

interface

To select an interface to configure and to enter interface configuration mode, use the **interface** command.

interface *type number*

Syntax Description	<i>type</i>	Type of interface to be configured; see Table 2-7 for valid values.
	<i>number</i>	Module and port number.

Defaults No interface types are configured.

Command Modes Global configuration

Command History	Release	Modification
	12.2(25)EW	Extended to include the 10-Gigabit Ethernet interface.

Usage Guidelines [Table 2-7](#) lists the valid values for *type*.

Table 2-7 Valid type Values

Keyword	Definition
ethernet	Ethernet IEEE 802.3 interface.
fastethernet	100-Mbps Ethernet interface.
gigabitethernet	Gigabit Ethernet IEEE 802.3z interface.
tengigabitethernet	10-Gigabit Ethernet IEEE 802.3ae interface.
ge-wan	Gigabit Ethernet WAN IEEE 802.3z interface; supported on Catalyst 4500 series switches that are configured with a Supervisor Engine II only.
pos	Packet OC-3 interface on the Packet over SONET Interface Processor; supported on Catalyst 4500 series switches that are configured with a Supervisor Engine II only.
atm	ATM interface; supported on Catalyst 4500 series switches that are configured with a Supervisor Engine II only.
vlan	VLAN interface; see the interface vlan command.
port-channel	Port channel interface; see the interface port-channel command.
null	Null interface; the valid value is 0 .

Examples

This example shows how to enter the interface configuration mode on the Fast Ethernet interface 2/4:

```
Switch(config)# interface fastethernet2/4  
Switch(config)#
```

Related Commands

[show interfaces](#)

interface port-channel

To access or create a port-channel interface, use the **interface port-channel** command.

interface port-channel *channel-group*

Syntax Description	<i>channel-group</i> Port-channel group number; valid values are from 1 to 64.
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Defaults	This command has no default settings.
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Command Modes	Global configuration
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Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	You do not have to create a port-channel interface before assigning a physical interface to a channel group. A port-channel interface is created automatically when the channel group gets its first physical interface, if it is not already created.
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You can also create the port channels by entering the **interface port-channel** command. This will create a Layer 3 port channel. To change the Layer 3 port channel into a Layer 2 port channel, use the **switchport** command before you assign the physical interfaces to the channel group. A port channel cannot be changed from Layer 3 to Layer 2 or vice versa when it contains member ports.

Only one port channel in a channel group is allowed.

**Caution**

The Layer 3 port-channel interface is the routed interface. Do not enable Layer 3 addresses on the physical Fast Ethernet interfaces.

If you want to use CDP, you must configure it only on the physical Fast Ethernet interface and not on the port-channel interface.

Examples	This example creates a port-channel interface with a channel-group number of 64: <pre>Switch(config)# interface port-channel 64 Switch(config)#</pre>
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Related Commands	channel-group show etherchannel
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interface range

To run a command on multiple ports at the same time, use the **interface range** command.

interface range { **vlan** *vlan_id - vlan_id* } { *port-range* | **macro** *name* }

Syntax Description

vlan <i>vlan_id - vlan_id</i>	Specifies a VLAN range; valid values are from 1 to 4094.
<i>port-range</i>	Port range; for a list of valid values for <i>port-range</i> , see the “Usage Guidelines” section.
macro <i>name</i>	Specifies the name of a macro.

Defaults

This command has no default settings.

Command Modes

Global configuration
Interface configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(12c)EW	Support for extended VLAN addresses added.

Usage Guidelines

You can use the **interface range** command on the existing VLAN SVIs only. To display the VLAN SVIs, enter the **show running config** command. The VLANs that are not displayed cannot be used in the **interface range** command.

The values that are entered with the **interface range** command are applied to all the existing VLAN SVIs.

Before you can use a macro, you must define a range using the [define interface-range](#) command.

All configuration changes that are made to a port range are saved to NVRAM, but the port ranges that are created with the **interface range** command do not get saved to NVRAM.

You can enter the port range in two ways:

- Specifying up to five port ranges
- Specifying a previously defined macro

You can either specify the ports or the name of a port-range macro. A port range must consist of the same port type, and the ports within a range cannot span the modules.

You can define up to five port ranges on a single command; separate each range with a comma.

When you define a range, you must enter a space between the first port and the hyphen (-):

interface range gigabitethernet 5/1 -20, gigabitethernet4/5 -20.

Use these formats when entering the *port-range*:

- *interface-type* {*mod*}/{*first-port*} - {*last-port*}
- *interface-type* {*mod*}/{*first-port*} - {*last-port*}

Valid values for *interface-type* are as follows:

- **FastEthernet**
- **GigabitEthernet**
- **Vlan** *vlan_id*

You cannot specify both a macro and an interface range in the same command. After creating a macro, you can enter additional ranges. If you have already entered an interface range, the CLI does not allow you to enter a macro.

You can specify a single interface in the *port-range* value. This makes the command similar to the **interface** *interface-number* command.

