Set the the default lease time for the DHCP server.
Command Mode	Interface configuration
Syntax	dhcp-server lease-time <0-864000> no dhcp-server lease-time
Parameters	<0-864000> : Lease time in seconds
Example usage	switch_a(config-if)# dhcp-server lease-time 86000

dhcp-server subnet-mask	
Purpose	Set the default subnet mask for the DHCP server.
Command Mode	Interface configuration
Syntax	dhcp-server subnet-mask <A.B.C.D> no dhcp-server subnet-mask
Parameters	<A.B.C.D> ::Subnet mask
Example usage	switch_a(config-if)# dhcp-server subnet-mask 255.255.0.0

dhcp-server gateway	
Purpose	Set the default gateway for the DHCP server.
Command Mode	Interface configuration
Syntax	dhcp-server gateway <A.B.C.D> no dhcp-server gateway
Parameters	<A.B.C.D> ::Gateway address
Example usage	switch_a(config-if)# dhcp-server gateway 10.10.10.10

dhcp-server dns	
Purpose	Set the default dns for the DHCP server
Command Mode	Interface configuration
Syntax	dhcp-server dns <1 2> <A.B.C.D> no dhcp-server dns <1 2>
Parameters	<A.B.C.D> ::dns address
Example usage	switch_a(config-if)# dhcp-server dns 1 10.10.10.10

DHCP Relay

dhcprelay enable	
Purpose	Enable globally
Command Mode	Global Configuration and Interface Configuration
Syntax	dhcprelay enable no dhcprelay enable
Parameters	None
Example usage	switch_a(config)# dhcprelay enable

dhcprelay serverip	
Purpose	Add DHCP server IP
Command Mode	Global Configuration
Syntax	dhcprelay serverip <A.B.C.D> no dhcprelay serverip <A.B.C.D>
Parameters	<A.B.C.D>: IP address of server
Example usage	switch_a(config)# dhcprelay serverip 10.10.10.10

dhcprelay information-option	
Purpose	Enable DHCP relay option 82
Command Mode	Global Configuration
Syntax	dhcprelay information-option no dhcprelay information-option
Parameters	None
Example usage	switch_a(config)# dhcprelay information-option

dhcprelay restart	
Purpose	Restart dhcp relay.
Command Mode	Global Configuration
Syntax	dhcprelay restart
Parameters	None
Example usage	switch_a(config)# dhcprelay restart

DHCP Snooping

dhcp-snooping	
Purpose	Enable DHCP snooping globally
Command Mode	Global Configuration
Syntax	dhcp-snooping enable no dhcp-snooping enable
Parameters	None
Example usage	switch_a(config)# dhcp-snooping enable

dhcp-snooping binding	
Purpose	Create DHCP snooping binding table.
Command Mode	Global Configuration
Syntax	dhcp-snooping binding MAC vlan <1-4094> A.B.C.D interface IFNAME expiry <1-86400>
Parameters	MAC: MAC address in HHHH.HHHH.HHHH format <1-4094>: VLAN ID <1-86400>: IP lease time
Example usage	switch_a(config)# dhcp-snooping binding mmmm.mmmm.mmmm vlan 1 10.10.10.10 interface ge5 expiry 1000

16 NTP (Network Time Protocol)

NTP Configuration

show system time

Purpose	Display system time
Command Mode	Privileged Exec
Syntax	show system time
Parameters	none
Example usage	switch_a# show system time

show ntp associations

Purpose	Display NTP associations
Command Mode	Privileged Exec
Syntax	show ntp associations
Parameters	none
Example usage	switch_a# show ntp associations

show ntp status

Purpose	Display ntp status.
Command Mode	Privileged Exec
Syntax	show ntp status
Parameters	none
Example usage	switch_a# show ntp status

set clock	
Purpose	Set time and date for the switch.
Command Mode	Privileged Exec
Syntax	set clock <2000-2037> <1-12> <1-31> <0-23> <0-59> <0-59>
Parameters	<2000-2037>: Year, <1-12>: Month, <1-31>: Date, <0-23>: Hour <0-59>: Minute , <0-59>: Second
Example usage	switch_a# set clock 2017 3 27 17 24 30

ntp enable	
Purpose	Enable ntp
Command Mode	Global Configuration
Syntax	[no] ntp enable
Parameters	None
Example usage	switch_a(config)# ntp enable

ntp sync-time	
Purpose	Have the NTP client sync the clock immediately switch,
Command Mode	Global Configuration
Syntax	ntp sync-time
Parameters	None
Example usage	switch_a(config)# ntp sync-time

clock	
Purpose	Set time zone for the switch
Command Mode	Global Configuration
Syntax	clock summer-time <name of time zone> date <start Day> <start Month> <start Hour> <start Minute> <end Day> <end Month> <end Hour> <end Minute> <offset in Minute>
Parameters	ZONE: Name of time zone (Examples: CST, MST, PST, UCT, EST, MST, RFT, IST, NAST, TTST, MET, NZST, UAEST)pst OFFSET: Offset from Coordinated Universal Time (UTC), range is <0~24>:<0~59>
Example usage	switch_a(config)# clock timezone pst 9:0

clock summer time	
Purpose	Set time zone, system daylight saving day, and system daylight saving weekday mode
Command Mode	Global Configuration
Syntax	clock summer-time ZONE { date { date month year hh:mm date month year hh:mm month date year hh:mm month date year hh:mm } recurring week day month hh:mm week day month hh:mm } [1-480] no clock summer-time
Parameters	ZONE: Name of the time zone (for example, PDT) displayed when summer time is in effect. date: Indicates that summer time should start on the first specific date listed in the command and end on the second specific date in the command. date: Date of the month. recurring: Indicates that summer time should start and end on the corresponding specified days every year. week: Week of the month <1-5> [1-480]: Number of minutes to add during summer time.
Example usage	switch_a(config)# clock summer-time CDT weekday 2 Sun March 2 0 1 Sun November 2 0 60

ntp server	
Purpose	Configure NTP server, server peer authentication key, peer preference, and NTP server version.
Command Mode	Global Configuration
Syntax	<pre>ntp server <WORD> ntp server <WORD> key <1-4294967295> ntp server <WORD> prefer ntp server <WORD> version <1-4> no ntp server <WORD></pre>
Parameters	WORD: IP address or host name of server
Example usage	<code>switch_a(config)# ntp server 10.10.10.10</code>

Static Route

show ip route	
Purpose	Display the IP routing table for a protocol or from a particular table.
Command Mode	Privileged Exec
Syntax	show ip route show ip route <A.B.C.D> show ip route <A.B.C.D/M> show ip route database show ip route static show ip route summary
Parameters	A.B.C.D: Display network in the IP routing table. A.B.C.D/M: Display IP prefix <network>/<length>, for example, 35.0.0.0/8. database: Display IPv6 routing table database information. static: Display static routes. summary: Display a summary of all routes
Example usage	switch_a# show ip route 10.10.10.5

show routing	
Purpose	Display routing information,
Command Mode	Privileged Exec
Syntax	show routing show routing <A.B.C.D> show routing <A.B.C.D/M> show routing database show routing static show routing summary
Parameters	A.B.C.D: Display network in the IP routing table. A.B.C.D/M: Display IP prefix <network>/<length>, Example - 35.0.0.0/8. database: Display IPv6 routing table database information. static: Display static routes. summary: Display a summary of all routes
Example usage	switch_a# show routing 10.10.10.10/24

ip route	
Purpose	Create an IPv4 static route. Use the no form to delete a static route.
Command Mode	Global Configuration
Syntax	[no] ip route <A.B.C.D/M> <A.B.C.D> [no] ip route <A.B.C.D> <A.B.C.D> <A.B.C.D> [no] ip route <A.B.C.D/M> <A.B.C.D> <1-255> [no] ip route <A.B.C.D/M> <A.B.C.D> description <WORD> [no] ip route <A.B.C.D/M> <A.B.C.D> tag <1-4294967295> [no] ip route <A.B.C.D/M> <IFNAME> [no] ip route <A.B.C.D/M> <IFNAME> <A.B.C.D>
Parameters	A.B.C.D/M : Subnet IP destination prefix and mask <0-32> A.B.C.D A.B.C.D : Subnet: IP destination address and mask A.B.C.D : Gateway nexthop IPv4 address <1-255> : Administrative distance IFNAME : Gateway nexthop interface name description : Description of the static route tag : Tag used as a “match” value to control redistribution <1-4294967295> : Tag value
Example usage	switch_a(config)# ip route 192.168.3.0 255.255.255.0 2.2.2.2 128

max-static-routes	
Purpose	Set maximum static routes number.
Command Mode	Global Configuration
Syntax	max-static-routes <1-8192>
Parameters	<1-8192> : Allowed number of static routes
Example usage	switch_a(config)# max-static-routes 100

ip prefix-list	
Purpose	Create a prefix list. Prefixes are matched from the top of the prefix list, and matching stops whenever a match or deny occurs. For efficiency, use the seq parameter and place common matches or denials towards the top of the list. The sequence values are generated in the sequence of 5. The parameters GE and LE specify the range of the prefix length to be matched. When setting these parameters, set LE to be less than 32 and GE to be less than LE.
Command Mode	Global Configuration
Syntax	<pre>[no] ip prefix-list WORD (deny permit) (A.B.C.D/M any) [no] ip prefix-list WORD (deny permit) A.B.C.D/M ge <0-32> [no] ip prefix-list WORD (deny permit) A.B.C.D/M ge <0-32> le <0-32> [no] ip prefix-list WORD (deny permit) A.B.C.D/M le <0-32> [no] ip prefix-list WORD (deny permit) A.B.C.D/M le <0-32> ge <0-32> [no] ip prefix-list WORD seq <1-4294967295> (deny permit) (A.B.C.D/M any) [no] ip prefix-list WORD seq <1-4294967295> (deny permit) A.B.C.D/M ge <0-32> [no] ip prefix-list WORD seq <1-4294967295> (deny permit) A.B.C.D/M ge <0-32> le <0-32> [no] ip prefix-list WORD seq <1-4294967295> (deny permit) A.B.C.D/M le <0-32> [no] ip prefix-list WORD seq <1-4294967295> (deny permit) A.B.C.D/M le <0-32> ge <0-32> [no] ip prefix-list sequence-number [no] ip prefix-list WORD description LINE</pre>
Parameters	WORD: Specify the name of a prefix list. deny: Specify that packets are to be rejected. Description: Prefix-list specific description. LINE: Up to 80 characters describing this prefix-list permit: Specify that packets are to be accepted. A.B.C.D/M: The IP address mask and length of the prefix list mask le: Maximum prefix length to be matched <0-32>. ge: Minimum prefix length to be matched <0-32>. seq: The sequence number of the prefix list <1-429496725>. any: Takes all packets of any length. sequence-number: Sequence numbers in nonvolatile generation
Example usage	<pre>switch_a(config)# ip prefix-list mylist seq 5 deny 76.2.2.0/24</pre>

Route Table

show route-table	
Purpose	Display the route table, which contains information about the topology of the surrounding network.
Command Mode	Privileged Exec
Syntax	show route-table
Parameters	None
Example usage	switch_a# show route-table

Route Map

show route-map	
Purpose	Display the IP routing table for a protocol or from a particular table.
Command Mode	Privileged Exec
Syntax	show route map [WORD]
Parameters	WORD: Route map name
Example usage	switch_a# show route map

route-map	
Purpose	Enter route-map mode, and configure permit or deny match/set operations. This command controls and modifies routing information to allow redistribution of routes. It has a list of match and set commands associated with it. The match commands specify the conditions under which redistribution is allowed, and the set commands specify the redistribution actions to be performed if the match criteria are met. Route allow for detailed control over route distribution between routing processes. Route maps also allow policy routing, and can route packets to a different route than the obvious shortest path.
Command Mode	Global configuration
Syntax	[no] route-map WORD (deny permit) <1-65535>
Parameters	WORD: Identify the route. deny: Route map denies set operations. If the deny parameter is specified, and the match criteria are met, the route is not redistributed, and any other route maps with the same map tag are not examined. permit: Route map permits set operations. If the permit parameter is specified, and the match criteria are met, the route is redistributed as specified by set actions. If the match criteria are not met, the next route map with the same tag is tested. <1-65535>: Sequence to insert to or delete from an existing route-map entry
Example usage	<pre>switch_a(config)# route-map permit 100 switch_a(config-route-map)#</pre>

match interface	
Purpose	Define interface match criterion. Specifies the next-hop interface name of a route to be matched.
Command Mode	Route map
Syntax	<pre>match interface IFNAME no match interface (IFNAME)</pre>
Parameters	IFNAME: Interface name.
Example usage	<pre>switch_a#configure terminal switch_a(config)#route-map examplerule permit 10 switch_a(config-route-map)#match interface ge5</pre>

match ip	
Purpose	Match address of a route, a prefix-list, a next-hop address, the next-hop IP address using the prefix-list, a peer IPv4 address of a route.
Command Mode	Route map
Syntax	[no] match ip address (<1-199> <1300-2699> WORD) [no] match ip address prefix-list (WORD) [no] match ip next-hop (<1-199> <1300-2699> WORD) [no] match ip next-hop prefix-list (WORD) [no] match ip peer (<1-199> <1300-2699> WORD)
Parameters	WORD: IP access-list name <1-199>: IP access-list number (standard range) <1300-2699>: IP access-list number (expanded range)
Example usage	switch_a#configure terminal switch_a(config)# route-map rmap1 permit 3 switch_a(config-route-map)# match ip address prefix-list mylist

match metric	
Purpose	Match a metric of a route. The route specified by the policies might not be the same as specified by the routing protocols. Setting policies enable packets to take different routes depending on their length or content. Packet forwarding based on configured policies overrides packet forwarding specified in routing tables.
Command Mode	Route map
Syntax	match metric <0-4294967295> no match metric (<0-4294967295>)
Parameters	<0-4261412864>: Metric value
Example usage	switch_a#configure terminal switch_a(config)# route-map mapexample permit 3 switch_a(config-route-map)# match metric 223455
Note	This command is valid for BGP, OSPF, RIP, and IS-IS only.

set ip next-hop	
Purpose	Set the specified next-hop value.
Command Mode	Route map
Syntax	set ip next-hop A.B.C.D (interface IFNAME) (primary secondary) no set ip next-hop (A.B.C.D) (interface IFNAME) (primary secondary)
Parameters	A.B.C.D: IP address of the next-hop. Interface: Interface name primary: Specify the nexthop as primary. secondary: Specify the nexthop as secondary.
Example usage	switch_a(config)# route-map rmap1 permit 3 switch_a(config-route-map)# set next-hop 10.10.0.67
Note	This command is valid for BGP, OSPF, and RIP only.

set metric	
Purpose	Set a metric value for a route and influence external neighbors about the preferred path into an Autonomous System (AS). The preferred path is the one with a lower metric value. A router compares metrics for paths from neighbors in the same ASs. To use this command, you must first have a match clause. Match and set commands set conditions for redistributing routes from one routing protocol to another.
Command Mode	Route map
Syntax	[no] set metric (<0-4294967295> <+/-metric>)
Parameters	<0-4294967295>: Specify a metric value. <+/-metric>: Adds or subtracts a metric.
Example usage	<pre>switch_a(config)# route-map rmap1 permit 3 switch_a(config-route-map)# set metric 600</pre>

Proxy ARP

ip proxy-arp	
Purpose	Enable proxy ARP on an interface, allowing the switch to answer ARP queries for a network address that is not on that network.
Command Mode	Interface Configuration
Syntax	[no] ip proxy-arp
Parameters	None
Example usage	<pre>switch_a(config-if)# ip proxy arp</pre>

18 RIP (Routing Information Protocol)

RIP Information and General Settings

show ip rip	
Purpose	Display RIP configuration info.
Command Mode	Privileged Exec
Syntax	show ip rip show ip rip database show ip rip interface show ip rip interface <IFNAME> show ip rip statistics show ip rip statistics <IFNAME>
Parameters	IFNAME: Interface name database: IP RIP database
Example usage	switch_a# show ip rip interface

show ip protocols rip	
Purpose	Show the RIP process parameter and statistics information.
Command Mode	Privileged Exec
Syntax	show ip protocols rip
Parameters	None
Example usage	switch_a# show ip protocols rip

clear ip rip route	
Purpose	Clear specific data from the RIP routing tables. Using this command with the all parameter clears the RIP table of all routes. To prevent the RIP from being deleted, use the redistribute connected command and make the RIP network a connected route. To delete the RIP routes learned from neighbors and also keep the RIP network intact, use the rip parameter (clear ip rip route rip).
Command Mode	Privileged Exec
Syntax	clear ip rip route (A.B.C.D/M rip connected static ospf all)
Parameters	A.B.C.D/M: Removes entries which exactly match this destination address bgp: Removes BGP routes from the RIP routing table. connected: Removes entries for connected routes isis: Removes IS-IS routes kernel: Removes kernel entries. ospf: Removes only OSPF routes. rip: Removes only RIP routes. all: Removes the entire RIP routing table.
Example usage	switch_a# clear ip rip route 10.0.0.0/8

clear ip rip statistics	
Purpose	Clear RIP statistics.
Command Mode	Privileged Exec
Syntax	clear ip rip statistics IFNAME
Parameters	IFNAME : Interface to clear
Example usage	switch_a# clear ip rip statistics ge5

router rip	
Purpose	Enable RIP routing. This command places the switch into Router Configuration Mode.
Command Mode	Global Configuration
Syntax	[no] router rip
Parameters	None
Example usage	<pre>switch_a(config)#router rip switch_a(config-router)#</pre>

version	
Purpose	Specify a RIP version to be used globally. Options are version 1 or version 2. Version 2 has more features than version 1, including authentication. Once the rip version is set, rip packets of that version will be received and sent on all the rip-enabled interfaces. Use the no parameter to restore the default version (version 2).
Command Mode	Router Configuration
Syntax	version <1-2>
Parameters	<1-2> : RIP version
Example usage	switch_a(config-router)#version 1

default-information originate	
Purpose	Distribute a default route, always advertise default route, create a route map reference.
Command Mode	Router Configuration
Syntax	[no] default-information originate default-information originate always default-information originate route-map <WORD> default-information originate always route-map <WORD>
Parameters	always : Always advertise default route route-map : Route map reference WORD : Pointer to route-map entries
Example usage	switch_a(config-router)# default-information originate always

cisco-metric-behavior	
Purpose	Enable metric updates consistent with Cisco.
Command Mode	Router Configuration
Syntax	cisco-metric-behavior <enable/disable>
Parameters	None
Example usage	switch_a(config-router)# cisco-metric-behavior enable

default-metric	
Purpose	Specify the metrics to be assigned to redistributed routers. This command is used in conjunction with the redistribute command to make the routing protocol use the specified metric value for all redistributed routes. A default metric is useful in redistributing routes with incompatible metrics. Default metric provides the standard to compare. All routes that are redistributed will use the default metric.
Command Mode	Router Configuration
Syntax	default-metric <1-16>
Parameters	<1-16> : default metric.
Example usage	switch_a(config-router)# default-metric 10

distribute-list	
Purpose	Filter incoming or outgoing route updates using an access list or a prefix list. Incoming or outgoing route updates can be filtered out using an access list or a prefix list. If no interface is specified, the filter will be applied to all the interfaces.
Command Mode	Router Configuration
Syntax	[no] distribute-list WORD (in out) (IFNAME) [no] distribute-list prefix WORD (in out) (IFNAME)
Parameters	WORD : The IPv4 access-list number or name to use. prefix : Filter prefixes in routing updates. WORD : The name of the IPv4 prefix-list to use. in : Filter incoming routing updates. out : Filter outgoing routing updates. IFNAME : The name of the interface on which distribute-list applies.
Example usage	switch_a(config-router)# distribute-list prefix myfilter in ge10

maximum-prefix	
Purpose	Set the maximum number of RIP routes, and the percentage of maximum routes created that will generate a warning (Default 75%).
Command Mode	Router Configuration
Syntax	maximum-prefix <1-65535> maximum-prefix <1-65535> (1-100) no maximum-prefix
Parameters	<1-65535> : The maximum number of RIP routes allowed. <1-100> : Percentage of maximum routes that will generate a warning. Default is 75%.
Example usage	switch_a(config-router)# maximum-prefix 150

timers basic

Purpose	Adjusts the RIP timing parameters. Every 30 seconds, an update is sent out containing the complete routing table to every neighboring router. When the time specified by the timeout parameter expires, the route is no longer valid. However, it is retained in the routing table for a short time so that neighbors are notified that the route has been dropped. When the time specified by the garbage parameter expires, the route is finally removed from the routing table. Until the garbage time expires, the route is included in all updates sent by the router. All routers in the network must have the same timers to allow RIP to execute distributed and asynchronous routing algorithms. The timers should not be synchronized as it might lead to unnecessary collisions on the network.
Command Mode	Router Configuration
Syntax	timers basic: <5-2147483647> <5-2147483647> <5-2147483647> no timers basic
Parameters	<5-2147483647>: The routing table update timer in seconds. Default is 30. <5-2147483647>: The routing information timeout timer in seconds. Default is 180 seconds. After this interval has elapsed and no updates for a route are received, the route is declared invalid. <5-2147483647>: The routing garbage collection timer in seconds. Default is 120 seconds.
Example usage	<pre>switch_a(config-router)# timers basic 30 180 120</pre>

recv-buffer-size

Purpose	Configure the RIP UDP receive-buffer size.
Command Mode	Router Configuration
Syntax	recv-buffer-size <8192-2147483647> no recv-buffer-size (<8192-2147483647>)
Parameters	<8192-2147483647> : The RIP UDP receive buffer size value
Example usage	<pre>switch_a(config-router)# recv-buffer-size 150000</pre>