Examples

This example shows how to use the **interface range** command to interface to FE 5/18 - 20:

```
Switch(config)# interface range fastethernet 5/18 - 20  
Switch(config-if)#
```

This command shows how to run a port-range macro:

```
Switch(config)# interface range macro macro1  
Switch(config-if)#
```

Related Commands

[define interface-range](#)

show running config (refer to Cisco IOS documentation)

interface vlan

To create or access a Layer 3 switch virtual interface (SVI), use the **interface vlan** command. To delete an SVI, use the **no** form of this command.

interface vlan *vlan_id*

no interface vlan *vlan_id*

Syntax Description

vlan_id Number of the VLAN; valid values are from 1 to 4094.

Defaults

Fast EtherChannel is not specified.

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(12c)EW	Support for extended addressing was added.

Usage Guidelines

The SVIs are created the first time that you enter the **interface vlan** *vlan_id* command for a particular VLAN. The *vlan_id* value corresponds to the VLAN tag that is associated with the data frames on an ISL or 802.1Q-encapsulated trunk or the VLAN ID that is configured for an access port. A message is displayed whenever a VLAN interface is newly created, so you can check that you entered the correct VLAN number.

If you delete an SVI by entering the **no interface vlan** *vlan_id* command, the associated interface is forced into an administrative down state and marked as deleted. The deleted interface will no longer be visible in a **show interface** command.

You can reinstate a deleted SVI by entering the **interface vlan** *vlan_id* command for the deleted interface. The interface comes back up, but much of the previous configuration will be gone.

Examples

This example shows the output when you enter the **interface vlan** *vlan_id* command for a new VLAN number:

```
Switch(config)# interface vlan 23
% Creating new VLAN interface.
Switch(config)#
```

ip arp inspection filter vlan

To permit ARPs from hosts that are configured for static IP when DAI is enabled and to define an ARP access list and apply it to a VLAN, use the **ip arp inspection filter vlan** command. To disable this application, use the **no** form of this command.

ip arp inspection *filter arp-acl-name* **vlan** *vlan-range* [*static*]

no ip arp inspection *filter arp-acl-name* **vlan** *vlan-range* [*static*]

Syntax Description

<i>arp-acl-name</i>	Access control list name.
<i>vlan-range</i>	VLAN number or range; valid values are from 1 to 4094.
<i>static</i>	(Optional) Specifies that the access control list should be applied statically.

Defaults

No defined ARP ACLs are applied to any VLAN.

Command Modes

Configuration

Command History

Release	Modification
12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

When an ARP access control list is applied to a VLAN for dynamic ARP inspection, the ARP packets containing only the IP-to-Ethernet MAC bindings are compared against the ACLs. All other packet types are bridged in the incoming VLAN without validation.

This command specifies that the incoming ARP packets are compared against the ARP access control list, and the packets are permitted only if the access control list permits them.

If the access control lists deny the packets because of explicit denies, the packets are dropped. If the packets are denied because of an implicit deny, they are then matched against the list of DHCP bindings if the ACL is not applied statically.

Examples

This example shows how to apply the ARP ACL “static-hosts” to VLAN 1 for DAI:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# ip arp inspection filter static-hosts vlan 1
Switch(config)# end
Switch#
Switch# show ip arp inspection vlan 1
Source Mac Validation      : Enabled
Destination Mac Validation : Disabled
IP Address Validation      : Disabled
```

ip arp inspection filter vlan

```

Vlan      Configuration      Operation      ACL Match      Static ACL
-----
      1      Enabled              Active          static-hosts    No

Vlan      ACL Logging      DHCP Logging
-----
      1      Acl-Match        Deny

Switch#
```

Related Commands

[arp access-list](#)
[show ip arp inspection](#)

ip arp inspection limit (interface)

To limit the rate of incoming ARP requests and responses on an interface and prevent DAI from consuming all of the system's resources in the event of a DoS attack, use the **ip arp inspection limit** command. To release the limit, use the **no** form of this command.

ip arp inspection limit {*rate pps* | *none*} [*burst interval seconds*]

no ip arp inspection limit

Syntax Description

rate pps	Specifies an upper limit on the number of incoming packets processed per second. The rate can range from 1 to 10000.
none	Specifies no upper limit on the rate of the incoming ARP packets that can be processed.
burst interval seconds	(Optional) Specifies the consecutive interval in seconds over which the interface is monitored for the high rate of the ARP packets. The interval is configurable from 1 to 15 seconds.

Defaults

The rate is set to 15 packets per second on the untrusted interfaces, assuming that the network is a switched network with a host connecting to as many as 15 new hosts per second.

The rate is unlimited on all the trusted interfaces.

The burst interval is set to 1 second by default.

Command Modes

Interface

Command History

Release	Modification
12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(20)EW	Added support for interface monitoring.

Usage Guidelines

The trunk ports should be configured with higher rates to reflect their aggregation. When the rate of the incoming packets exceeds the user-configured rate, the interface is placed into an error-disabled state. The error-disable timeout feature can be used to remove the port from the error-disabled state. The rate applies to both the trusted and nontrusted interfaces. Configure appropriate rates on trunks to handle the packets across multiple DAI-enabled VLANs or use the **none** keyword to make the rate unlimited.

The rate of the incoming ARP packets on the channel ports is equal to the sum of the incoming rate of packets from all the channel members. Configure the rate limit for the channel ports only after examining the rate of the incoming ARP packets on the channel members.

After a switch receives more than the configured rate of packets every second consecutively over a period of burst seconds, the interface is placed into an error-disabled state.

Examples

This example shows how to limit the rate of the incoming ARP requests to 25 packets per second:

```
Switch# config terminal
Switch(config)# interface fa6/3
Switch(config-if)# ip arp inspection limit rate 25
Switch(config-if)# end
Switch# show ip arp inspection interfaces fastEthernet 6/3
```

Interface	Trust State	Rate (pps)
-----	-----	-----
Fa6/3	Trusted	25

```
Switch#
```

This example shows how to limit the rate of the incoming ARP requests to 20 packets per second and to set the interface monitoring interval to 5 consecutive seconds:

```
Switch# config terminal
Switch(config)# interface fa6/1
Switch(config-if)# ip arp inspection limit rate 20 burst interval 5
Switch(config-if)# end
```

Related Commands

[show ip arp inspection](#)

ip arp inspection log-buffer

	log-buffer	no	ip arp inspection
	ip arp inspection log-buffer entries <i>number</i> logs <i>number</i> interval <i>seconds</i>		
	no ip arp inspection log-buffer entries logs		

Syntax Description

entries <i>number</i>
logs <i>number</i>
interval <i>seconds</i>

Defaults

Command Modes

Command History

Release	Modification

Usage Guidelines

Examples

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# ip arp inspection log-buffer entries 45
Switch(config)# end
Switch# show ip arp inspection log
Total Log Buffer Size : 45
Syslog rate : 5 entries per 1 seconds.
No entries in log buffer.
Switch#
```

```
Switch(config)# ip arp inspection log-buffer logs 10 interval 3
Switch(config)# end
Switch# show ip arp inspection log
Total Log Buffer Size : 45
Syslog rate : 10 entries per 3 seconds.
No entries in log buffer.
Switch#
```

Related Commands

[arp access-list](#)
[show ip arp inspection](#)

ip arp inspection trust

```

ip arp inspection trust
no
ip arp inspection trust
no ip arp inspection trust

```

Syntax Description

Defaults

Command Modes

Command History

Release	Modification

Examples

```

Switch# config terminal
Switch(config)# interface fastEthernet 6/3
Switch(config-if)# ip arp inspection trust
Switch(config-if)# end

```

```

Switch# show ip arp inspection interfaces fastEthernet 6/3

```

Interface	Trust State	Rate (pps)	Burst Interval
Fa6/3	Trusted	None	1

```

Switch#

```

Related Commands

[show ip arp inspection](#)

ip arp inspection validate

ip arp inspection validate

no

ip arp inspection validate src-mac dst-mac ip

no ip arp inspection validate src-mac dst-mac ip

Syntax Description	src-mac
	Note
	dst-mac
	Note
	ip

Defaults

Command Modes

Command History	Release	Modification

Usage Guidelines	src-mac dst-mac ip
	src dst
	no

Examples

```
Switch(config)# ip arp inspection validate src-mac
Switch(config)# end
Switch# show ip arp inspection vlan 1
Source Mac Validation      : Enabled
Destination Mac Validation : Disabled
IP Address Validation      : Disabled
```

Vlan	Configuration	Operation	ACL Match	Static ACL
----	-----	-----	-----	-----
1	Enabled	Active		

Vlan	ACL Logging	DHCP Logging
----	-----	-----
1	Deny	Deny

Switch#

Related Commands

[arp access-list](#)
[show arp access-list](#)

ip arp inspection vlan

ip arp inspection vlan

no

ip arp inspection vlan *vlan-range*

no ip arp inspection vlan *vlan-range*

Syntax Description

vlan-range

Defaults

Command Modes

Command History

Release

Modification

Usage Guidelines

Examples

```
Switch(config)# ip arp inspection vlan 1
Switch(config)# end
Switch# show ip arp inspection vlan 1
```

```
Source Mac Validation      : Disabled
Destination Mac Validation : Disabled
IP Address Validation      : Disabled
Vlan      Configuration    Operation  ACL Match      Static ACL
----      -
    1      Enabled          Active
Vlan      ACL Logging      DHCP Logging
----      -
    1      Deny             Deny
Switch#
```

Related Commands

[arp access-list](#)
[show ip arp inspection](#)

ip arp inspection vlan logging

ip arp inspection vlan logging

no

ip arp inspection vlan *vlan-range* logging **acl-match** **matchlog** **none** **dhcp-bindings**
permit **all** **none**

no ip arp inspection vlan *vlan-range* logging **acl-match** **dhcp-bindings**

Syntax Description	
<i>vlan-range</i>	Number of the VLANs to be mapped to the specified instance. The number is entered as a single value or a range; valid values are from 1 to 4094.
acl-match	Specifies the logging criteria for packets that are dropped or permitted based on ACL matches.
matchlog	Specifies that logging of packets matched against ACLs is controlled by the matchlog keyword in the permit and deny access control entries of the ACL. Note By default, the matchlog keyword is not available on the ACEs. When the keyword is used, denied packets are not logged. Packets are logged only when they match against an ACE that has the matchlog keyword.
none	Specifies that ACL-matched packets are not logged.
dhcp-bindings	Specifies the logging criteria for packets dropped or permitted based on matches against the DHCP bindings.
permit	Specifies logging when permitted by DHCP bindings.
all	Specifies logging when permitted or denied by DHCP bindings.
none	Prevents all logging of packets permitted or denied by DHCP bindings.