RIP Interface Settings

ip rip authentication key-chain

Purpose	Enable RIP version 2 authentication on an interface and specify the name of the key chain to be used. If no key chain is configured, then the result will be no authentication.
Command Mode	Interface Configuration
Syntax	ip rip authentication key-chain LINE no ip rip authentication key-chain
Parameters	LINE: The name of the key chain.
Example usage	<pre>switch_a(config-if)# ip rip authentication key-chain rufferto</pre>

ip rip authentication mode

Purpose	Specify the type of authentication mode used for RIP version 2 packets
Command Mode	Interface Configuration
Syntax	ip rip authentication mode md5 ip rip authentication mode text no ip rip authentication mode
Parameters	md5: Uses the keyed MD5 authentication algorithm. text: The clear text or simple password authentication.
Example usage	<pre>switch_a(config-if)# ip rip authentication mode md5</pre>

ip rip authentication string

Purpose	Specify the authentication string or password used by a key. You can choose to configuring authentication for single key or multiple keys at different times. Use this command to specify password for a single key on an interface.
Command Mode	Interface Configuration
Syntax	ip rip authentication string LINE no ip rip authentication string
Parameters	LINE: The authentication string or password used by a key.
Example usage	<pre>switch_a(config-if)# ip rip authentication string guest</pre>

ip rip receive version	
Purpose	Receive specified version of RIP packets on an interface basis using version control, and override the setting of the version command. Use no form to set default (2).
Command Mode	Interface Configuration
Syntax	ip rip receive version (1 2) ip rip receive version 1 2 ip rip receive version 2 1 no ip rip receive version
Parameters	1: Accept RIP version 1 packets on the interface. 2: Accept RIP version 2 packets on the interface. 1 2: Accept RIP version 1 and 2 packets on the interface. 2 1: Accept RIP version 2 and 1 packets on the interface.
Example usage	switch_a(config-if)# ip rip receive version 1 2

ip rip receive-packet	
Purpose	Configure the interface to enable the reception of RIP packets.
Command Mode	Interface Configuration
Syntax	[no] ip rip receive-packet
Parameters	None
Example usage	switch_a(config-if)# ip rip receive-packet

ip rip send version	
Purpose	Interface version control. In addition to version 1 & 2, compatible version packets can be specified. The parameter 1-compatible lets a version 2 RIP interface broadcast packets instead of multicasting. This command overrides version specified by the version command. Use no parameter for global RIP version rules.
Command Mode	Interface Configuration
Syntax	[no] ip rip send version (1 2 1-compatible) ip rip send version 1 2 ip rip send version 2 1
Parameters	1: Send RIP version 1 packets out of an interface. 2: Send RIP version 2 packets out of an interface. 1-compatible: Send RIP version 1 compatible packets from a version 2 RIP interface.
Example usage	switch_a(config-if)# ip rip send version 1 2

ip rip send-packet	
Purpose	Enable the sending of RIP packets through the current interface.
Command Mode	Interface Configuration
Syntax	[no] ip rip send-packet
Parameters	None
Example usage	switch_a(config-if)# ip rip send-packet

ip rip split-horizon	
Purpose	Perform the split-horizon action on the interface. This command helps avoid including routes in updates sent to the same gateway from which they were learned. Using the split horizon command omits routes learned from one neighbor, in updates sent to that neighbor. Using the poisoned parameter includes such routes in updates, but sets their metrics to infinity (effectively advertising that these routes are unreachable).
Command Mode	Interface Configuration
Syntax	ip rip split-horizon ip rip split-horizon poisoned no ip rip split-horizon
Parameters	poisoned : Performs split-horizon with poisoned reverse.
Example usage	switch_a(config-if)# ip rip split-horizon poisoned

RIP Route

offset-list	
Purpose	Add an offset to in and out metrics to routes learned through RIP. This command specifies the offset value that is added to the routing metric. When the networks match the access list the offset is applied to the metrics. No change occurs if the offset value is zero.
Command Mode	Router Configuration
Syntax	offset-list WORD (in out) <0-16> (IFNAME) no offset-list WORD (in out) <0-16> (IFNAME)
Parameters	WORD : The access-list number or names to apply. in : Access list will be used for metrics of incoming advertised routes. out : Access list will be used for metrics of outgoing advertised routes. <0-16> : Offset used for metrics of networks matching the access list. IFNAME : The interface to match.
Example usage	Set the router to examine the RIP updates being sent out from interface ge1 and add 16 hops to routes matching the ip addresses specified in the access list accesslist1 .
	<pre>switch_a(config-router)# offset-list accesslist1 in 16 ge1</pre>

route	
Purpose	Configure static RIP routes. This command is used most often for debugging purposes and does not show up in the kernel routing table. After adding the RIP route, it can be checked in the RIP routing table.
Command Mode	Router Configuration
Syntax	[no] route A.B.C.D/M
Parameters	A.B.C.D/M : The IP address prefix and length.
Example usage	<pre>switch_a(config-router)# route 10.10.10.0/24</pre>

RIP Network

network	
Purpose	Specify a network as one that runs RIP. This command specifies the networks to which routing updates will be sent and received. If a network is not specified, the interfaces in that network will not be advertised in any RIP update.
Command Mode	Router Configuration
Syntax	[no] network A.B.C.D/M [no] network IFNAME
Parameters	A.B.C.D/M : The IP address prefix and length of this IP network. IFNAME : Alphanumeric string that defines the interface name.
Example usage	<code>switch_a(config-router)# network 10.0.0.0/8</code>

RIP Neighbor

neighbor	
Purpose	Specify a neighbor router. It is used for each connected point-to-point link. This command to exchanges non-broadcast routing information. It can be used multiple times for additional neighbors. The passive-interface command disables sending routing updates on an interface. Use the neighbor command in conjunction with the passive-interface command to send routing updates to specific neighbors.
Command Mode	Router Configuration
Syntax	neighbor <A.B.C.D> neighbor <A.B.C.D> fail-over no neighbor A.B.C.D
Parameters	A.B.C.D : IP address of a neighboring router with which the routing information will be exchanged. fail-over : Fall-over detection
Example usage	<code>switch_a(config-router)# neighbor 20.20.20.20</code>

RIP Passive

passive-interface	
Purpose	Block RIP broadcast on the interface.
Command Mode	Router Configuration
Syntax	passive-interface IFNAME no passive-interface IFNAME
Parameters	IFNAME: Interface name.
Example usage	switch_a(config-router)# passive-interface ge5

RIP Redistribute

redistribute	
Purpose	Redistribute information from other routing protocols
Command Mode	Router Configuration
Syntax	[no] redistribute (kernel connected static ospf isis bgp) [no] redistribute (kernel connected static ospf isis bgp) metric <0-16> [no] redistribute (kernel connected static ospf isis bgp) route-map WORD [no] redistribute (kernel connected static ospf isis bgp) metric <0-16> route-map WORD
Parameters	bgp: Redistribute from BGP routes connected: Redistribute from connected routes isis: Redistribute from ISO IS-IS routes kernel: Redistribute from kernel routes ospf6: Redistribute from OSPF routes (version 3) static: Redistribute from static routes metric: Set metric value <0-16>: Metric value route-map: Route map reference WORD: Name of the route-map
Example usage	switch_a(config-router)# redistribute static metric 8

19 RIPng (Routing Information Protocol Next Generation)

RIPng Information and General Settings

show ip rip	
Purpose	Display RIPng process parameters and statistics. Show RIPng routes.
Command Mode	Privileged Exec
Syntax	show ipv6 rip show ipv6 rip database show ipv6 rip interface show ipv6 rip interface <IFNAME> show ipv6 protocols rip show ipv6 route rip
Parameters	database: IPv6 RIP database
Example usage	switch_a# show ipv6 protocols rip

clear ipv6 rip route	
Purpose	Clear specific data from the RIPng routing tables.
Command Mode	Privileged Exec
Syntax	clear ipv6 rip route (X:X::X:X/M rip kernel connected static ospf6 isis bgp all)
Parameters	X:X::X:X/M: Removes entries which exactly match this destination address bgp: Removes BGP routes from the RIP routing table. connected: Removes entries for connected routes isis: Removes IS-IS routes kernel: Removes kernel entries. ospf: Removes only OSPF routes. rip: Removes only RIP routes. static: Removes static entries. all: Removes the entire RIP routing table.
Example usage	switch_a# clear ipv6 rip route 3ffe:ffff::/16

router ipv6 rip	
Purpose	Enable RIPng routing. This command places the switch into Router Configuration Mode.
Command Mode	Global Configuration
Syntax	[no] router ipv6 rip
Parameters	None
Example usage	switch_a(config)#router ipv6 rip switch_a(config-router)#

default-information originate	
Purpose	Generate a default route into the RIPng.
Command Mode	Router Configuration
Syntax	[no] default-information originate
Parameters	None
Example usage	switch_a(config-router)# default-information originate

cisco-metric-behavior	
Purpose	Enable or disable the metric update as Cisco.
Command Mode	Router Configuration
Syntax	cisco-metric-behavior <enable/disable>
Parameters	None
Example usage	switch_a(config-router)# cisco-metric-behavior enable

default-metric	
Purpose	Specify the metrics to be assigned to redistributed routers.
Command Mode	Router Configuration
Syntax	[no] default-metric <1-16>
Parameters	<1-16>: default metric.
Example usage	switch_a(config-router)# default-metric 10

distribute-list	
Purpose	Filter incoming or outgoing route updates using an access list or a prefix list. Incoming or outgoing route updates can be filtered out using an access list or a prefix list. If no interface is specified, the filter will be applied to all the interfaces.
Command Mode	Router Configuration
Syntax	[no] distribute-list WORD (in out) (IFNAME) [no] distribute-list prefix WORD (in out) (IFNAME)
Parameters	WORD: The IPv6 access-list number or name to use. prefix: Filter prefixes in routing updates. WORD: The name of the IPv6 prefix-list to use. in: Filter incoming routing updates. out: Filter outgoing routing updates. IFNAME: The name of the interface on which distribute-list applies.
Example usage	<code>switch_a(config-router)# distribute-list prefix myfilter in ge10</code>

timers basic	
Purpose	Adjust routing network timers.
Command Mode	Router Configuration
Syntax	timers basic: <5-2147483647> <5-2147483647> <5-2147483647> no timers basic
Parameters	<5-2147483647>: The routing table update timer in seconds. Default is 30. <5-2147483647>: The routing information timeout timer in seconds. Default is 180 seconds. After this interval has elapsed and no updates for a route are received, the route is declared invalid. <5-2147483647>: The routing garbage collection timer in seconds. Default is 120 seconds.
Example usage	<code>switch_a(config-router)# timers basic 30 180 120</code>

recv-buffer-size	
Purpose	Configure the RIPng UDP receive-buffer size.
Command Mode	Router Configuration
Syntax	recv-buffer-size <8192-2147483647> no recv-buffer-size (<8192-2147483647>)
Parameters	<8192-2147483647> : The RIPng UDP receive buffer size value
Example usage	<code>switch_a(config-router)# recv-buffer-size 150000</code>
Note	The no parameter will return the recv-buffer return to the default value (8192).

RIPng Neighbors

neighbor	
Purpose	Specify neighbor router.
Command Mode	Router Configuration
Syntax	[no] neighbor <X:X::X:X> <IFNAME>
Parameters	IFNAME : Interface name <X:X::X:X> : IPv6 link-local address
Example usage	<code>switch_a(config-router)# neighbor 80::1 eth0</code>

RIPng Passive

passive-interface	
Purpose	Block RIP broadcast on the interface.
Command Mode	Router Configuration
Syntax	passive-interface IFNAME no passive-interface IFNAME
Parameters	IFNAME : Interface name.
Example usage	<code>switch_a(config-router)# passive-interface ge5</code>

RIPng Interface Settings

Ipv6 rip split-horizon

Purpose	Perform the split-horizon action on the interface. This command helps avoid including routes in updates sent to the same gateway from which they were learned. Using the split horizon command omits routes learned from one neighbor, in updates sent to that neighbor. Using the poisoned parameter includes such routes in updates, but sets their metrics to infinity (effectively advertising that these routes are unreachable).
Command Mode	Interface Configuration
Syntax	ipv6 rip split-horizon ipv6 rip split-horizon poisoned no ipv6 rip split-horizon
Parameters	poisoned : Performs split-horizon with poisoned reverse.
Example usage	<code>switch_a(config-if)# ipv6 rip split-horizon poisoned</code>

Ipv6 rip metric-offset

Purpose	Set a RIPng metric offset.
Command Mode	Interface Configuration
Syntax	[no] ipv6 rip metric-offset <1-16>
Parameters	<1-16> : Metric value
Example usage	<code>switch_a(config-if)# ip rip split-horizon poisoned</code>

RIPng Route

offset-list	
Purpose	Add an offset to in and out metrics to routes learned through RIPng.
Command Mode	Router Configuration
Syntax	offset-list WORD (in out) <0-16> (IFNAME) no offset-list WORD (in out) <0-16> (IFNAME)
Parameters	WORD : The access-list number or names to apply. in : Access list will be used for metrics of incoming advertised routes. out : Access list will be used for metrics of outgoing advertised routes. <0-16> : Offset used for metrics of networks matching the access list. IFNAME : The interface to match.
Example usage	Set the router to examine the RIP updates being sent out from interface ge1 and add 16 hops to routes matching the ip addresses specified in the access list accesslist1 .
	<pre>switch_a(config-router)# offset-list accesslist1 in 16 eth0</pre>

route	
Purpose	Configure static RIPng routes. Used mostly for debugging.
Command Mode	Router Configuration
Syntax	[no] route X:X::X:X/M
Parameters	X:X::X:X/M : The IPv6 address prefix and length.
Example usage	<pre>switch_a(config-router)# route 3ffe:1234:5678::1/64</pre>

Route-map	
Purpose	Set a route map for input or output filtering on a specified interface.
Command Mode	Router Configuration
Syntax	route-map <WORD> <in out> <IFNAME>
Parameters	WORD : Route map name in : Input filtering out : Output filtering IFNAME : Interface name to which to associate the route map
Example usage	<pre>switch_a(config-router)# route-map routemap10 in ge5</pre>

aggregate-address	
Purpose	Set an aggregate RIPng route announcement.
Command Mode	Router Configuration
Syntax	aggregate-address X:X::X:X/M no aggregate-address X:X::X:X/M
Parameters	X:X::X:X/M : Specify an aggregate network (IPv6 address prefix and length).
Example usage	switch_a(config-router)# aggregate-address 3ffe:8088::/32

RIPng Redistribute

redistribute	
Purpose	Redistribute information from other routing protocols
Command Mode	Router Configuration
Syntax	[no] redistribute (connected static ospf6) [no] redistribute (connected static ospf6) metric <0-16> [no] redistribute (connected static ospf6) route-map WORD [no] redistribute (connected static ospf6) metric <0-16> route-map WORD
Parameters	connected : Redistribute from connected routes ospf6 : Redistribute from OSPF routes (version 3) static : Redistribute from static routes metric : Set metric value <0-16> : Metric value route-map : Route map reference WORD : Name of the route-map
Example usage	switch_a(config-router)# redistribute static metric 8

20 OSPF (Open Shortest Path First)

OSPF Information

show ip ospf	
Purpose	Display OSPF information, border and boundary router Information, details and summary of the OSPF database, interfaces, and multi-area adjacencies. View neighbor list, OSPF routing table, and virtual link information.
Command Mode	Privileged exec
Syntax	<pre>show ip ospf (<0-65535>) show ip ospf (<0-65535>) border-routers show ip ospf <0-65535> database(self-originate max-age adv-router A.B.C.D) show ip ospf <0-65535> database (asbr-summary external network router summary nssa-external opaque-link opaque-area opaque-as) A.B.C.D (self-originate adv-router A.B.C.D) show ip ospf interface (IFNAME) show ip ospf (<0-65535>) multi-area-adjacencies show ip ospf (<0-65535>) {neighbor neighbor all neighbor interface A.B.C.D neighbor A.B.C.D neighbor A.B.C.D detail neighbor detail neighbor detail all} show ip ospf (<0-65535>) route (A.B.C.D A.B.C.D/M summary) show ip ospf (<0-65535>) virtual-links</pre>
Parameters	<0-65535>: The ID of the router process for which information will be displayed. self-originate: Self-originated link states. max-age: LSAs which have reached the max-age (3600 seconds). adv-router: Advertising router link states. asbr-summary: Autonomous System Boundary Router (ASBR) summary LSAs. external: External LSAs. network: Network LSAs. router: Router LSAs. summary: LSA summary information. nssa-external: NSSA external LSAs. opaque-link: Type 9 LSAs which are not flooded beyond the local network. opaque-area: Type 10 LSAs which are not flooded beyond the borders of their area. opaque-as: Type 11 LSAs which are flooded throughout the Autonomous System (AS).
Example usage	<pre>switch_a# show ip ospf 500 database asbr-summary</pre>

show ip protocols	
Purpose	Display OSPF process parameters and statistics.
Command Mode	Privileged exec
Syntax	show ip protocols [ospf]
Parameters	None
Example usage	switch_a# show ip protocols ospf

OSPF Configuration

router ospf	
Purpose	Enter router mode to configure an OSPF routing process. Specify the process ID to configure multiple instances of OSPF. A process ID is not needed of running a single OSPF instance.
Command Mode	Global Configuration
Syntax	router ospf router ospf <1-65535>
Parameters	<1-65535> : Process ID; unique for each routing process.
Example usage	switch_a(config)# router ospf 100 switch_a(config-router)#

area authentication	
Purpose	Enable authentication for an OSPF area. Setting up a Type 1 authentication configures a 64-bit field for that particular network. All packets sent on this network must have this configured value in their OSPF header. This allows only routers that have the same passwords to join the routing domain. Use the ip ospf authentication-key command to specify a simple text password. Use the ip ospf message-digest-key to specify MD5 password.
Command Mode	Router Configuration
Syntax	[no] area (A.B.C.D <0-4294967295>) authentication area (A.B.C.D <0-4294967295>) authentication message-digest
Parameters	A.B.C.D : OSPF Area ID in IPv4 address format. <0-4294967295> : OSPF Area ID as 4-octet unsigned integer value. message-digest : Enable MD5 authentication in specified area ID.
Example usage	switch_a(config-router)# area 1 authentication message-digest

area default-cost	
Purpose	Specify a cost for the default summary route sent into a stub or NSSA area. This command provides the metric for the summary default route, generated by the area border router, into the NSSA or stub area. Use this option only on an area border router that is attached to the NSSA (Not-so-stubby area) or stub area.
Command Mode	Router Configuration
Syntax	area (A.B.C.D <0-4294967295>) default-cost <0-16777215> no area (A.B.C.D <0-4294967295>) default-cost
Parameters	A.B.C.D : OSPF Area ID in IPv4 address format. <0-4294967295> : OSPF Area ID as a decimal value. default-cost : Indicates the cost for the default summary route used for a stub or NSSA area. <0-16777215> : Stub's advertised default summary cost. Default is 1.
Example usage	switch_a(config-router)# area 1 default-cost 10

area filter-list	
Purpose	Configure a filter to advertise summary routes on an Area Border Router (ABR). This command suppresses incoming and outgoing summary routes between this area and other areas. You use this command in conjunction with the prefix-list and access-list commands.
Command Mode	Router Configuration
Syntax	area (A.B.C.D <0-4294967295>) filter-list prefix WORD (in out) area (A.B.C.D <0-4294967295>) filter-list access WORD (in out) no area (A.B.C.D <0-4294967295>) filter-list prefix WORD (in out) no area (A.B.C.D <0-4294967295>) filter-list access WORD (in out)
Parameters	A.B.C.D : OSPF area ID as an IPv4 address. <0-4294967295> : OSPF area ID as a decimal value. prefix : Use prefix list to filter summary. WORD : Name of the prefix or access list. access : Use access list to filter summary. in : Filter routes from other areas into this area. out : Filter routes from this area into other areas.
Example usage	switch_a(config)#access-list 1 deny 172.22.0.0/8 switch_a(config)#router ospf 100 switch_a(config-router)#area 1 filter-list access 1 in