Defaults

Command Modes

Command History	Release	Modification
	12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

acl-match **dhcp-bindings**

no

- **acl-match**—Logging on ACL matches is reset to log on deny
- **dhcp-bindings**—Logging on DHCP binding compared is reset to log on deny

Examples

This example shows how to configure an ARP inspection on VLAN 1 to add packets to a log on matching against the ACLs with the **logging** keyword:

```
Switch# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# ip arp inspection vlan 1 logging acl-match matchlog
Switch(config)# end
Switch# show ip arp inspection vlan 1
```

```
Source Mac Validation      : Enabled
Destination Mac Validation : Disabled
IP Address Validation      : Disabled
```

Vlan	Configuration	Operation	ACL Match	Static ACL
1	Enabled	Active		

Vlan	ACL Logging	DHCP Logging
1	Acl-Match	Deny

```
Switch#
```

Related Commands

[arp access-list](#)
[show ip arp inspection](#)

ip cef load-sharing algorithm

To configure the load-sharing hash function so that the source TCP/UDP port, the destination TCP/UDP port, or both ports can be included in the hash in addition to the source and destination IP addresses, use the **ip cef load-sharing algorithm** command. To revert back to the default, which does not include the ports, use the **no** form of this command.

```
ip cef load-sharing algorithm {include-ports {source source | destination dest} | original |  
                             tunnel | universal}
```

```
no ip cef load-sharing algorithm {include-ports {source source | destination dest} | original |  
                                tunnel | universal}
```

Syntax Description

include-ports	Specifies the algorithm that includes the Layer 4 ports.
source <i>source</i>	Specifies the source port in the load-balancing hash functions.
destination <i>dest</i>	Specifies the destination port in the load-balancing hash. Uses the source and destination in hash functions.
original	Specifies the original algorithm; not recommended.
tunnel	Specifies the algorithm for use in tunnel-only environments.
universal	Specifies the default Cisco IOS load-sharing algorithm.

Defaults

Default load-sharing algorithm is disabled.



Note

This option does not include the source or destination port in the load-balancing hash.

Command Modes

Global configuration

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

The original algorithm, tunnel algorithm, and universal algorithm are routed through the hardware. For software-routed packets, the algorithms are handled by the software. The **include-ports** option does not apply to the software-switched traffic.

Examples

This example shows how to configure the IP CEF load-sharing algorithm that includes Layer 4 ports:

```
Switch(config)# ip cef load-sharing algorithm include-ports  
Switch(config)#
```

This example shows how to configure the IP CEF load-sharing algorithm that includes Layer 4 tunneling ports:

```
Switch(config)# ip cef load-sharing algorithm include-ports tunnel
Switch(config)#
```

Related Commands [show ip cef vlan](#)

ip device tracking maximum

ip device tracking maximum
no

ip device tracking maximum *number*

no ip device tracking maximum *number*

Syntax Description

<i>number</i>	Specifies the number of bindings created in the IP device tracking table for a port, valid values are from 0 to 2048.
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Defaults

Command Modes

Command History

Release	Modification
12.2(37)SG	Support for this command was introduced on the Catalyst 4500 series switch.

Examples

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# ip device tracking
Switch(config)# interface fastethernet 4/3
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 1
Switch(config-if)# ip device tracking maximum 5
Switch(config-if)# switchport port-security
Switch(config-if)# switchport port-security maximum 5
Switch(config-if)# ip verify source tracking port-security
Switch(config-if)# end
```

show ip verify source privileged EXEC command.

Related Commands

[ip verify source](#)
[show ip verify source](#)

ip dhcp snooping

To enable DHCP snooping globally, use the **ip dhcp snooping** command. To disable DHCP snooping, use the **no** form of this command.

ip dhcp snooping

no ip dhcp snooping

Syntax Description This command has no arguments or keywords.

Defaults DHCP snooping is disabled.

Command Modes Global configuration

Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines You must enable DHCP snooping globally before you can use DHCP snooping on a VLAN.

Examples This example shows how to enable DHCP snooping:

```
Switch(config)# ip dhcp snooping
Switch(config)#
```

This example shows how to disable DHCP snooping:

```
Switch(config)# no ip dhcp snooping
Switch(config)#
```

Related Commands

- [ip dhcp snooping information option](#)
- [ip dhcp snooping limit rate](#)
- [ip dhcp snooping trust](#)
- [ip dhcp snooping vlan](#)
- [show ip dhcp snooping](#)
- [show ip dhcp snooping binding](#)

ip dhcp snooping binding

To set up and generate a DHCP binding configuration to restore bindings across reboots, use the **ip dhcp snooping binding** command. To disable the binding configuration, use the **no** form of this command.

ip dhcp snooping binding *mac-address* **vlan** *vlan-#* *ip-address* **interface** *interface* **expiry** *seconds*

no ip dhcp snooping binding *mac-address* **vlan** *vlan-#* *ip-address* **interface** *interface*

Syntax Description	<i>mac-address</i>
	vlan <i>vlan-#</i>
	<i>ip-address</i>
	interface <i>interface</i>
	expiry <i>seconds</i>

Defaults

Command Modes

Command History	Release	Modification

Usage Guidelines

Examples

```
Switch# ip dhcp snooping binding 0001.1234.1234 vlan 1 172.20.50.5 interface gi1/1 expiry 1000
Switch#
```

Related Commands	ip dhcp snooping
	ip dhcp snooping information option
	ip dhcp snooping trust
	ip dhcp snooping vlan
	show ip dhcp snooping
	show ip dhcp snooping binding

ip dhcp snooping database

ip dhcp snooping database

no

ip dhcp snooping database *url* **timeout** *seconds* | **write-delay** *seconds*no ip dhcp snooping database **timeout** **write-delay**

Syntax Description

url

- tftp://<host>/<filename>
- ftp://<user>:<password>@<host>/<filename>
- rcp://<user>@<host>/<filename>
- nvram:/<filename>
- bootflash:/<filename>

timeout

Specifies when to abort the database transfer process after a change to the binding database.

The minimum value of the delay is 15 seconds. 0 is defined as an infinite duration.

write-delay

Specifies the duration for which the transfer should be delayed after a change to the binding database.

Defaults

Command Modes

Command History

Release**Modification**

12.1(19)EW

Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

**Note**

Examples

This example shows how to store a database file with the IP address 10.1.1.1 within a directory called directory. A file named file must be present on the TFTP server.

```
Switch# config terminal
Switch(config)# ip dhcp snooping database tftp://10.1.1.1/directory/file
Switch(config)# end
Switch# show ip dhcp snooping database
Agent URL : tftp://10.1.1.1/directory/file
Write delay Timer : 300 seconds
Abort Timer : 300 seconds

Agent Running : Yes
Delay Timer Expiry : Not Running
Abort Timer Expiry : Not Running

Last Succeeded Time : None
Last Failed Time : None
Last Failed Reason : No failure recorded.

Total Attempts      :          1   Startup Failures :          0
Successful Transfers :          0   Failed Transfers :          0
Successful Reads     :          0   Failed Reads    :          0
Successful Writes    :          0   Failed Writes   :          0
Media Failures       :          0

Switch#
```

Related Commands

[ip dhcp snooping](#)
[ip dhcp snooping binding](#)
[ip dhcp snooping information option](#)
[ip dhcp snooping trust](#)
[ip dhcp snooping vlan](#)
[show ip dhcp snooping](#)
[show ip dhcp snooping binding](#)

ip dhcp snooping information option

To enable DHCP option 82 data insertion, use the **ip dhcp snooping information option** command. To disable DHCP option 82 data insertion, use the **no** form of this command.

ip dhcp snooping information option

no ip dhcp snooping information option

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	DHCP option 82 data insertion is enabled.
-----------------	---

Command Modes	Global configuration
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Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Examples	This example shows how to enable DHCP option 82 data insertion:
-----------------	---

```
Switch(config)# ip dhcp snooping information option
Switch(config)#
```

This example shows how to disable DHCP option 82 data insertion:

```
Switch(config)# no ip dhcp snooping information option
Switch(config)#
```

Related Commands	ip dhcp snooping
	ip dhcp snooping limit rate
	ip dhcp snooping trust
	ip dhcp snooping vlan
	show ip dhcp snooping
	show ip dhcp snooping binding

ip dhcp snooping information option allow-untrusted

To allow DHCP packets with option 82 data inserted to be received from a snooping untrusted port, use the **ip dhcp snooping information option allow-untrusted** command. To disallow receipt of these DHCP packets, use the **no** form of this command.

ip dhcp snooping information option allow-untrusted

no ip dhcp snooping information option allow-untrusted

Syntax Description

This command has no arguments or keywords.

Defaults

DHCP packets with option 82 are not allowed on snooping untrusted ports.

Command Modes

Global configuration

Command History

Release	Modification
12.2(25)EWA	Support for this command was introduced on the Catalyst 4500 series switch.

Examples

This example shows how to allow DHCP packets with option 82 data inserted to be received from a snooping untrusted port:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# ip dhcp snooping information option allow-untrusted
Switch(config)# end
Switch#
```

Related Commands

[ip dhcp snooping](#)
[ip dhcp snooping limit rate](#)
[ip dhcp snooping trust](#)
[ip dhcp snooping vlan](#)
[ip dhcp snooping information option](#)
[show ip dhcp snooping](#)
[show ip dhcp snooping binding](#)

ip dhcp snooping limit rate

To configure the number of the DHCP messages that an interface can receive per second, use the **ip dhcp snooping limit rate** command. To disable the DHCP snooping rate limiting, use the **no** form of this command.

ip dhcp snooping limit rate

no ip dhcp snooping limit rate

Syntax Description

Number of DHCP messages a switch can receive per second.

Defaults

DHCP snooping rate limiting is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

Typically, the rate limit applies to the untrusted interfaces. If you want to set up rate limiting for the trusted interfaces, note that the trusted interfaces aggregate all DHCP traffic in the switch, and you will need to adjust the rate limit of the interfaces to a higher value.