area multi-area-adjacency	
Purpose	Enable multi-area adjacency on the specified interface. Multi-area adjacency establishes adjacency between the Area Border Routers (ABRs). The specified interface of the ABR is associated with multiple areas. Multiple OSPF interfaces must be created for multiple areas.
Command Mode	Router Configuration
Syntax	area (A.B.C.D <0-4294967295>) multi-area-adjacency IFNAME neighbor A.B.C.D no area (A.B.C.D <0-4294967295>) multi-area-adjacency IFNAME (neighbor A.B.C.D)
Parameters	IFNAME: An alphanumeric string that is the interface name. neighbor: Set the neighbor. A.B.C.D: IP address of neighbor.
Example usage	switch_a(config)#router ospf 1 switch_a(config)#router-id 10.10.10.10 switch_a(config-router)#area 1 multi-area-adjacency ge20 neighbor 20.20.20.10

area range	
Purpose	Summarize OSPF routes at an area boundary. A single summary route is then advertised to other areas by the Area Border Routers (ABRs). Routing information is condensed at area boundaries and outside the area. If the network numbers in an area are assigned in a way such that they are contiguous, the ABRs can be configured to advertise a summary route that covers all the individual networks within the area that fall into the specified range.
Command Mode	Router Configuration
Syntax	area (A.B.C.D <0-4294967295>) range A.B.C.D/M area (A.B.C.D <0-4294967295>) range A.B.C.D/M advertise area (A.B.C.D <0-4294967295>) range A.B.C.D/M not-advertise no area (A.B.C.D <0-4294967295>) range A.B.C.D/M no area (A.B.C.D <0-4294967295>) range A.B.C.D/M (advertise not-advertise)
Parameters	A.B.C.D: OSPF Area ID in IPv4 address format. <0-4294967295>: OSPF Area ID as a decimal value. A.B.C.D/M: Area range prefix and length. advertise: Advertise this range. not-advertise: Do not advertise this range.
Example usage	switch_a(config-router)# area 1 range 192.16.0.0/24

area nssa	
Purpose	Set an area as a Not-So-Stubby-Area (NSSA). There are no external routes in an OSPF stub area, so you cannot redistribute from another protocol into a stub area. An NSSA allows external routes to be flooded within the area. These routes are then leaked into other areas. However, the external routes from other areas still do not enter the NSSA. You can configure an area to be a stub area or an NSSA, but not both. This command simplifies administration when connecting a central site using OSPF to a remote site that is using a different routing protocol. You can extend OSPF to cover the remote connection by defining the area between the central router and the remote router as a NSSA.
Command Mode	Router Configuration
Syntax	<pre>[no] area (A.B.C.D <0-4294967295>) nssa area (A.B.C.D <0-4294967295>) nssa (translate-candidate translate-always) area (A.B.C.D <0-4294967295>) nssa {translator-role (candidate always) stability-interval <0-2147483647> no-redistribution default-information-originate (metric <0-16777214> metric-type <1-2> metric <0-16777214> metric-type <1-2> metric-type <1-2> metric <0-16777214>) no-summary} no area (A.B.C.D <0-4294967295>) nssa {translator-role no-redistribution default-information-originate no-summary}</pre>
Parameters	A.B.C.D: OSPF Area ID in IPv4 address format. <0-4294967295>: OSPF Area ID as a decimal value. translator-role: NSSA-ABR translator role candidate: Translate NSSA-LSA to Type-5 LSA if router is elected. always: Always translate NSSA-LSA to Type-5 LSA. stability-interval: Stability timer for a NSSA area. If an elected translator determines its services are no longer required, it continues to perform its duties for this time interval. This minimizes excess flushing of translated Type-7 LSAs and provides a more stable translator transition. <0-2147483647>: Stability interval in seconds. no-redistribution: Do not redistribute into the NSSA. default-information-originate: Originate Type-7 default LSA into the NSSA. metric: Set metric for default routes. <0-16777214>: Metric value.
Example usage	<pre>switch_a(config-router)# area 3 nssa translator-role candidate noredistribution default-information-originate metric 34 metric-type 2</pre>

area shortcut	
Purpose	Configure the short-cutting mode of an area. An area shortcut enables traffic to go through the non-backbone area with a lower metric whether or not an ABR router is attached to the backbone area.
Command Mode	Router Configuration
Syntax	area (A.B.C.D <0-4294967295>) shortcut (default enable disable) no area (A.B.C.D <0-4294967295>) shortcut no area (A.B.C.D <0-4294967295>) shortcut (enable disable)
Parameters	A.B.C.D : OSPF Area ID in IPv4 address format. <0-4294967295> : OSPF Area ID as a decimal value. default : Sets default short-cutting behavior. enable : Forces short-cutting through the area. disable : Disables short-cutting through the area.
Example usage	<code>switch_a(config-router)# area 1 shortcut default</code>

area stub	
Purpose	Define an area as a stub area. There are two stub area router configuration commands: the stub and default-cost commands. In all routers attached to the stub area, configure the area by using the stub option of the area command. For an area border router (ABR) attached to the stub area, use the area default-cost command. Use the no-summary parameter with this command to define a totally stubby area. Define an area as a totally stubby area when routers in the area do not need to learn about summary LSAs from other areas.
Command Mode	Router Configuration
Syntax	area (A.B.C.D <0-4294967295>) stub area (A.B.C.D <0-4294967295>) stub no-summary no area (A.B.C.D <0-4294967295>) stub no area (A.B.C.D <0-4294967295>) stub no-summary
Parameters	A.B.C.D : OSPF Area ID in IPv4 address format. <0-4294967295> : OSPF Area ID as a decimal value. no-summary : Stops an ABR from sending summary link advertisements into the stub area.
Example usage	<code>switch_a(config-router)# area 1 stub no-summary</code>

area virtual-link	
Purpose	Configure a link between two backbone areas that are physically separated through other nonbackbone area. Configure the hello-interval to be the same for all routers attached to a common network. A short hello-interval results in the router detecting topological changes faster but also increases routing traffic. The retransmit-interval is the expected round-trip delay between any two routers in a network. Set the value to be greater than the expected round-trip delay to avoid needless retransmissions. The transmit-delay is the time taken to transmit a link state update packet on the interface.
Command Mode	Router Configuration
Syntax	<pre>[no] area (A.B.C.D <0-4294967295>) virtual-link A.B.C.D area (A.B.C.D <0-4294967295>) virtual-link A.B.C.D {authentication (messagedigest null) authentication-key LINE message-digest-key <1-255> md5 LINE deadinterval <1-65535> hello-interval <1-65535> retransmit-interval <1-3600> transmit-delay <1-3600>} [no] area (A.B.C.D <0-4294967295>) virtual-link A.B.C.D {fall-over} no area (A.B.C.D <0-4294967295>) virtual-link A.B.C.D {dead-interval hellointerval retransmit-interval transmit-delay authentication authenticationkey message-digest-key <1-255>}</pre>
Parameters	A.B.C.D: OSPF Area ID in IPv4 address format. <0-4294967295>: OSPF Area ID as a decimal value. A.B.C.D: IP address of the virtual link neighbor. message-digest: Cryptographic authentication. null: Null authentication. authentication-key: Set authentication key. LINE: Authentication key ID of 8 characters. <1-255>: Message digest key. md5: Set the MD5 key - LINE: MD5 key. dead-interval: Interval during which no packets are received and after which the router acknowledges a neighboring router as off-line. <1-65535>: The interval in seconds. Default is 40. hello-interval: Interval the router waits before it sends hello packet. <1-65535> in seconds. Default is 10 seconds. retransmit-interval: Interval router waits before it retransmits a packet. <1-3600> in seconds. Default is 5 seconds. transmit-delay: Interval router waits before it transmits a packet. <1-3600> in seconds. Default is 1 second. fall-over: Specify fall-over detection.
Example usage	<pre>switch_a(config-router)# area 1 virtual-link 10.10.11.50 hello 5 dead 10</pre>

auto-cost reference bandwidth	
Purpose	Control how OSPF calculates the default metric for the interface. By default, OSPF calculates the OSPF metric for an interface by dividing the reference bandwidth by the interface bandwidth. The default value for the reference bandwidth is 100Mbps. The auto-cost command is used to differentiate high bandwidth links. For multiple links with high bandwidth, specify a larger reference bandwidth value to differentiate cost on those links.
Command Mode	Router Configuration
Syntax	auto-cost reference-bandwidth <1-4294967> no auto-cost reference-bandwidth
Parameters	<1-4294967>: Reference bandwidth in Mbps. Default is 100 Mbps.
Example usage	<pre>switch_a(config-router)# auto-cost reference-bandwidth 50</pre>

capability opaque	
Purpose	Enable opaque-LSAs which are Type 9, 10 and 11 LSAs that deliver information used by external applications.
Command Mode	Router Configuration
Syntax	[no] capability opaque
Parameters	None
Example usage	<pre>switch_a(config-router)# compatibility opaque</pre>

capability restart	
Purpose	Enable OSPF graceful restart or restart signaling. If a router is not restart-enabled, it cannot enter graceful restart mode and act as a helper.
Command Mode	Router Configuration
Syntax	capability restart (graceful signaling) no capability restart
Parameters	None
Example usage	<pre>switch_a(config-router)# capability restart graceful</pre>

compatible rfc1583

Purpose	Restore the method used to calculate summary route costs per RFC. RFC 1583 specifies a method for calculating the metrics for summary routes based on the minimum metric of the component paths available. RFC 2328 specifies a method for calculating metrics based on maximum cost. With this change, it is possible that all of the ABRs in an area might not be upgraded to the new code at the same time. This command addresses this issue and allows the selective disabling of RFC 2328 compatibility.
Command Mode	Router Configuration
Syntax	[no] compatible rfc1583
Parameters	None
Example usage	<code>switch_a(config-router)# compatible rfc1583</code>

default-information originate

Purpose	Create a default external route into an OSPF routing domain. The system acts like an Autonomous System Boundary Router (ASBR) when you use the default-information originate command to redistribute routes into an OSPF routing domain. An ASBR does not by default generate a default route into the OSPF routing domain. When you give the default-information originate command, also specify a route-map to avoid a dependency on the default network in the routing table.
Command Mode	Router Configuration
Syntax	<code>default-information originate</code> <code>default-information originate {metric <0-16777214> metric-type (1 </code>

	2) {route-map WORD always} no default-information originate no default-information originate {metric metric-type {route-map always}}
Parameters	always: Used to advertise the default route regardless of whether there is a default route. metric: Sets the OSPF metric used in creating the default route. <0-16777214>: Sets the OSPF metric used in creating the default route. Default metric value is 10. metric-type: The external link type associated with the default route advertised into the OSPF routing domain (see RFC 3101). 1: Sets OSPF External Type 1 metric. 2: Sets OSPF External Type 2 metric (default). route-map: Route map. WORD: Name of route map.
Example usage	switch_a(config-router)# default-information originate always metric 23 metric-type 2 route-map myinfo

default-metric	
Purpose	Set a default metric for OSPF. A default metric facilitates redistributing routes with incompatible metrics. If the metrics do not convert, the default metric provides an alternative. Use this command to use the same metric value for all redistributed routes. Use this command in conjunction with redistribute .
Command Mode	Router Configuration
Syntax	default-metric <1-16777214> no default-metric
Parameters	<1-16777214>: Metric value
Example usage	switch_a(config-router)# default-metric 100
distance	
Purpose	Set OSPF administrative distances. The administrative distance rates the trustworthiness of a routing information source. A higher distance value means a lower trust rating. Use the no form to restore the default value (110).
Command Mode	Router Configuration
Syntax	[no] distance <1-255> [no] distance <1-255> A.B.C.D/M (WORD) distance ospf {intra-area <1-255> inter-area <1-255> external <1-255>} no distance ospf
Parameters	<1-255>: Default administrative distance to be used.

	intra-area: Routes within an area, <1-255>: Distance for all routes within an area inter-area: Routes from one area to another area. <1-255>: Distance for all routes from one area to another area. external: Routes from other domains learned by redistribution. <1-255>: Distance from other domains learned by redistribution. A.B.C.D/M: Distance for routes to prefixes whose nexthop matches this address. WORD: Name of access list to apply to route updates.
Example usage	<pre>switch_a(config-router)# distance ospf inter-area 20 intra-area 10 external 40</pre>

distribute-list	
Purpose	Filter networks in routing updates. This command redistributes other routing protocols into the OSPF routing table.
Command Mode	Router Configuration
Syntax	<pre>[no] distribute-list WORD out (kernel connected static rip bgp isis ospf (<1-65535>)) [no] distribute-list WORD in</pre>
Parameters	WORD: Name of the access list. in, out: Filter incoming and outgoing routing updates. kernel: Specify kernel routes. connected: Specify connected routes. <1-65535>: OSPF process ID. If not specified, this command redistributes all running OSPF processes.
Example usage	<pre>switch_a(config)#access-list list1 permit 172.10.0.0/16 switch_a(config)#router ospf 100 switch_a(config-router)#distribute-list list1 out bgp</pre>

enable db-summary-opt	
Purpose	Enable the database summary list optimization for OSPFv2. When enabled, the database exchange process is optimized by removing the LSA from the database summary list for the neighbor, if the LSA instance in database summary list is the same as or less recent than the listed LSA in the database description packet received from the neighbor.
Command Mode	Router Configuration
Syntax	<pre>[no] enable db-summary-opt</pre>
Parameters	None

Example usage	<code>switch_a(config-router)# enable db-summary-opt</code>
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host area	
Purpose	Configure a stub host entry belonging to a particular area. Using this command, you can advertise specific host routes in the router-LSA as stub link. Since stub host belongs to the specified router, specifying cost is not important.
Command Mode	Router Configuration
Syntax	<pre>host A.B.C.D area (A.B.C.D <0-4294967295>) host A.B.C.D area (A.B.C.D <0-4294967295>) cost <0-65535> no host A.B.C.D area (A.B.C.D <0-4294967295>) no host A.B.C.D area (A.B.C.D <0-4294967295>) cost (<0-65535>)</pre>
Parameters	A.B.C.D: IP address of the host. area: Set the OSPF area ID A.B.C.D: OSPF Area ID in IPv4 address format. <0-4294967295>: OSPF Area ID as a decimal value. cost: Specify cost for stub host entry. <0-65535>: Cost for stub host entry.
Example usage	<pre>switch_a(config-router)# host 172.16.10.101 area 2 cost 10</pre>

max-concurrent-dd	
Purpose	Limit the number of Database Descriptors (DD) that can be processed concurrently. This command limits the maximum number of DD exchanges that can occur concurrently per OSPF instance, thus allowing for all of the adjacencies to come up.
Command Mode	Router Configuration
Syntax	<pre>max-concurrent-dd <1-65535> no max-concurrent-dd</pre>
Parameters	<1-65535>: Number of DD processes.
Example usage	<code>switch_a(config-router)# max-concurrent-dd 4</code>

maximum-area	
Purpose	Configure the maximum number of OSPF areas.
Command Mode	Router Configuration
Syntax	maximum-area <1-4294967294> no maximum-area
Parameters	<1-4294967294> : Maximum number of OSPF areas.
Example usage	switch_a(config-router)# maximum-area 5000

neighbor	
Purpose	Configure OSPF routers interconnecting to NBMA (Non-Broadcast Multi-Access) networks. Include one neighbor entry for each known non-broadcast network neighbor. Configure the neighbor address on the primary address of the interface.
Command Mode	Router Configuration
Syntax	[no] neighbor A.B.C.D [no] neighbor A.B.C.D (priority <0-255> poll-interval <1-2147483647> cost <1-65535>) [no] neighbor A.B.C.D (cost <1-65535>)
Parameters	priority : Router priority of the non-broadcast neighbor associated with the specified IP address - <0-255>, default is 0. poll-interval : Rate at which routers send hello packets when neighboring router inactive, <1-2147483647> in seconds. Set this value much larger than hello interval. Default is 120. cost : Link-state metric to this neighbor, <1-65535>.
Example usage	switch_a(config-router)# neighbor 1.2.3.4 priority 1 poll-interval 90

network	
Purpose	Enable OSPF routing with a specified area ID (and optionally an instance ID) on interfaces with IP addresses that match the specified network address. OSPF routing is enabled per IPv4 subnet basis. You define the network address using the prefix length or a subnet mask. Use the no parameter with this command to disable OSPF routing on the interfaces.
Command Mode	Router Configuration
Syntax	Network address defined using the prefix length: network A.B.C.D/M area (A.B.C.D <0-4294967295>) (instance-id <0-255>)

	no network A.B.C.D/M area (A.B.C.D <0-4294967295>) (instance-id <0-255>) Network address defined using subnet mask: network A.B.C.D A.B.C.D area (A.B.C.D <0-4294967295>) (instance-id <0-255>) no network A.B.C.D A.B.C.D area (A.B.C.D <0-4294967295>) (instance-id <0-255>)
Parameters	A.B.C.D/M: IPv4 network address with prefix length. A.B.C.D: IPv4 network address. A.B.C.D: Subnet mask where the bits on left side are set to 1 to represent the network part and the bits on the right side are set to 0 to represent the host part. area: Set the OSPF area ID A.B.C.D: OSPF area ID in IPv4 address format. <0-4294967295>: OSPF area ID as a decimal value. instance-id: Instance ID. <0-255>: Instance ID. The default is 0.
Example usage	<pre>switch_a(config-router)# network 10.0.0.0/8 area 1.1.1.1</pre>

ospf abr-type

Purpose

Set an OSPF Area Border Router (ABR) type.

Use the no parameter to revert the ABR type to the default setting (Cisco).

Specifying the ABR type allows better functioning in a multi-vendor environment. The ABR types are:

- Cisco (RFC 3509): A router is considered an ABR if it has more than one area actively attached and one of them is the backbone area.
- IBM (RFC 3509): A router is considered an ABR if it has more than one area actively attached and the backbone area is configured. In this case the configured backbone need not be actively connected.
- Standard (RFC 2328): A router is considered an ABR if it has more

	than one area actively attached to it. • Shortcut (draft-ietf-ospf-shortcut-abr-02): This improves the standard ABR by modifying the calculation of interarea routes which are installed in non-backbone areas if the non-backbone path is better, thus providing a “shortcut” through these areas. To prevent routing loops, the inter-area routes are re-advertised only if they are associated with the backbone area.
Command Mode	Router Configuration
Syntax	ospf abr-type (cisco ibm standard shortcut) no ospf abr-type (cisco ibm standard shortcut)
Parameters	cisco: Alternative ABR using Cisco implementation. This is the default ABR type. ibm: SAlternative ABR using IBM implementation. standard: Standard ABR. shortcut: Shortcut ABR.
Example usage	switch_a(config-router)# ospf abr-type ibm

ospf flood-reduction

Purpose	Enable/disable flood reduction, which reduces unnecessary refreshing and flooding of already known and unchanged information.
Command Mode	Router Configuration
Syntax	[no] ospf flood-reduction
Parameters	None
Example usage	switch_a(config-router)# ospf flood-reduction

ospf router-id

Purpose	Specify a router ID for the OSPF process. Configure each router with a unique router ID. In an OSPF router process which has active neighbors, a new router ID is used at the next reload or when you start the OSPF manually. Use the no parameter to force OSPF to use the previous router ID.
Command Mode	Router Configuration
Syntax	[no] ospf router-id A.B.C.D
Parameters	A.B.C.D : The router ID in IPv4 address format.
Example usage	switch_a(config-router)# ospf router-id 2.3.4.5

overflow database	
Purpose	Limit the maximum number of LSAs that can be supported by the OSPF instance. Use no parameter for an unlimited number of LSAs.
Command Mode	Router Configuration
Syntax	overflow database <0-4294967294> (hard soft) no overflow database
Parameters	<0-4294967294> : Maximum number of LSAs hard : Shutdown occurs if the number of LSAs exceeds the specified value. soft : Warning message appears if the number of LSAs exceeds the specified value.
Example usage	switch_a(config-router)# overflow database 100 hard

overflow database external	
Purpose	Limit the number of AS-external-LSAs a router can receive once it is in the wait state.
Command Mode	Router Configuration
Syntax	overflow database external <0-2147483647> <0-65535> no overflow database external
Parameters	<0-2147483647> : Maximum number of LSAs. This value should be the same on all routers in the AS. <0-65535> : Number of seconds the router waits before trying to exit the database overflow state. If this parameter is 0, the router exits the overflow state only after an explicit administrator command.
Example usage	switch_a(config-router)# overflow database external 5 30

passive-interface	
Purpose	Suppress sending Hello packets on all interfaces or on a specified interface. This command configures OSPF on simplex Ethernet interfaces. Since a simplex interface represents only one network segment between two devices, configure the transmitting interface as a passive interface. This ensures that OSPF does not send hello packets for the transmitting interface. Both the devices can see each other via the hello packet generated for the receiving interface.
Command Mode	Router Configuration
Syntax	[no] passive-interface IFNAME [no] passive-interface (IFNAME A.B.C.D)
Parameters	IFNAME : The name of the interface. A.B.C.D : IP address of the interface.