Examples

This example shows how to enable the DHCP message rate limiting:

```
Switch(config-if)# ip dhcp snooping limit rate 150
Switch(config)#
```

This example shows how to disable the DHCP message rate limiting:

```
Switch(config-if)# no ip dhcp snooping limit rate
Switch(config)#
```

Related Commands

[ip dhcp snooping](#)
[ip dhcp snooping information option](#)
[ip dhcp snooping trust](#)
[ip dhcp snooping vlan](#)
[show ip dhcp snooping](#)
[show ip dhcp snooping binding](#)

ip dhcp snooping trust

To configure an interface as trusted for DHCP snooping purposes, use the **ip dhcp snooping trust** command. To configure an interface as untrusted, use the **no** form of this command.

ip dhcp snooping trust

no ip dhcp snooping trust

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	DHCP snooping trust is disabled.
-----------------	----------------------------------

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Examples	This example shows how to enable DHCP snooping trust on an interface:
-----------------	---

```
Switch(config-if) # ip dhcp snooping trust
Switch(config) #
```

This example shows how to disable DHCP snooping trust on an interface:
--

```
Switch(config-if) # no ip dhcp snooping trust
Switch(config) #
```

Related Commands	ip dhcp snooping ip dhcp snooping information option ip dhcp snooping limit rate ip dhcp snooping vlan show ip dhcp snooping show ip dhcp snooping binding
-------------------------	---

ip dhcp snooping vlan

Use the **ip dhcp snooping vlan** command to enable DHCP snooping on a VLAN. To disable DHCP snooping on a VLAN, use the **no** form of this command.

ip dhcp snooping [vlan]

no ip dhcp snooping [vlan]

Syntax Description

vlan (Optional) Single VLAN number or a range of VLANs; valid values are from 1 to 4094.

Defaults

DHCP snooping is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

DHCP snooping is enabled on a VLAN only if both the global snooping and the VLAN snooping are enabled.

Examples

This example shows how to enable DHCP snooping on a VLAN:

```
Switch(config)# ip dhcp snooping vlan 10
Switch(config)#
```

This example shows how to disable DHCP snooping on a VLAN:

```
Switch(config)# no ip dhcp snooping vlan 10
Switch(config)#
```

This example shows how to enable DHCP snooping on a group of VLANs:

```
Switch(config)# ip dhcp snooping vlan 10 55
Switch(config)#
```

This example shows how to disable DHCP snooping on a group of VLANs:

```
Switch(config)# no ip dhcp snooping vlan 10 55
Switch(config)#
```

Related Commands

[ip dhcp snooping](#)
[ip dhcp snooping information option](#)
[ip dhcp snooping limit rate](#)
[ip dhcp snooping trust](#)
[show ip dhcp snooping](#)
[show ip dhcp snooping binding](#)

ip igmp filter

To control whether all hosts on a Layer 2 interface can join one or more IP multicast groups by applying an IGMP profile to the interface, use the **ip igmp filter** command. To remove a profile from the interface, use the **no** form of this command.

ip igmp filter

no ip igmp filter

Syntax Description

IGMP profile number to be applied; valid values are from 1 to 429496795.

Defaults

Profiles are not applied.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(11b)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

You can apply IGMP filters only to Layer 2 physical interfaces; you cannot apply IGMP filters to routed ports, switch virtual interfaces (SVIs), or ports that belong to an EtherChannel group.

An IGMP profile can be applied to one or more switch port interfaces, but one port can have only one profile applied to it.

Examples

This example shows how to apply IGMP profile 22 to an interface.

```
Switch(config)# interface gigabitethernet1/1
Switch(config-if)# ip igmp filter 22
Switch(config-if)#
```

Related Commands

[ip igmp profile](#)
[show ip igmp profile](#)

ip igmp max-groups

To set the maximum number of IGMP groups that a Layer 2 interface can join, use the **ip igmp max-groups** command. To set the maximum back to the default, use the **no** form of this command.

ip igmp max-groups

no ip igmp max-groups

Syntax Description

Maximum number of IGMP groups that an interface can join; valid values are from 0 to 4294967294.

Defaults

No maximum limit.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(11b)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

You can use the **ip igmp max-groups** command only on Layer 2 physical interfaces; you cannot set the IGMP maximum groups for the routed ports, the switch virtual interfaces (SVIs), or the ports that belong to an EtherChannel group.

Examples

This example shows how to limit the number of IGMP groups that an interface can join to 25:

```
Switch(config)# interface gigabitethernet1/1
Switch(config-if)# ip igmp max-groups 25
Switch(config-if)
```

ip igmp profile

To create an IGMP profile, use the **ip igmp profile** command. To delete the IGMP profile, use the **no** form of this command.

ip igmp profile

no ip igmp profile

Syntax Description

IGMP profile number being configured; valid values are from 1 to 4294967295.

Defaults

No profile created.

Command Modes

Global configuration

IGMP profile configuration

Command History

Release	Modification
12.1(11b)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

When entering a range, enter the low IP multicast address, a space, and the high IP multicast address. You can apply an IGMP profile to one or more Layer 2 interfaces, but each interface can have only one profile applied to it.