Example usage	<code>switch_a(config-router)# passive-interface ge10</code>
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redistribute	
Purpose	Redistribute routes from a routing protocol, static route, and kernel route into an OSPF routing table.
Command Mode	Router Configuration
Syntax	<code>redistribute (kernel connected static rip bgp isis ospf (<1-65535>)) {metric <0-16777214> metric-type (1 2) route-map WORD tag <0-4294967295>}</code> <code>no redistribute (kernel connected static rip bgp isis ospf (<1-65535>)) {metric metric-type route-map tag}</code>
Parameters	kernel : Kernel routes. connected : Connected routes. ospf : OSPF instance to redistribute a particular OSPF instance into another OSPF instance. <1-65535> : OSPF process ID metric : Specify the external metric, <0-16777214> metric-type : External metric-type 1 : OSPF External Type 1 metrics. 2 : OSPF External Type 2 metrics. route-map : Specify a route map reference. WORD : Name of the route-map. tag : Tag value to use as a “match” value for controlling redistribution via route maps <0-4294967295> : Route tag.
Example usage	<code>switch_a(config-router)# redistribute bgp metric 12</code>

router-id	
Purpose	Specify a router ID for the OSPFv3 process. Configure each router with a unique router-id. In an OSPFv3 router process that has active neighbors, a new router-id is used at the next reload or when you start the OSPFv3 manually. Use the no form to force OSPFv3 to stop routing functionality
Command Mode	Router Configuration
Syntax	<code>router-id A.B.C.D</code> <code>no router-id (A.B.C.D)</code>
Parameters	A.B.C.D : The router ID in IPv4 address format.
Example usage	<code>switch_a(config-router)# router-id 32.53.4.5</code>

summary-address	
Purpose	Summarize or suppress external routes with the specified address range. An address range is a pairing of a starting address and a mask that is almost the same as IP network number. Redistributing routes from other protocols into OSPF requires the router to advertise each route individually in an external LSA. Use this command to advertise one summary route for all redistributed routes covered by a specified network address and mask. This minimizes the size of the OSPF link state database.
Command Mode	Router Configuration
Syntax	<pre>summary-address X:X::X:X/M (not-advertise tag <0-4294967295>) summary-address A.B.C.D/M (not-advertise tag <0-4294967295>) no summary-address X:X::X:X/M no summary-address A.B.C.D/M no summary-address X:X::X:X/M (not-advertise tag (<0-4294967295>)) no summary-address A.B.C.D/M (not-advertise tag (<0-4294967295>))</pre>
Parameters	X:X::X:X/M: The range of addresses given as IPv6 starting address and a mask. A.B.C.D/M: The range of addresses given as IPv4 starting address and a mask. not-advertise: Suppress routes that match the range. tag: Tag value to use as a “match” value for controlling redistribution via route maps. <0-4294967295>: Tag value. The default is 0.
Example usage	<pre>switch_a(config-router)# summary-address 10.10.10.0/24 not-advertise</pre>
timers lsa arrival	
Purpose	Set the minimum interval to accept the same link-state advertisement (LSA) from OSPF neighbors. Use the no form to restore the default value (1000 milliseconds).
Command Mode	Router Configuration
Syntax	<pre>timers lsa arrival <0-600000> no timers lsa arrival</pre>
Parameters	<0-600000>: Minimum delay in milliseconds between accepting the same LSA from neighbors.
Example usage	<pre>switch_a(config-router)# timers lsa arrival 10000</pre>

timers throttle lsa	
Purpose	Sets the rate-limiting intervals for OSPF link-state advertisement (LSA) generation. Use the no form to restore default values.
Command Mode	Router Configuration
Syntax	timers throttle lsa all <0-600000> <1-600000> <1-600000> no timers throttle lsa all
Parameters	<0-600000>: Start interval - The minimum delay in milliseconds for the generation of LSAs. The first instance of LSA is always generated immediately upon a local OSPF topology change. The generation of the next LSA is not before the start interval. <0-600000>: Hold interval - The hold time in milliseconds. This value is used to calculate the subsequent rate limiting times for LSA generation. <0-600000>: Maximum interval - The maximum wait time in milliseconds between generation of the same LSA.
Example usage	switch_a(config-router)# timers throttle lsa all 200 10000 45000
Note	Default values: Start interval: 0 milliseconds Hold interval: 5000 milliseconds Maximum interval: 5000 milliseconds

timers spf	
Purpose	Adjust route-calculation timers. This command configures the delay time between the receipt of a topology change and the calculation of the Shortest Path First (SPF). This command also configures the hold time between two consecutive SPF calculations.
Command Mode	Router Configuration
Syntax	timers spf exp <0-2147483647> <0-2147483647> no timers spf exp
Parameters	<0-2147483647>: Minimum delay between receiving a change to SPF calculation (in milliseconds). <0-2147483647>: Maximum delay between receiving a change to SPF calculation (in milliseconds).
Example usage	switch_a(config-router)# timers spf exp 10000 25000

OSPF Interface Commands

ip ospf authentication	
Purpose	Send and receive OSPF packets with the specified authentication method on the current interface.
Command Mode	Interface Configuration
Syntax	ip ospf authentication (null message-digest) ip ospf A.B.C.D authentication (null message-digest) no ip ospf (A.B.C.D) authentication
Parameters	A.B.C.D: The IP address of the interface. null: Use no authentication. message-digest: Message digest authentication.
Example usage	switch_a(config-if)# ip ospf authentication null

ip ospf authentication-key	
Purpose	Specify an OSPF authentication password for neighboring routers. This command creates a password (key) that is inserted into the OSPF header when the switch software originates packets. Assign a separate password to each network for different interfaces. All neighboring routers on the same network with the same password exchange OSPF routing data. The key can be used only when authentication is enabled for an area with the area authentication command. Simple password authentication allows a password to be configured for each area. Configure the routers in the same routing domain with the same password.
Command Mode	Interface Configuration
Syntax	ip ospf (A.B.C.D) authentication-key LINE no ip ospf (A.B.C.D) authentication-key
Parameters	A.B.C.D: The IP address of the interface. LINE: Authentication password.

Example usage	Create an authentication key testkey on interface ge24 in area 0.
	<pre> switch_a#configure terminal switch_a(config)#router ospf 100 switch_a(config-router)#network 10.10.10.0/24 area 0 switch_a(config-router)#area 0 authentication switch_a(config-router)#exit switch_a(config)#interface ge24 switch_a(config-if)#ip ospf 12.10.10.2 authentication-key testkey </pre>

ip ospf cost

Purpose	Specify the cost of the link-state metric in a router-LSA. The interface cost indicates the overhead required to send packets across an interface. This cost is stated in the Router-LSA's link. The cost is inversely proportional to the bandwidth of an interface. By default, the cost of an interface is calculated based on the bandwidth (108/ bandwidth). Use this command to set the cost manually. Use the no parameter to reset the cost to its default value.
Command Mode	Interface Configuration
Syntax	<pre> ip ospf (A.B.C.D) cost <1-65535> no ip ospf (A.B.C.D) cost </pre>
Parameters	<1-65535>: The link-state metric. Default value is 10.
Example usage	<pre> switch_a(config-if)# ip ospf 10.10.12.12 cost 200 </pre>

ip ospf database-filter

Purpose	Turn on the LSA database-filter for a particular interface. By default, OSPF floods new LSAs over all interfaces in an area, except the interface on which the LSA was received. Too much flooding wastes bandwidth and can lead to excessive link and CPU usage in certain topologies. To avoid this, you can block flooding of LSAs over specified interfaces.
Command Mode	Interface Configuration
Syntax	<pre> ip ospf (A.B.C.D) database-filter all out no ip ospf (A.B.C.D) database-filter </pre>
Parameters	A.B.C.D : IP address of the interface.
Example usage	<pre> switch_a(config-if)# ip ospf database-filter all out </pre>

ip ospf dead-interval

Purpose	Set the interval during which the router waits to receive an OSPF hello packet from the neighbor before declaring the neighbor down. This value is advertised in the router's hello packets. This value must be a multiple of hello-interval and be the same for all routers on the network.
Command Mode	Interface Configuration
Syntax	[no] ip ospf (A.B.C.D) dead-interval <1-65535>
Parameters	<1-65535> : Interval in seconds. Default is 40 seconds.
Example usage	switch_a(config-if)# ip ospf dead-interval 100

ip ospf disable

Purpose	Disable OSPF packet processing on an interface. This command overrides the network area command.
Command Mode	Interface Configuration
Syntax	ip ospf disable all no ip ospf disable all
Parameters	None
Example usage	switch_a(config-if)# ip ospf disable all

ip ospf flood-reduction

Purpose	Enable/disable flood reduction on an interface. This reduces unnecessary refreshing and flooding of known and unchanged information.
Command Mode	Interface Configuration
Syntax	[no] ip ospf flood-reduction
Parameters	None
Example usage	switch_a(config-if)# ip ospf flood-reduction

ip ospf hello-interval

Purpose	Set the interval between hello packets. Configure the same hello-interval for all routers on a network. A shorter hello interval ensures faster detection of topological changes but results in more
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	routing traffic.
Command Mode	Interface Configuration
Syntax	ip ospf (A.B.C.D) hello-interval <1-65535> no ip ospf (A.B.C.D) hello-interval
Parameters	<1-65535> : Interval in seconds. Default is 10 seconds.
Example usage	switch_a(config-if)# ip ospf hello-interval 10

ip ospf message-digest-key

Purpose	Register an MD5 key for OSPF authentication. Use the no parameter to remove an MD5 key. Message Digest Authentication is cryptographic authentication. A key (password) and key-id are configured on each router. The router uses an algorithm based on the OSPF packet, the key, and the key-id to generate a message digest that is appended to the packet. Use this command for uninterrupted transitions between passwords. This is helpful for administrators who want to change the OSPF password without disrupting communication. The system begins a rollover process until all the neighbors have adopted the new password. This allows neighboring routers to continue communication while they are being updated with the new password. The router will stop sending duplicate packets once it detects that all neighbors have adopted the new password. Maintain only one password per interface, removing the old password when you add a new one. This prevents the local system from continuing to communicate with the system that is using the old password. Removing the old password also reduces overhead during rollover. All neighboring routers on the same network must have the same password value to enable exchange of OSPF routing data.
Command Mode	Interface Configuration
Syntax	ip ospf (A.B.C.D) message-digest-key <1-255> md5 LINE no ip ospf (A.B.C.D) message-digest-key <1-255>
Parameters	A.B.C.D: IPv4 address of the interface. message-digest-key: Specify a key ID. <1-255>: Key ID. md5: Specify a key (password). LINE: The OSPF password (1-16 characters).

Example usage	<pre>switch_a(config-if)#ip ospf authentication message-digest switch_a(config-if)#ip ospf message-digest-key 1 md5 passwordsample</pre>
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ip ospf mtu

Purpose	Set MTU size for OSPF to construct packets based on this value. Whenever OSPF constructs packets, it uses interface MTU size as Maximum IP packet size. This command forces OSPF to use the specified value overriding the actual interface MTU size. This command does not configure the MTU settings in the kernel. OSPF does not recognize MTU size changes made in the kernel until the MTU size is updated through this command.
Command Mode	Interface Configuration
Syntax	<pre>ip ospf mtu <576-65535> no ip ospf mtu</pre>
Parameters	<576-65535> : MTU size.
Example usage	<pre>switch_a(config-if)# ip ospf mtu 10000</pre>

ip ospf mtu-ignore

Purpose	Configure OSPF so that it does not check the MTU size during DD (Database Description) exchange.
Command Mode	Interface Configuration
Syntax	<pre>ip ospf (A.B.C.D) mtu-ignore no ip ospf (A.B.C.D) mtu-ignore</pre>
Parameters	A.B.C.D : IP address of the interface.
Example usage	<pre>switch_a(config-if)# ip ospf mtu-ignore</pre>

ip ospf network

Purpose	Set the OSPF network type. Use the no parameter to return to the default value (Broadcast).
Command Mode	Interface Configuration
Syntax	ip ospf network (broadcast non-broadcast point-to-multipoint point-to-point) ip ospf network point-to-multipoint non-broadcast no ip ospf network
Parameters	broadcast: Set the network type to broadcast. non-broadcast: Set the network type to NBMA. point-to-multipoint: Set the network type to point-to-multipoint. point-to-point: Set the network type to point-to-point.
Example usage	switch_a(config-if) # ip ospf network point-to-point

ip ospf priority

Purpose	Set the router priority to determine the designated router (DR) for the network. A router with the higher router priority becomes the DR. If the priority is the same for two routers, the router with the higher router ID takes precedence. The default priority is 1.
Command Mode	Interface Configuration
Syntax	ip ospf (A.B.C.D) priority <0-255> no ip ospf (A.B.C.D) priority
Parameters	A.B.C.D: IP address of the interface. priority: Specify the router priority of the interface. <0-255>: Router priority of the interface.
Example usage	switch_a(config-if) # ip ospf priority 20

ip ospf resync-timeout

Purpose	Set the interval after which adjacency is reset if out-of-band re-synchronization has not occurred. The interval period starts from the time a restart signal is received from a neighbor.
Command Mode	Interface Configuration
Syntax	ip ospf (A.B.C.D) resync-timeout <1-65535> no ip ospf (A.B.C.D) resync-timeout
Parameters	A.B.C.D: IP address of the interface. <1-65535>: The re-synchronization timeout value of the interface in seconds.
Example usage	switch_a(config-if) # ip ospf resync-timeout 65

ip ospf retransmit-interval

Purpose	Specify the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface.
Command Mode	Interface Configuration
Syntax	ip ospf (A.B.C.D) retransmit-interval <5-65535> no ip ospf (A.B.C.D) retransmit-interval
Parameters	A.B.C.D : IP address of the interface. <5-65535> : Interval in seconds. Default is 5 seconds.
Example usage	switch_a(config-if)# ip ospf retransmit-interval 20

ip ospf transmit-delay

Purpose	Set the estimated time it takes to transmit a link-state-update packet on the interface. The transmit delay value adds a specified time to the age field of an update. If the delay is not added, the time in which the LSA transmits over the link is not considered. This command is especially useful for low speed links. Add transmission and propagation delays when setting the transmit delay value. Use the no parameter to return to the default value 1 second).
Command Mode	Interface Configuration
Syntax	ip ospf (A.B.C.D) transmit-delay <1-65535> no ip ospf (A.B.C.D) transmit-delay
Parameters	A.B.C.D : IP address of the interface. <1-65535> : Time in seconds to transmit a link-state update
Example usage	switch_a(config-if)# ip ospf transmit-delay 5

OSPFv3 Information

show ip ospf	
Purpose	Display OSPFv3 information, border and boundary router Information, details and summary of the OSPFv3 database, interfaces, and multi-area adjacencies. View neighbor list, OSPFv3 routing table, and virtual link information.
Command Mode	Privileged exec
Syntax	<pre> show ipv6 ospf (word) show ipv6 ospf (word)border-routers show ipv6 ospf (word) database(self-originate max-age adv-router A.B.C.D) show ipv6 ospf (word) database (asbr-summary external network router summary nssa-external opaque-link opaque-area opaque-as) A.B.C.D (self-originate adv-router A.B.C.D) show ipv6 ospf interface (IFNAME) show ipv6 ospf (word) topology (area <0-4294967295 A.B.C.D>) show ipv6 ospf (word) {neighbor neighbor all neighbor interface A.B.C.D neighbor A.B.C.D neighbor A.B.C.D detail neighbor detail neighbor detail all} show ipv6 ospf (word) route (A.B.C.D A.B.C.D/M summary) show ipv6 ospf (word) virtual-links show ip protocols ospf </pre>
Parameters	WORD: Tag value to use as a “match” value for controlling redistribution via route maps. self-originate: Self-originated link states. max-age: LSAs which have reached the max-age (3600 seconds). adv-router: Advertising router link states. asbr-summary: Autonomous System Boundary Router (ASBR) summary LSAs. external: External LSAs. network: Network LSAs. router: Router LSAs. summary: LSA summary information. nssa-external: NSSA external LSAs. opaque-link: Type 9 LSAs which are not flooded beyond the local network. opaque-area: Type 10 LSAs which are not flooded beyond the borders of their area. opaque-as: Type 11 LSAs which are flooded throughout the Autonomous System (AS).
Example usage	switch_a# show ipv6 ospf

OSPFv3 Configuration

router ipv6 ospf	
Purpose	Initiate OSPFv3 routing process and enter Router mode to configure OSPFv3 routing process. For making the OSPFv3 routing process functional, you must specify OSPFv3 process tag in router mode and enable OSPFv3 on at least one interface. OSPFv3 is only enabled on interfaces where OSPFv3 process tag matches the tag specified using ipv6 router ospf area command in Interface mode.
Command Mode	Global Configuration
Syntax	router ipv6 ospf router ipv6 ospf WORD no router ipv6 ospf no router ipv6 ospf WORD
Parameters	WORD: Tag value to use as a “match” value for controlling redistribution via route maps.
Example usage	switch_a(config)# router ipv6 ospf IPI

area default-cost	
Purpose	Specify a cost for the default summary route sent into a stub or NSSA area. This command provides the metric for the summary default route, generated by the area border router, into the NSSA or stub area. Use this option only on an area border router that is attached to the NSSA (Not-so-stubby area) or stub area.
Command Mode	Router Configuration
Syntax	area (A.B.C.D <0-4294967295>) default-cost <0-16777215> no area (A.B.C.D <0-4294967295>) default-cost
Parameters	A.B.C.D: OSPF Area ID in IPv4 address format. <0-4294967295>: OSPF Area ID as a decimal value. default-cost: Indicates the cost for the default summary route used for a stub or NSSA area. <0-16777215>: Stub's advertised default summary cost. Default is 1.
Example usage	switch_a(config-router)# area 1 default-cost 10

area nssa	
Purpose	Set an area as a Not-So-Stubby-Area (NSSA). There are no external routes in an OSPF stub area, so you cannot redistribute from another protocol into a stub area. An NSSA allows external routes to be flooded within the area. These routes are then leaked into other areas. However, the external routes from other areas still do not enter the NSSA. You can configure an area to be a stub area or an NSSA, but not both. This command simplifies administration when connecting a central site using OSPF to a remote site that is using a different routing protocol. You can extend OSPF to cover the remote connection by defining the area between the central router and the remote router as a NSSA.
Command Mode	Router Configuration
Syntax	<pre>[no] area (A.B.C.D <0-4294967295>) nssa area (A.B.C.D <0-4294967295>) nssa (translate-candidate translate-always) area (A.B.C.D <0-4294967295>) nssa {translator-role (candidate always) stability-interval <0-2147483647> no-redistribution default-information-originate (metric <0-16777214> metric-type <1-2> metric <0-16777214> metric-type <1-2> metric-type <1-2> metric <0-16777214>) no-summary} no area (A.B.C.D <0-4294967295>) nssa {translator-role no-redistribution default-information-originate no-summary}</pre>
Parameters	A.B.C.D: OSPF Area ID in IPv4 address format. <0-4294967295>: OSPF Area ID as a decimal value. translator-role: NSSA-ABR translator role candidate: Translate NSSA-LSA to Type-5 LSA if router is elected. always: Always translate NSSA-LSA to Type-5 LSA. stability-interval: Stability timer for a NSSA area. If an elected translator determines its services are no longer required, it continues to perform its duties for this time interval. This minimizes excess flushing of translated Type-7 LSAs and provides a more stable translator transition. <0-2147483647>: Stability interval in seconds. no-redistribution: Do not redistribute into the NSSA. default-information-originate: Originate Type-7 default LSA into the NSSA. metric: Set metric for default routes. <0-16777214>: Metric value.
Example usage	<pre>switch_a(config-router)# area 3 nssa translator-role candidate noredistribution default-information-originate metric 34 metric-type 2</pre>

area range	
Purpose	Configure the OSPF address range. This command summarizes intra-area routes for an area. The single summary route is then advertised to other areas by the Area Border Routers (ABRs). Routing information is condensed at area boundaries and outside the area. If the network numbers in an area are assigned in a way such that they are contiguous, the ABRs can be configured to advertise a summary route that covers all the individual networks within the area that fall into the specified range.
Command Mode	Router Configuration
Syntax	<pre>area (A.B.C.D <0-4294967295>) range A.B.C.D/M area (A.B.C.D <0-4294967295>) range A.B.C.D/M advertise area (A.B.C.D <0-4294967295>) range A.B.C.D/M not-advertise no area (A.B.C.D <0-4294967295>) range A.B.C.D/M no area (A.B.C.D <0-4294967295>) range A.B.C.D/M (advertise not-advertise)</pre>
Parameters	A.B.C.D: OSPF Area ID in IPv4 address format. <0-4294967295>: OSPF Area ID as a decimal value. A.B.C.D/M: Area range prefix and length. advertise: Advertise this range. not-advertise: Do not advertise this range.
Example usage	<code>switch_a(config-router)# area 1 range 192.16.0.0/24</code>

area stub	
Purpose	Define an area as a stub area on all routers. There are two stub area router configuration commands: the stub and no-summary commands. In all routers attached to the stub area, configure the area by using the stub option of the area command. For an area border router (ABR) attached to the stub area, use the area command.
Command Mode	Router Configuration
Syntax	<pre>area (A.B.C.D <0-4294967295>) stub area (A.B.C.D <0-4294967295>) stub no-summary no area (A.B.C.D <0-4294967295>) stub no area (A.B.C.D <0-4294967295>) stub no-summary</pre>
Parameters	A.B.C.D: OSPF Area ID in IPv4 address format. <0-4294967295>: OSPF Area ID as a decimal value. no-summary: Stops an ABR from sending summary link advertisements into the stub area.
Example usage	<code>switch_a(config-router)# area 1 stub no-summary</code>

area virtual-link	
Purpose	Configure a link between two backbone areas that are physically separated through other nonbackbone areas. In OSPFv3, all non-backbone areas must be connected to a backbone area. If the connection to the backbone is lost, the virtual link repairs the connection. You can configure virtual links between any two backbone routers that have an interface to a common non-backbone area. The protocol treats these two routers joined by a virtual link as if they were connected by an unnumbered point-to-point network. Configure the hello-interval to be the same for all routers attached to a common network. If the hello-interval is short, the router detects topological changes faster, but more routing traffic follows. The retransmit-interval is the expected round-trip delay between any two routers in a network. Set the value to be greater than the expected round-trip delay to avoid needless retransmissions. The transmit-delay is the time taken to transmit a link state update packet on the interface. Before transmission, the link state advertisements in the update packet are increased by this amount. Set the transmit-delay to be greater than zero. Also, take into account the transmission and propagation delays for the interface.
Command Mode	Router Configuration
Syntax	<pre>[no] area (A.B.C.D <0-4294967295>) virtual-link A.B.C.D [no] area (A.B.C.D <0-4294967295>) virtual-link A.B.C.D (dead-interval hello-interval retransmit-interval transmit-delay) <1-65535> [no] area (A.B.C.D <0-4294967295>) virtual-link A.B.C.D instance-id <0-255></pre>
Parameters	A.B.C.D: OSPF Area ID in IP address format. <0-4294967295>: OSPF Area ID as a decimal value. A.B.C.D: Router ID associated with a virtual link neighbor. dead-interval: The interval in seconds during which no packets are received and after which the router acknowledges a neighboring router as off-line. The default is 40 seconds. hello-interval: The interval in seconds the router waits before it sends a hello packet. The default is 10 seconds. retransmit-interval: The interval in seconds the router waits before it retransmits a packet. The default is 5 seconds. transmit-delay: The interval in seconds the router waits before it transmits a packet. The default value is 1 second. <1-65535>: The timer interval. instance-id: The OSPFv3 instance. <0-255>: The OSPFv3 instance ID.
Example usage	<pre>switch_a(config-router)# area 1 virtual-link 10.10.11.50 hello 5 dead 10</pre>

auto-cost reference bandwidth	
Purpose	Control how OSPFv3 calculates the default metric for the interface. By default, OSPFv3 calculates the OSPFv3 metric for an interface by dividing the reference bandwidth by the interface bandwidth. The default value for the reference bandwidth is 100Mbps. The auto-cost command is used to differentiate high bandwidth links. For multiple links with high bandwidth, specify a larger reference bandwidth value to differentiate cost on those links.
Command Mode	Router Configuration
Syntax	[no] auto-cost reference-bandwidth <1-4294967>
Parameters	<1-4294967> : Reference bandwidth in Mbps. Default is 100 Mbps.
Example usage	<pre>switch_a(config-router)# auto-cost reference-bandwidth 1000</pre>

default-information originate	
Purpose	Create a default external route into an OSPF routing domain. The system acts like an Autonomous System Boundary Router (ASBR) when you use the default-information originate command to redistribute routes into an OSPF routing domain. An ASBR does not by default generate a default route into the OSPF routing domain. When you give the default-information originate command, also specify a route-map to avoid a dependency on the default network in the routing table.
Command Mode	Router Configuration
Syntax	<pre>[no] default-information originate default-information originate {metric <0-16777214> metric-type (1 2) {route-map WORD always} no default-information originate {metric metric-type {route-map always}}</pre>
Parameters	always: Used to advertise the default route regardless of whether there is a default route. metric: Sets the OSPF metric used in creating the default route. <0-16777214>: Sets the OSPF metric used in creating the default route. Default metric value is 10. metric-type: The external link type associated with the default route advertised into the OSPF routing domain (see RFC 3101). 1: Sets OSPF External Type 1 metric. 2: Sets OSPF External Type 2 metric (default). WORD: Name of route map.
Example usage	<pre>switch_a(config-router)# default-information originate always metric 23 metrictype 2 route-map myinfo</pre>

default-metric	
Purpose	Set a default metric for OSPF. A default metric facilitates redistributing routes with incompatible metrics. If the metrics do not convert, the default metric provides an alternative. Use this command to use the same metric value for all redistributed routes. Use this command in conjunction with redistribute .
Command Mode	Router Configuration
Syntax	default-metric <1-16777214> no default-metric
Parameters	<1-16777214> : Metric value
Example usage	switch_a(config-router)# default-metric 100

distance	
Purpose	Define OSPFv3 route administrative distances based on route type. This command sets the distance for an entire group of routes rather than a specific route that passes an access list. The administrative distance rates the trustworthiness of a routing information source. A higher distance value means a lower trust rating. For example, an administrative distance of 254 means that the routing information source cannot be trusted and should be ignored.
Command Mode	Router Configuration
Syntax	[no] distance <1-254> [no] distance <1-254> A.B.C.D/M (WORD) distance ospf {intra-area <1-254> inter-area <1-254> external <1-255>} no distance ospfv3
Parameters	<1-254> : Default administrative distance to be used. intra-area : Routes within an area, <1-254> : Distance for all routes within an area inter-area : Routes from one area to another area. <1-254> : Distance for all routes from one area to another area. external : Routes from other domains learned by redistribution. <1-254> : Distance from other domains learned by redistribution.
Example usage	switch_a(config-router)# distance ospf inter-area 20 intra-area 10 external 40

distribute-list	
Purpose	Filter networks in routing updates. This command redistributes other routing protocols into the OSPF routing table.
Command Mode	Router Configuration
Syntax	[no] distribute-list WORD out (connected static rip ospf (<1-65535> WORD)) [no] distribute-list WORD in
Parameters	WORD: Name of the access list. in, out: Filter incoming and outgoing routing updates. kernel: Specify kernel routes. connected: Specify connected routes. <1-65535>: OSPF process ID. If not specified, this command redistributes all running OSPF processes.
Example usage	switch_a(config)#access-list list1 permit 172.10.0.0/16 switch_a(config)#router ipv6 ospf 100 switch_a(config-router)#distribute-list list1 out rip

enable db-summary-opt	
Purpose	Enable the database summary list optimization for OSPFv3. When enabled, the database exchange process is optimized by removing the LSA from the database summary list for the neighbor, if the LSA instance in database summary list is the same as or less recent than the listed LSA in the database description packet received from the neighbor.
Command Mode	Router Configuration
Syntax	[no] enable db-summary-opt
Parameters	None
Example usage	switch_a(config-router)# enable db-summary-opt

max-concurrent-dd	
Purpose	Limit the number of Database Descriptors (DD) that can be processed concurrently. This command limits the maximum number of DD exchanges that can occur concurrently per OSPF instance, thus allowing for all of the adjacencies to come up.
Command Mode	Router Configuration
Syntax	max-concurrent-dd <1-65535> no max-concurrent-dd
Parameters	<1-65535> : Number of DD processes.
Example usage	switch_a(config-router)# max-concurrent-dd 4

abr-type	
Purpose	Set an OSPF Area Border Router (ABR) type. Use the no parameter to revert the ABR type to the default setting (Cisco). Specifying the ABR type allows better functioning in a multi-vendor environment. The ABR types are: • Cisco (RFC 3509): A router is considered an ABR if it has more than one area actively attached and one of them is the backbone area. • IBM (RFC 3509): A router is considered an ABR if it has more than one area actively attached and the backbone area is configured. In this case the configured backbone need not be actively connected. • Standard (RFC 2328): A router is considered an ABR if it has more than one area actively attached to it.
Command Mode	Router Configuration
Syntax	abr-type (cisco ibm standard) no abr-type (cisco ibm standard)
Parameters	cisco: Alternative ABR using Cisco implementation. This is the default ABR type. ibm: SAlternative ABR using IBM implementation. standard: Standard ABR.
Example usage	switch_a(config-router)# abr-type ibm

passive-interface	
Purpose	Suppress sending Hello packets on all interfaces or on a specified interface. This command configures OSPFv3 on simplex Ethernet interfaces. Since a simplex interface represents only one network segment between two devices, configure the transmitting interface as a passive interface. This ensures that OSPFv3 does not send hello packets for the transmitting interface. Both the devices can see each other via the hello packet generated for the receiving interface.
Command Mode	Router Configuration
Syntax	[no] passive-interface IFNAME
Parameters	IFNAME: The name of the interface.
Example usage	<code>switch_a(config-router)# passive-interface ge10</code>

redistribute	
Purpose	Import routes from other routing protocols, or from another OSPF instance, into OSPFv3 AS-external-LSAs. OSPFv3 advertises routes learned from other routing protocols or from other OSPF instances, including static or connected routes. Each injected prefix is put into the AS-external-LSA with a specified metric and metric-type.
Command Mode	Router Configuration
Syntax	<code>redistribute (connected static rip ospf (<1-65535>)) {metric <0-16777214> metric-type (1 2) route-map WORD tag <0-4294967295>}</code> <code>no redistribute (connected static rip ospf (<1-65535>)) {metric metric-type route-map tag}</code>
Parameters	connected: Connected routes. ospf: OSPF instance to redistribute a particular OSPF instance into another OSPF instance. <1-65535>: OSPF process ID metric: Specify the external metric, <0-16777214> metric-type: External metric-type 1: OSPF External Type 1 metrics. 2: OSPF External Type 2 metrics. route-map: Specify a route map reference. WORD: Name of the route-map. tag: Tag value to use as a “match” value for controlling redistribution via route maps <0-4294967295>: Route tag.
Example usage	<code>switch_a(config-router)# redistribute rip metric 12</code>

router-id	
Purpose	Specify a router ID for the OSPFv3 process. Configure each router with a unique router ID. In an OSPFv3 router process which has active neighbors, a new router ID is used at the next reload or when you start the OSPFv3 manually. Use the no parameter to force OSPF to use the previous router ID.
Command Mode	Router Configuration
Syntax	[no] router-id A.B.C.D
Parameters	A.B.C.D: The router ID in IPv4 address format.
Example usage	switch_a(config-router)# router-id 2.3.4.5

summary-address	
Purpose	Summarize or suppress external routes with the specified address range. An address range is a pairing of a starting address and a mask that is almost the same as IP network number. For example: • If the specified IPV6 address range is 2020:100:100:2000::/53, it matches 2020:100:100:2222::/64, 2020:100:100:2666::/64 and so on. • If the specified IPV4 address range is 192.168.0.0/255.255.240.0, it matches 192.168.1.0/24, 192.168.4.0/22, 192.168.8.128/25 and so on. Redistributing routes from other protocols into OSPF requires the router to advertise each route individually in an external LSA. Use this command to advertise one summary route for all redistributed routes covered by a specified network address and mask.
Command Mode	Router Configuration
Syntax	[no] summary-address X:X::X:X/M (not-advertise tag <0-4294967295>) [no] summary-address A.B.C.D/M (not-advertise tag <0-4294967295>)
Parameters	X:X::X:X/M: The range of addresses given as IPv6 starting address and a mask. A.B.C.D/M: The range of addresses given as IPv4 starting address and a mask. not-advertise: Suppress routes that match the range. tag: Tag value to use as a “match” value for controlling redistribution via route maps. <0-4294967295>: Tag value. The default is 0.
Example usage	switch_a(config-router)# summary-address 2020:100:100:2000::/53 tag 3

timers lsa arrival	
Purpose	Set the minimum interval to accept the same link-state advertisement (LSA) from OSPF neighbors. Use the no form to restore the default value (1000 milliseconds).
Command Mode	Router Configuration
Syntax	timers lsa arrival <0-600000> no timers lsa arrival
Parameters	<0-600000> : Minimum delay in milliseconds between accepting the same LSA from neighbors.
Example usage	switch_a(config-router)# timers lsa arrival 10000

timers spf	
Purpose	Adjust route-calculation timers. This command configures the delay time between the receipt of a topology change and the calculation of the Shortest Path First (SPF). This command also configures the hold time between two consecutive SPF calculations.
Command Mode	Router Configuration
Syntax	timers spf exp <0-2147483647> <0-2147483647> no timers spf exp
Parameters	<0-2147483647> : Minimum delay between receiving a change to SPF calculation (in milliseconds). <0-2147483647> : Maximum delay between receiving a change to SPF calculation (in milliseconds).
Example usage	switch_a(config-router)# timers spf exp 10000 25000

OSPFv3 Interface Commands

ipv6 router ospf	
Purpose	Enable OSPFv3 routing on an interface. Specify the process ID to configure multiple instances of OSPFv3. When running a single instance of OSPFv3, you do not need to specify a instance ID. When OSPFv3 receives a packet, it checks if the instance ID in the packet matches the instance ID of the receiving interface.
Command Mode	Interface Configuration
Syntax	[no] ipv6 router ospf area (A.B.C.D <0-4294967295>) [no] ipv6 router ospf area (A.B.C.D <0-4294967295>) instance-id <0-255> [no] ipv6 router ospf area (A.B.C.D <0-4294967295>) tag WORD [no] ipv6 router ospf area (A.B.C.D <0-4294967295>) tag WORD instance-id <0-255> [no] ipv6 router ospf tag WORD area (A.B.C.D <0-4294967295>) [no] ipv6 router ospf tag WORD area (A.B.C.D <0-4294967295>) instance-id <0-255>
Parameters	area: OSPF Area ID in IPv4 address format. A.B.C.D: OSPF area ID in IP address format. <0-4294967295>: OSPF area ID as a decimal value. instance-id: Instance. <0-255>: Instance ID. tag: Tag value to use as a “match” value for controlling redistribution via route maps. WORD: The tag value.
Example usage	switch_a(config-if)# ipv6 router ospf area 1 tag IPI instance-id 1

IPv6 ospf cost	
Purpose	Specify the link-cost described in LSAs. The cost (or metric) of an interface in OSPF indicates the overhead required to send packets across a certain interface. The value is taken to describe Link State information, and used for route calculation. Use the no parameter to reset the cost to its default value.
Command Mode	Interface Configuration
Syntax	<pre>ipv6 ospf cost <1-65535> ipv6 ospf cost <1-65535> instance-id <0-255> no ipv6 ospf cost no ipv6 ospf cost instance-id <0-255></pre>
Parameters	<1-65535>: The link-state metric. Default value is 10. <0-255>: Instance ID
Example usage	<code>switch_a(config-if)# ipv6 ospf cost 20 instance-id 1</code>

IPv6 ospf dead-interval	
Purpose	Set the amount of time that the router waits to receive an OSPF hello packet from the neighbor before declaring the neighbor down. The dead interval is advertised in hello packets. OSPF compares the dead interval in a received packet to the dead interval configured for the receiving interface. If the intervals do not match, the hello packet is discarded.
Command Mode	Interface Configuration
Syntax	<pre>ipv6 ospf dead-interval <1-65535> ipv6 ospf dead-interval <1-65535> instance-id <0-255> no ipv6 ospf dead-interval no ipv6 ospf dead-interval instance-id <0-255></pre>
Parameters	<1-65535>: Interval in seconds. Default is 40 seconds. <0-255>: Instance ID
Example usage	<code>switch_a(config-if)# ipv6 ospf dead-interval 100</code>

IPv6 OSPF hello-interval	
Purpose	Specify the interval between hello packets. The hello interval is advertised in the hello packets. An OSPF router compares the hello interval in a received packet to the interval configured for the receiving interface. If this interval does not match, the hello packet is discarded. A shorter hello interval ensures faster detection of topological changes, but results in more routing traffic.
Command Mode	Interface Configuration
Syntax	<pre> ipv6 ospf hello-interval <1-65535> ipv6 ospf hello-interval <1-65535> instance-id <0-255> no ipv6 ospf hello-interval no ipv6 ospf hello-interval instance-id <0-255> </pre>
Parameters	<1-65535> : Interval in seconds. Default is 10 seconds. <0-255> : Instance ID
Example usage	<code>switch_a(config-if)# ipv6 ospf hello-interval 100</code>

IPv6 OSPF mtu-ignore	
Purpose	Configure OSPFv3 so that it does not check the MTU size during DD (Database Description) exchange.
Command Mode	Interface Configuration
Syntax	<pre> ipv6 ospf mtu-ignore no ipv6 ospf mtu-ignore </pre>
Parameters	None
Example usage	<code>switch_a(config-if)# ipv6 ospf mtu-ignore</code>

IPv6 OSPF network	
Purpose	Set the OSPFv3 network type.
Command Mode	Interface Configuration
Syntax	<pre> ipv6 ospf network (broadcast non-broadcast point-to-multipoint point-to-point) ipv6 ospf network point-to-multipoint non-broadcast no ip ospf network </pre>
Parameters	broadcast : Set the network type to broadcast. non-broadcast : Set the network type to NBMA. point-to-multipoint : Set the network type to point-to-multipoint. point-to-point : Set the network type to point-to-point.
Example usage	<code>switch_a(config-if)# ipv6 ospf network point-to-point</code>

Ipv6 ospf priority	
Purpose	Set the router priority for determining the designated router (DR) for the network. A router with the higher router priority becomes the DR. If the priority is the same for two routers, the router with the higher router ID takes precedence. Only routers with a nonzero priority value are eligible to become the designated or backup designated router. Configure router priority for broadcast or NBMA networks only and not for point-to-point networks.
Command Mode	Interface Configuration
Syntax	<pre> ipv6 ospf priority <0-255> ipv6 ospf priority <0-255> instance-id <0-255> no ipv6 ospf (A.B.C.D) priority no ipv6 ospf priority instance-id <0-255> </pre>
Parameters	priority: Specify the router priority of the interface. <0-255>: Router priority of the interface. Instance-id: Specify the instance <0-255>: instance ID.
Example usage	<code>switch_a(config-if)# ipv6 ospf priority 20</code>

Ipv6 ospf retransmit-interval	
Purpose	Set the interval between retransmission of Link State Update packets. This interval is also used to retransmit DD packets and Link State Request packets. After sending an LSA to a neighbor, the router keeps the LSA on the LS-retransmission list until it receives an acknowledgement. If the router does not receive an acknowledgment from the neighbor during the retransmit interval, it sends the LSA to the neighbor again.
Command Mode	Interface Configuration
Syntax	<pre> ipv6 ospf retransmit-interval <1-65535> ipv6 ospf retransmit-interval <1-65535> instance-id <0-255> no ipv6 ospf retransmit-interval no ipv6 ospf retransmit-interval instance-id <0-255> </pre>
Parameters	<1-65535>: Interval in seconds. Default is 5 seconds. Instance-id: Specify the instance <0-255>: instance ID.
Example usage	<code>switch_a(config-if)# ipv6 ospf retransmit-interval 20</code>

Ipv6 ospf transmit-delay	
Purpose	Set the estimated time it takes to transmit a Link State Update packet over the interface. The transmit-delay value is added to the LS age of LSAs and is advertised through this interface whenever the LSAs are transmitted.
Command Mode	Interface Configuration
Syntax	ipv6 ospf transmit-delay <1-65535> ipv6 ospf transmit-delay <1-65535> instance-id <0-255> no ipv6 ospf transmit-delay no ipv6 ospf transmit-delay instance-id <0-255>
Parameters	<1-65535> : Time in seconds to transmit a link-state update Instance-id : Specify the instance <0-255> : instance ID.
Example usage	switch_a(config-if)# ipv6 ospf transmit-delay 5

Ipv6 ospf link-lsa-suppression	
Purpose	Enable or disable link LSA (type 8) suppression. A type 8 LSA gives information about link-local addresses and a list of IPv6 addresses on the link. If enabled and the interface type is not broadcast or NBMA, the router does not send type 8 link LSAs. This implies that other routers on the link determine the router's next-hop address using a mechanism other than the type 8 link LSA. This feature is implicitly disabled if the interface type is broadcast or NBMA.
Command Mode	Interface Configuration
Syntax	ipv6 ospf link-lsa-suppression (enable disable) ipv6 ospf link-lsa-suppression (enable disable) instance-id <0-255>
Parameters	<0-255> : interface instance ID.
Example usage	switch_a(config-if)# ipv6 ospf transmit-delay 5

22 VRRP (Virtual Router Redundancy Protocol)

VRRP Information

show vrrp	
Purpose	Show VRRP configuration data and statistics. VRRP provides for automatic assignment of available IP routers to participating hosts. This increases the availability and reliability of routing paths via automatic default gateway selections on an IP subnetwork.
Command Mode	Privileged exec
Syntax	show vrrp <1-255> <IFNAME> show vrrp statistics <1-255> <IFNAME>
Parameters	<1-255> : VRRP IPv4 router identifier <IFNAME> : Interface name
Example usage	switch_a# show vrrp 10 ge1