Examples

This example shows how to configure IGMP profile 40 that permits the specified range of IP multicast addresses:

```
Switch # config terminal
Switch(config)# ip igmp profile 40
Switch(config-igmp-profile)# permit
Switch(config-igmp-profile)# range 233.1.1.1 233.255.255.255
Switch(config-igmp-profile)#
```

Related Commands

[ip igmp filter](#)
[show ip igmp profile](#)

ip igmp query-interval

To configure the frequency that the switch sends the IGMP host-query messages, use the **ip igmp query-interval** command. To return to the default frequency, use the **no** form of this command.

ip igmp query-interval

no ip igmp query-interval

Syntax Description

Frequency, in seconds, at which the IGMP host-query messages are transmitted; valid values depend on the IGMP snooping mode. See the “Usage Guidelines” section for more information.

Defaults

The query interval is set to 60 seconds.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

If you use the default IGMP snooping configuration, the valid query interval values are from 1 to 65535 seconds. If you have changed the default configuration to support CGMP as the IGMP snooping learning method, the valid query interval values are from 1 to 300 seconds.

The designated switch for a LAN is the only switch that sends the IGMP host-query messages. For IGMP version 1, the designated switch is elected according to the multicast routing protocol that runs on the LAN. For IGMP version 2, the designated querier is the lowest IP-addressed multicast switch on the subnet.

If no queries are heard for the timeout period (controlled by the **ip igmp query-timeout** command), the switch becomes the querier.



Note

Changing the timeout period may severely impact multicast forwarding.

Examples

This example shows how to change the frequency at which the designated switch sends the IGMP host-query messages:

```
Switch(config-if)# ip igmp query-interval 120
Switch(config-if)#
```

Related Commands

ip igmp query-timeout (refer to Cisco IOS documentation)

ip pim query-interval (refer to Cisco IOS documentation)

show ip igmp groups (refer to Cisco IOS documentation)

ip igmp snooping

To enable IGMP snooping, use the **ip igmp snooping** command. To disable IGMP snooping, use the **no** form of this command.

ip igmp snooping [**tcn** {**flood** **query count** | **query solicit**}]

no ip igmp snooping [**tcn** {**flood** **query count** | **query solicit**}]

Syntax Description	
tcn	(Optional) Specifies the topology change configurations.
flood	(Optional) Specifies to flood the spanning-tree table to the network when a topology change occurs.
query	(Optional) Specifies the TCN query configurations.
count	(Optional) Specifies how often the spanning-tree table is flooded; valid values are from 1 to 10.
solicit	(Optional) Specifies an IGMP general query.

Defaults IGMP snooping is enabled.

Command Modes Global configuration
Interface configuration

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
	12.1(11)EW	Support for flooding the spanning-tree table was added.

Usage Guidelines The **tcn flood** option applies only to Layer 2 switch ports and EtherChannels; it does not apply to routed ports, VLAN interfaces, or Layer 3 channels.

The **ip igmp snooping command** is disabled by default on multicast routers.



Note

You can use the **tcn flood** option in interface configuration mode.

Examples This example shows how to enable IGMP snooping:

```
Switch(config)# ip igmp snooping
Switch(config)#
```

This example shows how to disable IGMP snooping:

```
Switch(config)# no ip igmp snooping
Switch(config)#
```

This example shows how to enable the flooding of the spanning-tree table to the network after nine topology changes have occurred:

```
Switch(config)# ip igmp snooping tcn flood query count 9
Switch(config)#
```

This example shows how to disable the flooding of the spanning-tree table to the network:

```
Switch(config)# no ip igmp snooping tcn flood
Switch(config)#
```

This example shows how to enable an IGMP general query:

```
Switch(config)# ip igmp snooping tcn query solicit
Switch(config)#
```

This example shows how to disable an IGMP general query:

```
Switch(config)# no ip igmp snooping tcn query solicit
Switch(config)#
```

Related Commands

[ip igmp snooping vlan immediate-leave](#)
[ip igmp snooping vlan mrouter](#)
[ip igmp snooping vlan static](#)

ip igmp snooping report-suppression

To enable report suppression, use the **ip igmp snooping report-suppression** command. To disable report suppression and forward the reports to the multicast devices, use the **no** form of this command.

ip igmp snooping report-suppression

no igmp snooping report-suppression

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	IGMP snooping report-suppression is enabled.
-----------------	--

Command Modes	Global configuration
----------------------	----------------------

Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	If the ip igmp snooping report-suppression command is disabled, all the IGMP reports are forwarded to the multicast devices. If the command is enabled, report suppression is done by IGMP snooping.
-------------------------	---

Examples	This example shows how to enable report suppression: <pre>Switch(config)# ip igmp snooping report-suppression Switch(config)#</pre>
-----------------	--

This example shows how to disable report suppression:

```
Switch(config)# no ip igmp snooping report-suppression
Switch(config)#
```

This example shows how to display the system status for report suppression:

```
Switch# show ip igmp snoop
vlan 1
-----
IGMP snooping is globally enabled
IGMP snooping TCN solicit query is globally disabled
IGMP snooping global TCN flood query count is 2
IGMP snooping is enabled on this Vlan
IGMP snooping immediate-leave is disabled on this Vlan
IGMP snooping mrouter learn mode is pim-dvmrp on this Vlan
IGMP snooping is running in IGMP_ONLY mode on this Vlan
IGMP snooping report suppression is enabled on this Vlan
Switch#
```

■ ip igmp snooping report-suppression

Related Commands

[ip igmp snooping vlan immediate-leave](#)
[ip igmp snooping vlan mrouter](#)
[ip igmp snooping vlan static](#)

ip igmp snooping vlan

To enable IGMP snooping for a VLAN, use the **ip igmp snooping vlan** command. To disable IGMP snooping, use the **no** form of this command.

ip igmp snooping vlan

no ip igmp snooping vlan

Syntax Description

Number of the VLAN; valid values are from 1 to 1001 and from 1006 to 4094.