VRRP Configuration

router vrrp	
Purpose	Enter router mode to configure an OSPF routing process. VRRP sessions cannot be enabled on L2 interfaces.
Command Mode	Global Configuration
Syntax	router vrrp <1-255> <IFNAME>
Parameters	<1-255> : Virtual router identifier IFNAME : Interface name
Example usage	switch_a(config)# router vrrp 1 ge23 switch_a(config-router)#

vrrp vmac	
Purpose	Enable or disable Virtual MAC (VMAC). This command affects all VRRP groups in a router. On a single network segment, multiple VRRP groups can be configured, each using a different VMAC. The use of VMAC addressing allows for faster switchover when a backup router assumes the master role.
Command Mode	Global Configuration
Syntax	vrrp vmac (enable disable)
Parameters	None
Example usage	switch_a(config)# vrrp vmac enable

vrrp compatible-v2	
Purpose	Enable backward-compatibility feature. When enabled, recommendation for VRRPv3 and VRRPv2 Inter-operation are supported.
Command Mode	Global Configuration
Syntax	vrrp compatible-v2 (enable disable)
Parameters	None
Example usage	switch_a(config)# vrrp compatible-v2 enable

accept-mode	
Purpose	Set accept mode for the session. Default is no accept-mode true.
Command Mode	Router Configuration
Syntax	accept-mode [true false]
Parameters	None
Example usage	switch_a(config-router)# accept-mode true

advertisement-interval	
Purpose	Configure the advertisement interval of a virtual router. This is the length of time in seconds between each advertisement sent from the master to its backup(s). The master virtual router sends VRRP advertisements to other VRRP routers in the same group. The advertisements communicate the priority and state of the master virtual router.
Command Mode	Router Configuration
Syntax	advertisement-interval <1-255> no advertisement-interval
Parameters	<1-255> : Interval in seconds. Default is 1 second.
Example usage	switch_a(config-router)# advertisement-interval 50
Note	VRRP Master router and backup routers should be configured with the same advertisement interval. If there is a mismatch in the configuration, VRRP goes to the INIT state.

circuit-failover	
Purpose	Enable the VRRP circuit failover feature. If an electrical connection fails, the failover event will cause a reduction in VRRP priority by the configured delta in this command
Command Mode	Router Configuration
Syntax	[no] circuit-failover IFNAME <1-253> no circuit-failover (IFNAME)
Parameters	IFNAME : Interface of the router that is monitored by the virtual router, usually an upstream interface. If the interface goes down, a router configured as backup may take over as a master. <1-253> : Delta value. The value by which the virtual router decrements its priority value during a circuit failover event. Configure this value to be greater than the difference of priorities between the master and backup routers.
Example usage	switch_a(config-router)# circuit-failover ge10 200

disable	
Purpose	Disable a VRRP session on the router. This command will cause a backup router to assume the role of master.
Command Mode	Router Configuration
Syntax	disable
Parameters	None
Example usage	switch_a(config-router)# disable

enable	
Purpose	Enable a VRRP session on the router. To make changes to the VRRP configuration, first disable the Router from participating in Virtual Routing using the disable command.
Command Mode	Router Configuration
Syntax	enable
Parameters	None
Example usage	switch_a(config-router)# disable
Note	Configure the virtual IP address and define an interface for the VRRP session (using the virtual-ip and interface commands) before enabling VRRP on a router.

preempt-mode	
Purpose	Configure preempt mode. When enabled (True), the highest priority backup is always the master when the default master is unavailable. If disabled (False), a higher priority backup will not preempt a lower priority backup that is acting as master. If the master router fails, the backup routers come online in priority order — highest to lowest. Preempt mode will cause a higher priority backup router to relieve a lower priority backup. By default, a preemptive scheme is enabled whereby a higher priority backup virtual router that becomes available takes over for the backup virtual router that was elected to become master virtual router. This preemptive scheme can be disabled using the preempt-mode false command. If preemption is disabled, the backup virtual router that is currently elected as Master does not transition to backup again when the alternate backup router with higher priority becomes available.
Command Mode	Router Configuration
Syntax	<pre>preempt-mode true preempt-mode false</pre>
Parameters	None.
Example usage	<code>switch_a(config-router)# preempt-mode false</code>

priority	
Purpose	Configure the VRRP router priority within the virtual router. Priority determines the role that each VRRP router plays and what happens if the master virtual router fails. If a VRRP router owns the IP address of the virtual router and the IP address of the physical interface, this router functions as the master virtual router. Priority also determines whether a VRRP router functions as a backup virtual router and the order of ascendancy to becoming a master virtual router if the master virtual router fails. Configure the priority of each backup virtual router with a value of 1 through 254 using the priority command.
Command Mode	Router Configuration
Syntax	<pre>priority <1-255> no priority</pre>
Parameters	<1-255>: Priority value. Set this to 255 for the master router.
Example usage	<code>switch_a(config-router)# priority 255</code>

switch-back delay	
Purpose	Set a switch-back delay timer for the master VRRP router. This feature prevents the original master VRRP router from transitioning back to the master state after coming back online until the configured delay timer has expired.
Command Mode	Router Configuration
Syntax	switch-back-delay <1-500000> no switch-back-delay
Parameters	<1-500000> : Delay in milliseconds. Default is 0.
Example usage	switch_a(config-router)# switch-back-delay 7000

virtual ip	
Purpose	Set the virtual IP address for the VRRP virtual router either as VRRP Master or Backup. This is the IP address used by end hosts to address their default gateway. The VRRP Master (and Owner) of the Virtual IP address only responds to packets destined to the Virtual IP address (for example, ICMP packets destined to the Virtual IP address). VRRP Master (and Not Owner) of the Virtual IP address does not respond to packets destined to the Virtual IP address, but forwards packets with a VMAC as the destination address.
Command Mode	Router Configuration
Syntax	virtual-ip [A.B.C.D] (master backup owner) no virtual-ip
Parameters	A.B.C.D: Specify the virtual IP address of the interface that participates in virtual routing. master: Specify the default state of the VRRP router within the Virtual Router as master. For master, the router must own the Virtual IP address. The owner is the router that has the virtual router address as its physical interface address. backup: Specify the default state of the VRRP router within the Virtual Router as backup. owner: Specify the IP address as the owner.
Example usage	switch_a(config-router)# virtual-ip 10.10.20.30 master

23 GVRP (Generic VLAN Registration Protocol)

GVRP Information

show gvrp	
Purpose	Show GVRP configuration, statistics, timer, and finite state machine.
Command Mode	Privileged exec
Syntax	show gvrp configuration show gvrp machine show gvrp statistics show gvrp timer
Parameters	None
Example usage	switch_a# show gvrp statistics

clear gvrp	
Purpose	Clear GVRP statistics
Command Mode	Privileged exec
Syntax	clear gvrp statistics clear gvrp statistics all clear gvrp statistics bridge BRIDGE_NAME clear gvrp statistics IFNAME
Parameters	BRIDGE_NAME : Bridge name IFNAME : Interface name
Example usage	switch_a# clear gvrp statistics

GVRP Configuration

set gvrp

Purpose	Enable (set) and disable (reset) GVRP globally for the default bridge instance. This command does not enable or disable GVRP in all ports of the bridge. After enabling GVRP globally, use the set port gvrp command to enable GVRP on individual ports of the bridge..
Command Mode	Global Configuration
Syntax	set gvrp <enable disable> bridge BRIDGE_NAME
Parameters	BRIDGE_NAME : Name of bridge.
Example usage	switch_a(config)# set gvrp enable bridge 10

set gvrp dynamic-vlan-creation

Purpose	Enable and disable dynamic VLAN creation for a specific bridge instance.
Command Mode	Global Configuration
Syntax	set gvrp dynamic-vlan-creation <enable disable> bridge BRIDGE_NAME
Parameters	BRIDGE_NAME : Name of bridge.
Example usage	switch_a(config)# set dynamic-vlan-creation gvrp enable bridge 10

set gvrp applicant state

Purpose	Set the GVRP applicant state to normal or active..
Command Mode	Global Configuration
Syntax	set gvrp applicant state [active normal] IFNAME
Parameters	active : Active state normal : Normal state IFNAME : Name of the interface.
Example usage	switch_a(config)# set gvrp applicant state active ge1

set gvrp timer	
Purpose	Set GVMRP timers for a specific interface.
Command Mode	Global Configuration
Syntax	set gvrp timer [join leave leaveall] TIMER_VALUE IF_NAME
Parameters	join : Timer for joining the group. leave : Timer for leaving a group. leaveall : Timer for leaving all groups. TIMER_VALUE : Timer value in hundredths of a second <1-65535> IF_NAME : Name of the interface
Example usage	switch_a(config)# set gvrp timer leave 245 ge1

set port gvrp	
Purpose	Enable and disable GVRP on a port or all ports in a bridge.
Command Mode	Global Configuration
Syntax	set port gvrp <enable disable> <IF_NAME all>
Parameters	all : All ports added to recently configured bridge. IFNAME : Interface name
Example usage	switch_a(config)# set port gvrp enable all

24 GMRP (Generic Multiple Registration Protocol)

GMRP Information

show gmrp	
Purpose	Show GMRP configuration, statistics, timer, and finite state machine.
Command Mode	Privileged exec
Syntax	show gmrp configuration show gmrp machine show gmrp statistics show gmrp timer
Parameters	None
Example usage	switch_a# show gmrp statistics

clear gmrp	
Purpose	Clear GMRP statistics
Command Mode	Privileged exec
Syntax	clear gmrp statistics all clear gmrp statistics all bridge BRIDGE_NAME clear gmrp statistics vlanid <1-4094> clear gmrp statistics vlanid <1-4094> bridge <1-32> clear gmrp dynamic-entry bridge BRIDGE_NAME
Parameters	BRIDGE_NAME : Bridge name <1-4094> : VLAN ID <1-32> : Bridge ID
Example usage	switch_a# clear gmrp statistics all

GMRP Configuration

set gmrp

Purpose	Enable (set) and disable (reset) GMRP globally for the default bridge instance. This command does not enable or disable GMRP in all ports of the bridge. After enabling GMRP globally, use the set port gmrp command to enable GMRP on individual ports of the bridge.
Command Mode	Global Configuration
Syntax	set gmrp <enable disable> bridge <1-32>
Parameters	<1-32> : Bridge group ID
Example usage	switch_a(config)# set gvrp enable bridge 10

set gmrp extended-filtering bridge

Purpose	Enable or disable extended filtering on a bridge as per Table 8-7 of IEEE802.1Q-2003.
Command Mode	Global Configuration
Syntax	set gmrp extended-filtering <enable disable> bridge BRIDGE NAME
Parameters	BRIDGE_NAME : Bridge name.
Example usage	switch_a(config)# set gmrp extended-filtering enable bridge 1

set gmrp fwdall

Purpose	Set the GMRP forward all option for an interface. If this command is not used, the default setting is GMRP disabled
Command Mode	Global Configuration
Syntax	set gmrp fwdall <enable disable> IF_NAME
Parameters	IF_NAME : Interface name
Example usage	switch_a(config)# set gmrp fwdall enable ge7

set gmrp registration	
Purpose	Set GMRP registration type for all ports for a given bridge.
Command Mode	Global Configuration
Syntax	set gmrp registration < normal fixed forbidden restricted> IFNAME
Parameters	normal: Dynamic GMRP multicast registration and deregistration on the port. fixed: Multicast groups currently registered on the switch are applied to the port, but any subsequent registrations or deregistrations do not affect the port. Any registered multicast groups on the port are not deregistered based on the GARP timers. forbidden: All GMRP multicasts are deregistered, and prevent any further GMRP multicast registration on the port. restricted: Restricted registration
Example usage	switch_a(config)# set gmrp registration normal gel

set gmrp timer	
Purpose	Set the values for the GMRP Join, Leave, and Leaveall timers for a specified bridge.
Command Mode	Global Configuration
Syntax	set gvrp timer [join leave leaveall] TIMER_VALUE IF_NAME
Parameters	join: Timer for joining the group. leave: Timer for leaving a group. leaveall: Timer for leaving all groups. TIMER_VALUE: Timer value in hundredths of a second <1-65535> IF_NAME: Name of the interface
Example usage	switch_a(config)# set gmrp timer leave 245 gel

set port gmrp	
Purpose	Enable/disable GMRP on a particular port in all VLANs or all ports in a bridge. GMRP on a port cannot be enabled for all VLANs if GMRP has already been configured for a particular VLAN for the port.
Command Mode	Global Configuration
Syntax	set port gmrp <enable disable> <IF_NAME all> vlan VLANID
Parameters	all: All ports added to recently configured bridge. IFNAME: Interface name
Example usage	switch_a(config)# set port gmrp enable all

25 PIM (Protocol Independent Multicast)

PIM Information

show ip pim	
Purpose	Display PIM configuration and settings data.
Command Mode	Privileged Exec
Syntax	show ip pim interface show ip pim neighbor show ip pim nexthop show ip pim mroute show ip pim local-members show ip pim bsr-router
Parameters	None

PIM Configuration

ip pim accept-register	
Purpose	Configure the ability to filter out multicast sources specified by the given access-list at the rendezvous point (RP), so that the RP will accept/refuse to perform the Register mechanism for the packets sent by the specified sources. By default, the RP accepts Register packets from all multicast sources.
Command Mode	Global Configuration
Syntax	ip pim accept-register list (<100-199> <2000-2699> WORD) no ip pim accept-register
Parameters	<100-199> : IP extended access-list value <2000-2699> : IP extended access-list value in the expanded range WORD : Name of a standard access list
Example usage	switch_a(config)# ip pim accept-register list 121

ip pim anycast-rp	
Purpose	Configure the Anycast RP in the RP set.
Command Mode	Global Configuration
Syntax	ip pim anycast-rp A.B.C.D A.B.C.D no ip pim anycast-rp A.B.C.D no ip pim anycast-rp A.B.C.D A.B.C.D
Parameters	A.B.C.D: Unicast IP address of the Anycast RP set. An Anycast RP set is a collection of RPs in the same domain. A.B.C.D: Destination IP address where Register messages
Example usage	switch_a(config)# ip pim anycast-rp 1.1.1.1 10.10.10.10

ip pim bsr-candidate	
Purpose	Give the router the candidate BSR status using the specified IP address of the interface.
Command Mode	Global Configuration
Syntax	ip pim bsr-candidate IFNAME ip pim bsr-candidate IFNAME <0-32> ip pim bsr-candidate IFNAME <0-32> <0-255> no ip pim bsr-candidate (IFNAME)
Parameters	IFNAME Specify the name of the interface <0-32>: Hash mask length for RP selection <0-255>: Priority for a BSR candidate
Example usage	switch_a(config)# ip pim bsr-candidate ge24 20 30

ip pim cisco-register-checksum	
Purpose	Configure the option to calculate the register checksum over the whole packet. Use for inter-operation with older Cisco IOS versions.
Command Mode	Global Configuration
Syntax	ip pim cisco-register-checksum ip pim cisco-register-checksum group-list (<1-99> <1300-1999> WORD) no ip pim cisco-register-checksum no ip pim cisco-register-checksum group-list (<1-99> <1300-1999> WORD)
Parameters	group-list: Use this parameter to configure the option to calculate the register checksum over the whole packet on multicast groups specified by the access-list. <1-99>: IP standard access-list. <1300-1999>: IP access-list (expanded range). WORD: IP named standard access list.
Example usage	switch_a(config)# ip pim cisco-register-checksum group-list 34

ip pim crp-cisco-prefix	
Purpose	Use this command to interoperate with Cisco devices that conform to an earlier draft standard. Some Cisco devices might not accept candidate RPs with a group prefix number of zero. Note that the latest BSR specification prohibits sending RP advertisements with prefix 0. RP advertisements for the default IPv4 multicast group range 224/4 are sent with a prefix of 1.
Command Mode	Global Configuration
Syntax	[no] ip pim crp-cisco-prefix
Parameters	None
Example usage	switch_a(config)# ip pim crp-cisco-prefix

ip pim ignore-rp-set-priority	
Purpose	This command is used to inter-operate with older Cisco IOS versions. It allows the RP-SET priority value to be ignored, and only the hashing mechanism for RP selection used.
Command Mode	Global Configuration
Syntax	ip pim ignore-rp-set-priority no ip pim ignore-rp-set-priority
Parameters	
Example usage	switch_a(config)# ip pim ignore-rp-set-priority

ip pim jp-timer	
Purpose	Set a PIM join/prune timer.
Command Mode	Global Configuration
Syntax	[no] ip pim jp-timer <1-65535> no ip pim jp-timer
Parameters	<1-65535> : Value of the Join/Prune timer, in seconds
Example usage	switch_a(config)# ip pim jp-timer 234

ip pim register-rate-limit	
Purpose	Configure the rate of Register packets sent by this designated router (DR), in number of packets per second. The configured rate is per (S,G) state, and is not a system-wide rate.
Command Mode	Global Configuration
Syntax	ip pim register-rate-limit <1-65535> no ip pim register-rate-limit
Parameters	<1-65535> : Number of packets sent per second
Example usage	switch_a(config)# ip pim register-rate-limit 20000

ip pim register-rp-reachability

Purpose	Enable the RP reachability check for PIM Registers at the designated router.
Command Mode	Global Configuration
Syntax	ip pim register-rp-reachability no ip pim register-rp-reachability
Parameters	
Example usage	switch_a(config)# ip pim register-rp-reachability

ip pim register-source

Purpose	Configure the source address of Register packets sent by this DR, overriding the default source address, which is the address of the RPF interface toward the source host. Use the no option to remove the source address of register packets sent by this DR, and reset it to use the default source address, that is, the address of the RPF interface toward the source host. The configured address must be a reachable address so the RP can send corresponding Register-Stop messages in response. This address is usually the loopback interface address, but can also be other physical addresses. The address must be advertised by unicast routing protocols on the DR.
Command Mode	Global Configuration
Syntax	ip pim register-source A.B.C.D ip pim register-source IFNAME no ip pim register-source
Parameters	A.B.C.D: The IP address to use as the source of the register packets IFNAME: The name of the interface to use as the source of the register packets
Example usage	switch_a(config)# ip pim register-source 3.3.3.2
Note	The interface configured does not require PIM to be enabled.

ip pim register-suppression

Purpose	Configure the register-suppression time, in seconds. Configuring this value modifies register-suppression time at the designated router; configuring this value at the rendezvous point modifies the RPkeepalive-period value if the ip pim rp-register-kat command is not used. Default value of register-suppression time is 60 seconds.
Command Mode	Global Configuration
Syntax	ip pim register-suppression <1-65535> no ip pim register-suppression
Parameters	<1-65535> : Register suppression time in seconds
Example usage	switch_a(config)# ip pim register-suppression 180

ip pim rp-candidate

Purpose	Give the router a candidate RP status using the IP address of the specified interface.
Command Mode	Global Configuration
Syntax	ip pim rp-candidate IFNAME no ip pim rp-candidate (IFNAME)
Parameters	IFNAME : Interface name
Example usage	switch_a(config)# ip pim rp-candidate ge10

ip pim rp-address

Purpose

Configure static RP address for multicast groups. PIM supports multiple static RPs. It also supports usage of static-RP and BSR mechanism, simultaneously.

- If RP-address configured through BSR and RP-address configured statically are both available for a group range, the RP-address configured through BSR is chosen.

- One static-RP can be configured for multiple group ranges using Access Lists. However, configuring multiple static RPs (using ip pim rp-address command) with the same RP address is not allowed. The static-RP can either be configured for the whole multicast group range 224/4 (without ACL) or for specific group ranges (using ACL).

- If multiple static-RPs are available for a group range, then one with the highest IP address is chosen.

- Only Permit filters in ACL are considered as valid group ranges. The default Permit filter 0.0.0.0/0 is converted to default multicast filter 224/4.

- After configuration, the RP-address is inserted into static-RP group tree based on the configured group ranges. For each group range multiple static-RPs are maintained in a linked list, sorted by IP addresses. When selecting static-RPs for a group range, the first element, which is the static-RP with highest IP address, is chosen.

- Deletion of RP-address is handled by removing the static-RP from all the existing group ranges and recomputing the RPs for existing TIB states if required.

- Group mode and RP address mappings learned through BSR take precedence over mappings statistically defined by the ip pim rp-address command without the override keyword. Commands with the override keyword take precedence over dynamically learned mappings.

Command Mode

Global Configuration

Syntax

```
[no] ip pim rp-address A.B.C.D (override |  
[no] ip pim rp-address A.B.C.D (<1-99> | <1300-1999> | WORD)  
(override |  
| WORD) (override |)
```

Parameters

<1-99>: IP Standard access-list
<1300-1999>: IP Standard access-list (expanded range)
WORD: Access-list name
override: Static RP overrides dynamically-learned RP

Example usage

```
switch_a(config)# ip pim rp-address 3.3.3.3 4
```

ip pim rp-register-kat	
Purpose	Configure a Keepalive Timer (KAT) value for (S,G) states at RP to monitor PIM register packets, overriding the generic KAT timer value.
Command Mode	Global Configuration
Syntax	ip pim rp-register-kat <1-65535> no ip pim rp-register-kat
Parameters	<1-65535> : Keepalive timer in seconds
Example usage	switch_a(config)# ip pim rp-register-kat 3454

ip pim spt-threshold	
Purpose	Turn on the ability of the last-hop PIM router to switch to shortest-path tree (SPT). This option is binary, meaning that the switching to SPT happens either at the receiving of the first data packet or not at all. It is not rate-based.
Command Mode	Global Configuration
Syntax	ip pim spt-threshold ip pim spt-threshold group-list (<1-99> <1300-1999> WORD)
Parameters	group-list : Enable the ability for the last-hop PIM router to switch to SPT for multicast group addresses indicated by the given access-list <1-99> : IP Standard access-list <1300-1999> : IP Standard access-list (expanded range) WORD : Standard access list name
Example usage	switch_a(config)# ip pim spt-threshold group-list LIST1

ip pim ssm	
Purpose	Configure Source Specific Multicast (SSM), and define the range of multicast addresses. To define the SSM range to be other than the default, define an access-list. When an SSM range of IP multicast addresses is defined with the ip pim ssm command, the no (*,G) or (S,G,rpt) state is initiated for groups in the SSM range. The messages corresponding to these states are no accepted or originated in the SSM range.
Command Mode	Global Configuration
Syntax	ip pim ssm default ip pim ssm range (<1-99> WORD) no ip pim ssm
Parameters	default : This keyword defines the 232/8 group range for SSM range : Define an access-list for group range to use for SSM <1-99> : Value for a standard access-list WORD : Standard access list name
Example usage	switch_a(config)# access-list 10 permit 225.1.1.1

PIM Interface Commands

ip pim bsr-border	
Purpose	Prevent bootstrap router (BSR) messages from being sent or received through an interface. Use this command to configure an interface bordering another PIM domain to avoid the exchange of BSR messages between the two domains. This prevents routers in one domain from electing rendezvous points (RPs) in the other domain, resulting in a protocol malfunction or loss of isolation between the domains.
Command Mode	Interface Configuration
Syntax	[no] ip pim bsr-border
Parameters	None
Example usage	switch_a(config-if)# ip pim bsr-border
Note	This command does not set up multicast boundaries. It only sets up a PIM domain BSR message border.

ip pim	
Purpose	Enable PIM dense-mode or sparse-mode on the current interface.
Command Mode	Interface Configuration
Syntax	[no] ip pim (dense-mode sparse-mode)
Parameters	None
Example usage	switch_a(config-if)# ip pim dense-mode

ip pim dr-priority	
Purpose	Set the designated router's priority value.
Command Mode	Interface Configuration
Syntax	[no] ip pim dr-priority (<0-4294967294>)
Parameters	<0-4294967294> : Designated router priority. A higher value means a higher preference.
Example usage	switch_a(config-if)# ip pim dr-priority 314159

ip pim exclude-genid	
Purpose	Exclude the GenID (generated ID) option from Hello packets sent by the PIM module on an interface. This command is used to inter-operate with older Cisco IOS versions.
Command Mode	Interface Configuration
Syntax	[no] ip pim exclude-genid
Parameters	None
Example usage	switch_a(config-if)# ip pim exclude-genid

ip pim hello-holdtime	
Purpose	Configure a hello holdtime other than the default (3.5 * hello_interval seconds). If the configured value is less than the current hello_interval , it is refused. When removing a configured hello_holdtime, the value is reset to default. Every time the hello_interval is updated, the hello-holdtime is checked. If it is less than the current hello_interval value, then it reverts to default. Otherwise, the configured value is maintained.
Command Mode	Interface Configuration
Syntax	ip pim hello-holdtime <1-65535> no ip pim hello-holdtime
Parameters	<1-65535> : Hello holdtime in seconds
Example usage	switch_a(config-if)# ip pim hello-holdtime 20000

ip pim hello-interval	
Purpose	Configure a hello interval value other than the default. When a hello-interval is configured and hello-holdtime is not configured, or when the hello-holdtime value configured is less than the new hello-interval value, the holdtime value is modified to (3.5 * hello_interval). Otherwise, the hello-holdtime value is the configured value.
Command Mode	Interface Configuration
Syntax	ip pim hello-interval <1-65535> no ip pim hello-interval
Parameters	<1-65535> : Hello interval in seconds. Default is 30 seconds.
Example usage	switch_a(config-if)# ip pim hello-interval 300

ip pim neighbor-filter	
Purpose	Enable filtering of neighbors on the interface. When configuring a neighbor filter, PIM will either not establish adjacency with neighbor or terminates adjacency with existing neighbors, when denied by filtering access list.
Command Mode	Interface Configuration
Syntax	[no] ip pim neighbor-filter (<1-99> WORD)
Parameters	<1-99> : IP standard access-list number WORD : IP standard access list name
Example usage	switch_a(config-if)# ip pim neighbor-filter 14

ip pim propagation-delay	
Purpose	Configure a propagation delay value for PIM in milliseconds.
Command Mode	Interface Configuration
Syntax	ip pim propagation-delay <1000-5000> no ip pim propagation-delay
Parameters	<1000-5000> : Propagation delay in milliseconds. Default is 500.
Example usage	switch_a(config-if)# ip pim propagation-delay 1000

ip pim state-refresh origination-interval	
Purpose	Configure a PIM-DM State-Refresh origination interval. This is the number of seconds between PIM-DM State Refresh control messages.
Command Mode	Interface Configuration
Syntax	ip pim state-refresh origination-interval <1-100> no ip pim state-refresh origination-interval
Parameters	<1-100> : Interval in seconds. Default is 60 seconds.
Example usage	switch_a(config-if)# ip pim state-refresh origination-interval 72

ip pim unicast-bsm	
Purpose	Enable support for sending and receiving unicast Bootstrap Messages (BSM) on an interface. This command supports backward-compatibility with older versions of the Bootstrap Router specification, which specifies unicast BSM to refresh the state of new or restarting neighbors.
Command Mode	Interface Configuration
Syntax	[no] ip pim unicast-bsm
Parameters	None
Example usage	switch_a(config-if)# ip pim unicast-bsm

26 IPv6 Commands

IPv6 Access List

ip6-access-list	
Purpose	Create an IPv6 standard or extended access list.
Command Mode	Global Configuration
Syntax	[no] ip6-access-list (<1-99> <1300-1999>) (deny permit) (X:X::X:X/M host X:X::X:X any) [no] ip6-access-list (<100-199> <2000-2699>) (deny permit) (ip udp tcp gre igmp pim rsvp ospf vrrp ipcomp any <0-255>) (X:X::X:X/M host X:X::X:X any) (X:X::X:X/M host X:X::X:X any) [no] ip6-access-list extended (NAME) (deny permit) (ip udp tcp gre igmp pim rsvp ospf vrrp ipcomp any <0-255>) (X:X::X:X/M host X:X::X:X any) (X:X::X:X/M host X:X::X:X any) [no] ip6-access-list standard (NAME) (deny permit) (X:X::X:X/M host X:X::X:X any)
Parameters	<1-99>: IP standard access list <1300-1999>: IP standard access list (expanded range). deny: Route to reject. permit: Route to permit. ip: Any IPv4 encapsulation packet udp: UDP packet tcp: TCP packet gre: GRE packet igmp: IGMP packet pim: PIM packet rsvp: RSVP packet ospf: OSPF packet vrrp: VRRP packet ipcomp: IP Payload Compression packet any: Any protocol packet <0-255>: IANA-assigned protocol number X:X::X:X/M: IPv6 address
Example usage	<pre>switch_a(config)# ip6-access-list 99 permit db8:1::ab9:C0A8:102/92</pre>

ipv6 access-list	
Purpose	Configure an IPv6 access list for filtering frames. Use access lists to control the transmission of packets on an interface, and restrict contents of routing updates. The switch stops checking the access list after a match occurs.
Command Mode	Global Configuration
Syntax	<pre> ipv6 access-list WORD (deny permit) X:X::X:X/M ipv6 access-list WORD (deny permit) X:X::X:X/M exact-match ipv6 access-list WORD (deny permit) any ipv6 access-list WORD (deny permit) (ip gre igmp pim rsvp ospf vrrp ipcomp any <0-255>) (X:X::X:X/M X:X::X:X X:X::X:X any) (X:X::X:X/M X:X::X:X X:X::X:X any) ipv6 access-list WORD (deny permit) (tcp) (X:X::X:X/M X:X::X:X X:X::X:X any) ((eq gt lt neq) <0-65535> range <0-65535> <0-65535>) (X:X::X:X/M X:X::X:X X:X::X:X any) ((eq gt lt neq) (ftp ssh telnet www <0-65535>) range <0-65535> <0- 65535>) ipv6 access-list WORD (deny permit) (udp) (X:X::X:X/M X:X::X:X X:X::X:X any) ((eq gt lt neq) <0-65535> range <0-65535> <0-65535>) (X:X::X:X/M X:X::X:X X:X::X:X any) ((eq gt lt neq) (tftp bootp <0-65535>) range <0-65535> <0-65535>) ipv6 access-list WORD remark LINE </pre>
Parameters	WORD: Access-list name. Deny: Specify route to deny. Permit: Specify route to permit. <0-255>: Specify a number to identify a protocol, instead of a named protocol (as listed below). Any: Specify any protocol packet. gre: Specify Generic Routing Encapsulation packet. igmp: Specify Internet Group Management Protocol packet. ip: Specify IP packet. ipcomp: Specify IP payload compression packet. ospf: Specify Open Shortest Path First packet. pim: Specify Protocol Independent Multicast packet. rsvp: Specify Resource Reservation Protocol packet. vrrp: Specify Virtual Router Redundancy Protocol packet. X:X::X:X: Source IPv6 address. X:X::X:X/M: Source IPv6 address and mask. any: Source any local address. X:X::X:X: Destination IPv6 address. X:X::X:X/M: Destination IPv6 address and mask. any: Destination any local address. eq: Packet size equal to the specified value. gt: Packet size less than or greater than specified value. lt: Packet size less than or greater than specified value.
Example usage	<pre> switch_a(config)# ipv6 access-list list1 permit db8:1::ab9:C0A8:102/92 </pre>

IPv6 General Configuration

show ipv6	
Purpose	Turn IPv6 forwarding on or off.
Command Mode	Privileged Exec
Syntax	show ipv6 forwarding show ipv6 interface IFNAME brief show ipv6 neighbors show ipv6 route (database) show ipv6 route (database) (connected kernel ospf rip static) show ipv6 route X:X::X:X show ipv6 route X:X::X:X/M show ipv6 route summary show ipv6 prefix-list WORD show ipv6 prefix-list WORD seq <1-4294967295> show ipv6 prefix-list WORD X:X::X:X/M show ipv6 prefix-list WORD X:X::X:X/M longer show ipv6 prefix-list WORD X:X::X:X/M first-match show ipv6 prefix-list summary show ipv6 prefix-list summary WORD show ipv6 prefix-list detail show ipv6 prefix-list detail WORD
Parameters	None
Example usage	switch_a(config)# show ipv6 forwarding

ipv6 forwarding	
Purpose	Turn IPv6 forwarding on or off.
Command Mode	Global Configuration
Syntax	[no] ipv6 forwarding
Parameters	
Example usage	switch_a(config)# ipv6 forwarding

ipv6 neighbor	
Purpose	Add/remove an IPv6 neighbor entry.
Command Mode	Global Configuration
Syntax	[no] ipv6 neighbor X:X::X:X IFNAME MAC
Parameters	X:X::X:X: The neighbor's IPv6 address. IFNAME: The name of the interface. MAC: The MAC hardware address <HHHH.HHHH.HHHH>
Example usage	switch_a(config)# ipv6 neighbor 1:1::1:1 eth1 1111.1111.1111

Ipv6 route	
Purpose	Configure static IPv6 routes.
Command Mode	Global Configuration
Syntax	[no] ipv6 route X:X::X:X/M (X:X::X:X IFNAME) [no] ipv6 route X:X::X:X/M (X:X::X:X IFNAME) <1-255> [no] ipv6 route X:X::X:X/M X:X::X:X IFNAME [no] ipv6 route X:X::X:X/M X:X::X:X IFNAME <1-255>
Parameters	IFNAME: Interface name X:X::X:X: IPv6 Default route X:X::X:X/M: Address of next hop router <1-255>: IPv6 hop limit
Example usage	switch_a(config)# ipv6 route 3030::1/128 2000::2

Clear ipv6 mroute	
Purpose	Delete multicast route table entries.
Command Mode	Privileged Exec
Syntax	mand Syntax clear ipv6 mroute * clear ipv6 mroute * pim (dense-mode sparse-mode) clear ipv6 mroute X:X::X:X clear ipv6 mroute X:X::X:X X:X::X:X clear ipv6 mroute X:X::X:X X:X::X:X pim (dense-mode sparse-mode) clear ipv6 mroute X:X::X:X pim sparse-mode clear ipv6 mroute statistics * clear ipv6 mroute statistics X:X::X:X clear ipv6 mroute statistics X:X::X:X X:X::X:X
Parameters	NAME: The name of the VPN routing/forwarding instance * : Delete all multicast routes dense-mode: Clear multicast rout table for PIM dense-mode sparse-mode: Clear multicast route table for PIM sparse mode
Example usage	<pre>switch_a# clear ipv6 mroute 3ffe::24:3 ff00::3 pim sparse-mode</pre>

IPv6 Neighbor Discovery

ipv6 nd other-config-flag	
Purpose	Suppress/enable IPv6 Router Advertisement (RA) transmission for the current interface.
Command Mode	Global Configuration
Syntax	ipv6 nd suppress-ra no ipv6 nd suppress-ra
Parameters	None
Example usage	<pre>switch_a(config-if)# ipv6 nd suppress-ra</pre>

ipv6 nd managed-config-flag	
Purpose	Set the managed address configuration flag in the Router Advertisement to be used for the IPv6 address auto-configuration.
Command Mode	Interface Configuration
Syntax	ipv6 nd managed-config-flag no ipv6 nd managed-config-flag
Parameters	None
Example usage	switch_a(config-if)# ipv6 nd managed-config-flag

ipv6 nd other-config-flag	
Purpose	Set the other stateful configuration flag in Router Advertisement to be used for IPv6 address autoconfiguration
Command Mode	Interface Configuration
Syntax	ipv6 nd other-config-flag no ipv6 nd other-config-flag
Parameters	None
Example usage	switch_a(config-if)# ipv6 nd other-config-flag

ipv6 nd ra-interval	
Purpose	Specify the interval between IPv6 Router Advertisements (RA).
Command Mode	Interface Configuration
Syntax	ipv6 nd ra-interval <4-1800> no ipv6 nd ra-interval
Parameters	<4-1800>: The RA interval in milliseconds.
Example usage	switch_a(config-if)# ipv6 nd ra-interval 1000

ipv6 nd minimum-ra-interval	
Purpose	Set a minimum Router Advertisement (RA) interval for the interface.
Command Mode	Interface Configuration
Syntax	ipv6 nd minimum-ra-interval <3-1350> no ipv6 nd minimum-ra-interval
Parameters	<3-1350>: Minimum router advertisement interval (in seconds).
Example usage	switch_a(config-if)# ipv6 nd minimum-ra-interval 1000

ipv6 nd ra-lifetime	
Purpose	Specify the Router Advertisement (RA) lifetime of this router enabling it to act as a default gateway for the network.
Command Mode	Interface Configuration
Syntax	ipv6 nd ra-lifetime <0-9000> no ipv6 nd ra-lifetime
Parameters	<0-9000> : The RA lifetime duration in milliseconds.
Example usage	switch_a(config-if)# ipv6 nd ra-lifetime 5000

ipv6 nd current-hoplimit	
Purpose	Set an ND (Neighbor Discovery) advertised hop limit for an interface.
Command Mode	Interface Configuration
Syntax	ipv6 nd current-hoplimit <0-255> no ipv6 nd current-hoplimit
Parameters	<0-255> : Hop limit
Example usage	switch_a(config-if)# ipv6 nd current-hoplimit 50

ipv6 nd link-mtu	
Purpose	Set an advertised MTU option.
Command Mode	Interface Configuration
Syntax	ipv6 nd link-mtu no ipv6 nd link-mtu
Parameters	None
Example usage	switch_a(config-if)# ipv6 nd link-mtu

ipv6 nd reachable-time	
Purpose	Specify the reachable time in the Router Advertisement to be used for detecting unreachability of the IPv6 neighbor"
Command Mode	Interface Configuration
Syntax	ipv6 nd reachable-time <0-3600000> no ipv6 nd reachable-time
Parameters	<0-3600000> : The reachable time in milliseconds.
Example usage	switch_a(config-if)# ipv6 nd reachable-time 100000

ipv6 nd retransmission-time	
Purpose	Establish an IPv6 advertised retransmission time for the current interface.
Command Mode	Interface Configuration
Syntax	ipv6 nd retransmission-time <1000-3600000> no ipv6 nd retransmission-time
Parameters	<1000-3600000> : The retransmission time in milliseconds
Example usage	switch_a(config-if)# ipv6 nd retransmission-time 100000

MLD (Multicast Listener Discovery)

show ipv6 mld

Purpose	Display the multicast groups with receivers directly connected to the router, and learned through MLD. Display the state of MLD, MLD Proxy service, and MLD Snooping for a specified interface, or all interfaces. Display MLD SSM (source-specific-multicast) mapping. Display the contents of the MRIB VIF table. Display the contents of the IPv6 multicast routing (mroute) table. Display RPF information for the specified source address.
Command Mode	Privileged exec
Syntax	<pre>show ipv6 mld groups (detail) show ipv6 mld groups IFNAME (detail) show ipv6 mld groups IFNAME X:X::X:X (detail) show ipv6 mld groups X:X::X:X (detail) show ipv6 mld interface (IFNAME) show ipv6 mld ssm-map show ipv6 mld ssm-map X:X::X:X show ipv6 mif show ipv6 mif IFNAME show ipv6 mroute (dense sparse) (count summary) show ipv6 mroute X:X::X:X (dense sparse) (count summary) show ipv6 mroute X:X::X:X X:X::X:X (dense sparse) (count summary) show ipv6 rpf X:X::X:X</pre>
Parameters	None
Example usage	<pre>switch_a(config)# show ipv6 mld groups</pre>

clear ipv6	
Purpose	Delete entries from the IPv6 multicast routing table. When this command is used, the MRIB clears the multicast route entries in its multicast route table, and removes the entries from the multicast forwarder. The MRIB sends a clear message to the multicast protocols."
Command Mode	Privileged exec
Syntax	clear ipv6 mroute * clear ipv6 mroute statistics * clear ipv6 mroute statistics X:X::X:X clear ipv6 mroute statistics X:X::X:X X:X::X:X clear ipv6 mroute X:X::X:X clear ipv6 mroute X:X::X:X X:X::X:X" clear ipv6 mld clear ipv6 mld group * clear ipv6 mld group X:X::X:X clear ipv6 mld group X:X::X:X IFNAME clear ipv6 mld interface IFNAME"
Parameters	None
Example usage	switch_a(config)# clear ipv6 mroute

ipv6 mroute	
Purpose	Create a multicast static route. Multicast static routes are unicast routes that allow multicast and unicast topologies to be incongruous. These routes are used by multicast routing protocols to perform RPF checks.
Command Mode	Global Configuration
Syntax	<pre>ipv6 mroute X:X::X:X/M (static rip ospf bgp isis) (X:X::X:X IFNAME) ipv6 mroute X:X::X:X/M (static rip ospf bgp isis) (X:X::X:X IFNAME) <1-255> ipv6 mroute X:X::X:X/M (static rip ospf bgp isis) X:X::X:X IFNAME ipv6 mroute X:X::X:X/M (static rip ospf bgp isis) X:X::X:X IFNAME <1-255></pre>
Parameters	X:X::X:X/M: Specify multicast source IP address and mask X:X::X:X: RPF address for the multicast route. Host IP address can be a directly connected system or a remote system. For remote systems, a recursive lookup is done from the unicast routing table to find a directly connected system. Recursive lookup is done up one level. INTERFACE: Incoming interface name. Can only be specified for non-broadcast interfaces. bgp: Specify the border gateway protocol (BGP). isis: Specify the Intermediate system to intermediate system (IS-IS) protocol. ospf: Specify the open shortest patch first (OSPF) protocol. rip: Specify the routing information protocol (RIP) protocol. static: Specify Static routes. X:X::X:X: Specify Reverse path forwarding (RPF) neighbor address or route. INTERFACE: Specify Reverse path forwarding (RPF) interface or pseudo interface. <1-255>: Specify whether a unicast route or multicast static route is used for the RPF lookup. Lower distances have preference. If the multicast static route has the same distance as the other RPF sources, the multicast static route takes precedence. Default is 0.
Example usage	<pre>switch_a(config)# ipv6 mroute 10:10::10:50/1 255.255.255.0 1</pre>

ipv6 multicast-routing	
Purpose	Enable multicast routing.
Command Mode	Global Configuration
Syntax	[no] ipv6 multicast-routing
Parameters	
Example usage	switch_a(config)# ipv6 multicast-routing

ipv6 multicast route-limit	
Purpose	Set a maximum number of multicast routes.
Command Mode	Global Configuration
Syntax	ipv6 multicast route-limit <1-2147483647> ipv6 multicast route-limit <1-2147483647> <1-2147483647> no ipv6 multicast route-limit
Parameters	<1-2147483647>: Number of routes <1-2147483647>: Threshold at which to generate warning message
Example usage	switch_a(config)# ipv6 multicast route-limit 1000 2000000g

ipv6 mld	
Purpose	Enable and configure Multicast Listener Discovery.
Command Mode	Global Configuration
Syntax	[no] ipv6 mld limit <1-2097152> (except WORD) [no] ipv6 mld ssm-map enable [no] ipv6 mld ssm-map static WORD X:X::X:X
Parameters	
Example usage	switch_a(config)# ipv6 mld ssm-map enable

ipv6 mld version	
Purpose	Set the current MLD protocol version on an interface
Command Mode	Interface Configuration
Syntax	ipv6 mld version <1-2> no ipv6 mld version
Parameters	None
Example usage	switch_a(config-if)# ipv6 mld version 1

ipv6 mld proxy-service	
Purpose	Designate an interface to be the MLD proxy-service (upstream host-side) interface.
Command Mode	Interface Configuration
Syntax	ipv6 mld proxy-service no ipv6 mld proxy-service
Parameters	None
Example usage	switch_a(config-if)# ipv6 mld proxy-service

ipv6 mld immediate-leave	
Purpose	Minimize the leave latency of MLD memberships. This command applies to interfaces configured for MLD Layer-3 multicast protocols, MLD Snooping, or MLD Proxy"
Command Mode	Interface Configuration
Syntax	ipv6 mld immediate-leave group-list WORD no ipv6 mld immediate-leave
Parameters	WORD: IPv6 Named Standard Access list
Example usage	switch_a(config-if)# ipv6 mld immediate-leave group-list 1000

ipv6 mld limit	
Purpose	Configure the limit on the maximum number of group membership states at either the router level, or for the specified interface. Once the specified number of group memberships is reached, all further local memberships will be ignored. Optionally, an exception access-list can be configured to specify the group-address(es) to be excluded from being subject to the limit.
Command Mode	Interface Configuration
Syntax	ipv6 mld limit <1-2097152> (except WORD) no ipv6 mld limit
Parameters	<1-2097152>: Max Allowed State on this interface (Default: 0) WORD: IPv6 Named Standard Access list
Example usage	switch_a(config-if)# ipv6 mld limit 1000 except mylist

ipv6 mld access-group	
Purpose	Control the multicast local-membership groups learnt on an interface.
Command Mode	Interface Configuration
Syntax	ipv6 mld access-group WORD no ipv6 mld access-group
Parameters	WORD: IPv6 Named Standard Access list
Example usage	switch_a(config-if)# ipv6 mld access-group mylist

ipv6 mld last-member	
Purpose	Set/unset the last-member query-count value. Configure the frequency at which the router sends MLD group-specific host query messages.
Command Mode	Interface Configuration
Syntax	ipv6 mld last-member-query-count <2-7> no ipv6 mld last-member-query-count ipv6 mld last-member-query-interval <1000-25500> no ipv6 mld last-member-query-interval
Parameters	None
Example usage	switch_a(config-if)# ipv6 mld last-member-query-count 7

ipv6 mld querier-timeout	
Purpose	Configure the timeout period before the router takes over as the querier for the interface after the previous querier has stopped querying.
Command Mode	Interface Configuration
Syntax	ipv6 mld querier-timeout <60-300> no ipv6 mld querier-timeout
Parameters	<60-300>: Timeout period in seconds
Example usage	switch_a(config-if)# ipv6 mld querier-timeout 60

ipv6 mld query-interval	
Purpose	Configure the frequency of sending MLD host query messages.
Command Mode	Interface Configuration
Syntax	ipv6 mld query-interval <1-18000> no ipv6 mld query-interval
Parameters	<1-18000> : Query Interval value in seconds (Default is 125)
Example usage	switch_a(config-if)# ipv6 mld query-interval 200

ipv6 mld query-max-response-time	
Purpose	Configure the maximum response time advertised in MLD queries
Command Mode	Interface Configuration
Syntax	ipv6 mld query-max-response-time <1-240> no ipv6 mld query-max-response-time
Parameters	<1-240> : Response time in seconds
Example usage	switch_a(config-if)# ipv6 mld query-max-response-time 200

ipv6 mld robustness-variable	
Purpose	Change the robustness variable value on an interface.
Command Mode	Interface Configuration
Syntax	ipv6 mld robustness-variable <2-7> no ipv6 mld robustness-variable
Parameters	<2-7> : Robustness variable (default is 2)
Example usage	switch_a(config-if)# ipv6 mld robustness-variable 5

ipv6 mld ssm-map	
Purpose	Enable SSM mapping on the switch
Command Mode	Interface Configuration
Syntax	ipv6 mld ssm-map enable no ipv6 mld ssm-map enable
Parameters	None
Example usage	switch_a(config-if)# ipv6 mld ssm-map enable

ipv6 mld ssm-map static

Purpose	Specify the static mode of defining SSM mapping. SSM mapping statically assigns sources to MLDv1 groups to translate such (*,G) groups' memberships to (S,G) memberships for use with PIM-SSM.
Command Mode	Global Configuration
Syntax	ipv6 mld ssm-map static WORD X:X::X:X no ipv6 mld ssm-map static WORD X:X::X:X
Parameters	WORD: IPv6 Named Standard Access list X:X::X:X: Source address to use for static map group
Example usage	switch_a(config)# ipv6 mld ssm-map static listname ff55::3

ipv6 mld static-group

Purpose	"tatically configure IPv6 group membership entries on an interface. To statically add only a group membership, do not specify any parameters.
Command Mode	Interface Configuration
Syntax	ipv6 mld static-group X:X::X:X {(source (X:X::X:X ssm-map)) (interface IFNAME)} no ipv6 mld static-group X:X::X:X {(source (X:X::X:X ssm-map)) (interface IFNAME)}
Parameters	WORD: IPv6 Named Standard Access list X:X::X:X: Source address to use for static map group
Example usage	switch_a(config-if)# ipv6 mld static-group ff55::3

ipv6 ospf display route single-line

Purpose	Displays the output of the show ipv6 ospf route command with each route entry in a singleline.
Command Mode	Global Configuration
Syntax	[no] ipv6 ospf display route single-line
Parameters	None.
Example usage	switch_a(config)# ipv6 ospf display route single-line

IPv6 PIM Configuration

IPv6 pim accept-register

Purpose	Configure the ability to filter out multicast sources specified by the given access-list at the rendezvous point (RP), so that the RP will accept/refuse to perform the Register mechanism for the packets sent by the specified sources. By default, the RP accepts Register packets from all multicast sources.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim accept-register list (<100-199> <2000-2699> WORD) [no] ipv6 pim accept-register list (<100-199> <2000-2699> WORD)
Parameters	<100-199> : IP extended access-list value <2000-2699> : IP extended access-list value in the expanded range WORD : Name of a standard access list
Example usage	switch_a(config)# ipv6 pim accept-register list 121

IPv6 pim anycast-rp

Purpose	Configure the Anycast RP in the RP set.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim anycast-rp X:X::X:X X:X::X:X
Parameters	X:X::X:X : Unicast IP address of the Anycast RP set. An Anycast RP set is a collection of RPs in the same domain. X:X::X:X : Destination IP address where Register messages
Example usage	switch_a(config)# ipv6 pim anycast-rp 1.1.1.1 10.10.10.10

IPv6 pim bsr-candidate

Purpose	Give the router the candidate BSR status using the specified IPv6 address of the interface.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim bsr-candidate IFNAME ipv6 pim bsr-candidate IFNAME <0-32> ipv6 pim bsr-candidate IFNAME <0-32> <0-255>
Parameters	IFNAME Specify the name of the interface <0-32> : Hash mask length for RP selection <0-255> : Priority for a BSR candidate
Example usage	switch_a(config)# ipv6 pim bsr-candidate ge24 20 30

Ipv6 pim cisco-register-checksum	
Purpose	Configure the option to calculate the register checksum over the whole packet. Use for inter-operation with older Cisco IOS versions.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim cisco-register-checksum [no] ipv6 pim cisco-register-checksum group-list (<1-99> <1300-1999> WORD)
Parameters	group-list: Use this parameter to configure the option to calculate the register checksum over the whole packet on multicast groups specified by the access-list. <1-99>: IP standard access-list. <1300-1999>: IP access-list (expanded range). WORD: IP named standard access list.
Example usage	switch_a(config)# ipv6 pim cisco-register-checksum group-list 34

Ipv6 pim crp-cisco-prefix	
Purpose	Use this command to interoperate with Cisco devices that conform to an earlier draft standard. Some Cisco devices might not accept candidate RPs with a group prefix number of zero. Note that the latest BSR specification prohibits sending
Command Mode	Global Configuration
Syntax	[no] ipv6 pim crp-cisco-prefix
Parameters	
Example usage	switch_a(config)# ipv6 pim crp-cisco-prefix

Ipv6 pim ignore-rp-set-priority	
Purpose	This command is used to inter-operate with older Cisco IOS versions. It allows the RP-SET priority value to be ignored, and only the hashing mechanism for RP selection used.
Command Mode	Global Configuration
Syntax	[no] ip pim ignore-rp-set-priority
Parameters	
Example usage	switch_a(config)# ipv6 pim ignore-rp-set-priority

Ipv6 pim jp-timer	
Purpose	Set a PIM join/prune timer.
Command Mode	Global Configuration
Syntax	[no] ip pim jp-timer <1-65535> no ip pim jp-timer
Parameters	<1-65535> : Value of the Join/Prune timer, in seconds
Example usage	switch_a(config)# ipv6 pim jp-timer 234

Ipv6 pim register-probe	
Purpose	Set the register probe interval.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim register-probe <1-65535>
Parameters	<1-65535> : Value of the register probe timer, in seconds
Example usage	switch_a(config)# ipv6 pim register-probe 1000

Ipv6 pim register-rate-limit	
Purpose	Configure the rate of Register packets sent by this designated router (DR), in number of packets per second.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim register-rate-limit <1-65535>
Parameters	<1-65535> : Number of packets sent per second
Example usage	switch_a(config)# ipv6 pim register-rate-limit 20000

IPv6 pim register-rp-reachability	
Purpose	Enable the RP reachability check for PIM Registers at the designated router.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim register-rp-reachability
Parameters	
Example usage	switch_a(config)# ipv6 pim register-rp-reachability

IPv6 pim register-source	
Purpose	Configure the source address of Register packets sent by this DR, overriding the default source address, which is the address of the RPF interface toward the source host. Use the no option to remove the source address of register packets sent by this DR, and reset it to use the default source address, that is, the address of the RPF interface toward the source host. The configured address must be a reachable address so the RP can send corresponding Register-Stop messages in response. This address is usually the loopback interface address, but can also be other physical addresses. The address must be advertised by unicast routing protocols on the DR.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim register-source IFNAME [no] ipv6 pim register-source X:X::X:X
Parameters	X:X::X:X: The IP address to use as the source of the register packets IFNAME: The name of the interface to use as the source of the register packets
Example usage	switch_a(config)# ipv6 pim register-source 3ffe:406::1
Note	The interface configured does not require PIM to be enabled.

Ipv6 pim register-suppression

Purpose	Configure the register-suppression time, in seconds. Configuring this value modifies register-suppression time at the designated router; configuring this value at the rendezvous point modifies the RPkeepalive-period value if the ipv6 pim rp-register-kat command is not used. Default value of register-suppression time is 60 seconds.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim register-suppression <1-65535>
Parameters	<1-65535> : Register suppression time in seconds
Example usage	<code>switch_a(config)# ipv6 pim register-suppression 180</code>

Ipv6 pim rp-address

Purpose	Statically configure an RP address for multicast groups. To support embedded RP, the router configured as the RP must use a configured access-list that permits the embedded RP group ranges derived from the embedded RP address. If embedded RP support is available, only the RP must be statically configured as the RP for the embedded RP ranges: No additional configuration is required on other PIMv6 routers. The other routers will discover the RP address from the IPv6 group address. For these routers to select a static RP instead of the embedded RP, the specific embedded RP group range must be configured in the access list of the static RP, and embedded RP support must be disabled. • If RP-address configured through BSR and RP-address configured statically are both available for a group range, the BSR RP-address is chosen over static RP-address. • A single static-RP can be configured for multiple group ranges using Access Lists. However, configuring multiple static RPs (using <code>ipv6 pim rp-address</code> command) with the same RP address is not allowed. The static-RP can either be configured for the whole multicast group range <code>ff00::/8</code> (without ACL) or for specific group ranges (using ACL). For example, configuring <code>ipv6 pim rp-address 3ffe:10:10:5::153</code> will configure static-RP <code>3ffe:10:10:5::153</code> for the default group range <code>ff00::/8</code>. Configuring <code>ipv6 pim rp-address 3ffe:20:20:5::153 grp-list</code> will configure static-RP <code>3ffe:20:20:5::153</code> for all the group ranges represented by Permit filters in <code>grp-list</code> ACL. • If multiple static-RPs are available for a group range, then one with the highest IP address is chosen. • Only Permit filters in ACL are considered as valid group ranges.
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	The default Permit filter ::/0 is converted to default multicast filter ff00::/8. • After configuration, the RP-address is inserted into static-RP group tree based on the configured group ranges. For each group range multiple static-RPs are maintained in a linked list. This list is sorted in a descending order of IP addresses. When selecting static-RPs for a group range, the first element, which is the static-RP with highest IP address, is chosen. • Deletion of RP-address is handled by removing the static-RP from all the existing group ranges and recomputing the RPs for existing TIB states if required. • Group mode and RP address mappings learned through BSR take precedence over mappings statistically defined by the <code>ipv6 pim rp-address</code> command without the <code>override</code> keyword. Commands with the <code>override</code> keyword take precedence over dynamically learned mappings.
Command Mode	Global Configuration
Syntax	<pre>[no] ipv6 pim rp-address X:X::X:X (<1-99> <1300-1999> WORD) (override) [no] ipv6 pim rp-address X:X::X:X (override)</pre>
Parameters	X:X::X:X: IPv6 address for the RP <1-99>: IP Standard access-list <1300-1999>: IP Standard access-list (expanded range) WORD: Access-list name override: Static RP overrides dynamically-learned RP
Example usage	<pre>switch_a(config)# ipv6 pim rp-address 3ffe:30:30:5::153 4</pre>

IPv6 pim rp-candidate

Purpose	Give the router a candidate RP status using the IP address of the specified interface. Use the group-list parameter to give the router a candidate RP status using an access list of the specified interface. Use the interval parameter to give the router a candidate RP status using a candidate RP advertisement interval of the specified interface.
Command Mode	Global Configuration
Syntax	<pre>[no] ipv6 pim rp-candidate IFNAME [no] ipv6 pim rp-candidate IFNAME group-list (<1-99> WORD) interval <1-16383> (priority <0-255>) [no] ipv6 pim rp-candidate IFNAME group-list (<1-99> WORD) priority <0-255> (interval <1-16383>) [no] ipv6 pim rp-candidate IFNAME interval <1-16383> group-list (<1-99> WORD) (priority <0-255>) [no] ipv6 pim rp-candidate IFNAME interval <1-16383> priority <0-255> (group-list (<1-99> WORD))</pre>

	[no] ipv6 pim rp-candidate IFNAME priority <0-255> (group-list (<1-99> WORD)) [no] ipv6 pim rp-candidate IFNAME priority <0-255> group-list (<1-99> WORD) (interval <1-16383>) [no] ipv6 pim rp-candidate IFNAME priority <0-255> (interval <1-16383>) [no] ipv6 pim rp-candidate IFNAME priority <0-255> interval <1-16383> (group-list (<1-99> WORD))
Parameters	IFNAME: Interface name group-list: The group ranges for this candidate RP <1-99>: An IP Standard access-list WORD: A named standard access list Interval: A candidate-RP advertisement interval <0-16383>: Range of values for candidate-RP advertisement interval, in seconds <0-255>: Range of values for priority of an RP candidate priority: A candidate-RP priority <0-255>: Range of values for priority of an RP candidate
Example usage	switch_a(config)# ipv6 pim rp-candidate ge10

ipv6 pim rp-register-kat

Purpose	Configure a Keepalive Timer (KAT) value for (S,G) states at RP to monitor PIM register packets, overriding the generic KAT timer value.
Command Mode	Global Configuration
Syntax	ipv6 pim rp-register-kat <1-65535> no ipv6 pim rp-register-kat <1-65535>
Parameters	<1-65535>: Keepalive timer in seconds
Example usage	switch_a(config)# ipv6 pim rp-register-kat 3454

Ipv6 pim spt-threshold

Purpose	Configure a SPT (System Posture Token) threshold.
Command Mode	Global Configuration
Syntax	[no] ipv6 pim spt-threshold [no] ipv6 pim spt-threshold group-list (<1-99> <1300-1999> WORD)
Parameters	group-list: Enable the ability for the last-hop PIM router to switch to SPT for multicast group addresses indicated by the given access-list <1-99>: IP Standard access-list <1300-1999>: IP Standard access-list (expanded range) WORD: Standard access list name

Example usage	<code>switch_a(config)# ip pim spt-threshold group-list LIST1</code>
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IPv6 pim ssm	
Purpose	Configure a Source Specific Multicast (SSM), and define a range of IP multicast addresses. The default keyword defines the SSM range as ff3x::/32. To define the SSM range to be other than the default, use the access-list. When an SSM range of IP multicast addresses is defined with the ipv6 pim ssm command, the no (*,G) or (S,G,rpt) state is initiated for groups in the SSM range.
Command Mode	Global Configuration
Syntax	<code>[no] ipv6 pim ssm default</code> <code>[no] ipv6 pim ssm range (<1-99> WORD)</code>
Parameters	default: This keyword defines the 232/8 group range for SSM range: Define an access-list for group range to use for SSM <1-99>: Value for a standard access-list WORD: Standard access list name
Example usage	<code>switch_a(config)# ipv6 pim ssm range 4</code>

IPv6 prefix-list	
Purpose	Create an entry for an ipv6 prefix-list. Prefixes are matched from the top of the prefix list, and matching stops whenever a match or deny occurs. To promote efficiency, use the seq parameter and place common matches or denials towards the top of the list. The sequence values are generated in the sequence of 5. The parameters GE and LE specify the range of the prefix length to be matched.
Command Mode	Global Configuration
Syntax	<code>[no] ipv6 prefix-list WORD (deny permit) (X:X::X:X/M any)</code> <code>[no] ipv6 prefix-list WORD (deny permit) X:X::X:X/M ge <0-128></code> <code>[no] ipv6 prefix-list WORD (deny permit) X:X::X:X/M ge <0-128> le <0-128></code> <code>[no] ipv6 prefix-list WORD (deny permit) X:X::X:X/M le <0-128></code> <code>[no] ipv6 prefix-list WORD (deny permit) X:X::X:X/M le <0-128> ge <0-128></code> <code>[no] ipv6 prefix-list WORD description LINE</code> <code>[no] ipv6 prefix-list WORD seq <1-4294967295> (deny permit) (X:X::X:X/M any)</code> <code>[no] ipv6 prefix-list WORD seq <1-4294967295> (deny permit) X:X::X:X/M ge <0-128></code>

	<pre>[no] ipv6 prefix-list WORD seq <1-4294967295> (deny permit) X:X::X:X/M ge <0-128> le <0-128> [no] ipv6 prefix-list WORD seq <1-4294967295> (deny permit) X:X::X:X/M le <0-128> [no] ipv6 prefix-list WORD seq <1-4294967295> (deny permit) X:X::X:X/M le <0-128> ge <0-128> [no] ipv6 prefix-list sequence-number</pre>
Parameters	seq: The sequence number of the prefix list <1-429496725>. WORD: Name of a prefix list. description: Prefix-list specific description. LINE: Up to 80 characters describing this prefix-list Deny: Specify that packets are to be rejected. Permit: Specify that packets are to be accepted. IPPREFIX: The IP address mask and length of the prefix list mask (X:X::X:X/M). le: Maximum prefix length to be matched <0-128>. ge: Minimum prefix length to be matched <0-128>. any: Takes all packets of any length. This parameter is the same as using 0.0.0.0/0 le 32 for IPPREFIX. sequence-number: Include and exclude sequence numbers in nonvolatile generation (NVGEN)
Example usage	<pre>switch_a(config)# ipv6 prefix-list mylist seq 12345 deny 3ffe:345::/16 le 22 ge 14</pre>

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