Defaults

IGMP snooping is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(12c)EW	Support for extended addressing was added.

Usage Guidelines

This command is entered in VLAN interface configuration mode only.

The **ip igmp snooping vlan** command is disabled by default on multicast routers.

Examples

This example shows how to enable IGMP snooping on a VLAN:

```
Switch(config)# ip igmp snooping vlan 200
Switch(config)#
```

This example shows how to disable IGMP snooping on a VLAN:

```
Switch(config)# no ip igmp snooping vlan 200
Switch(config)#
```

Related Commands

[ip igmp snooping vlan immediate-leave](#)
[ip igmp snooping vlan mrouter](#)
[ip igmp snooping vlan static](#)

ip igmp snooping vlan explicit-tracking

To enable per-VLAN explicit host tracking, use the **ip igmp snooping vlan explicit-tracking** command. To disable explicit host tracking, use the **no** form of this command.

ip igmp snooping vlan explicit-tracking
no ip igmp snooping vlan explicit-tracking

Syntax Description	(Optional) Specifies a VLAN; valid values are from 1 to 1001 and from 1006 to 4094.
---------------------------	---

Defaults	Explicit host tracking is enabled.
-----------------	------------------------------------

Command Modes	Configuration
----------------------	---------------

Command History	<table border="1"> <tr> <th>Release</th> <th>Modification</th> </tr> <tr> <td>12.1(20)EW</td> <td>Support for this command was introduced on the Catalyst 4500 series switch.</td> </tr> </table>	Release	Modification	12.1(20)EW	Support for this command was introduced on the Catalyst 4500 series switch.
Release	Modification				
12.1(20)EW	Support for this command was introduced on the Catalyst 4500 series switch.				

Examples This example shows how to disable IGMP explicit host tracking on interface VLAN 200 and how to verify the configuration:

```
Switch(config)# no ip igmp snooping vlan 200 explicit-tracking
Switch(config)# end
Switch# show ip igmp snooping vlan 200 | include explicit tracking
Global IGMP Snooping configuration:
-----
IGMP snooping           : Enabled
IGMPv3 snooping         : Enabled
Report suppression      : Enabled
TCN solicit query       : Disabled
TCN flood query count   : 2

Vlan 2:
-----
IGMP snooping           : Enabled
IGMPv2 immediate leave  : Disabled
Explicit host tracking   : Disabled
Multicast router learning mode : pim-dvmrp
CGMP interoperability mode : IGMP_ONLY
Explicit host tracking   : Disabled
Switch#
```

Related Commands	show ip igmp snooping membership clear ip igmp snooping statistics vlan (refer to Cisco IOS documentation) show ip igmp snooping statistics vlan (refer to Cisco IOS documentation)
-------------------------	--

ip igmp snooping vlan immediate-leave

To enable IGMP immediate-leave processing, use the **ip igmp snooping vlan immediate-leave** command. To disable immediate-leave processing, use the **no** form of this command.

ip igmp snooping vlan	immediate-leave
no ip igmp snooping vlan	immediate-leave

Syntax Description

	Number of the VLAN; valid values are from 1 to 4094.
immediate-leave	Enables immediate leave processing.

Defaults

Immediate leave processing is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(12c)EW	Support for extended addressing was added.

Usage Guidelines

You enter this command in global configuration mode only.

Use the immediate-leave feature only when there is a single receiver for the MAC group for a specific VLAN.

The immediate-leave feature is supported only with IGMP version 2 hosts.

Examples

This example shows how to enable IGMP immediate-leave processing on VLAN 4:

```
Switch(config)# ip igmp snooping vlan 4 immediate-leave
Switch(config)#
```

This example shows how to disable IGMP immediate-leave processing on VLAN 4:

```
Switch(config)# no ip igmp snooping vlan 4 immediate-leave
Switch(config)#
```

Related Commands

[ip igmp snooping](#)
[ip igmp snooping vlan mrouter](#)
[ip igmp snooping vlan static](#)
[show ip igmp interface](#) (refer to Cisco IOS documentation)
[show mac-address-table multicast](#)

ip igmp snooping vlan mrouter

To statically configure an Layer 2 interface as a multicast router interface for a VLAN, use the **ip igmp snooping vlan mrouter** command. To remove the configuration, use the **no** form of this command.

```
ip igmp snooping vlan mrouter {interface {{fastethernet slot/port} | {{gigabitethernet
slot/port} | {{tengigabitethernet slot/port} | {{port-channel number}}} |
learn {{cgmp | pim-dvmrp}}
```

```
no ip igmp snooping vlan vlan-id mrouter {interface {{fastethernet slot/port} | {{gigabitethernet
slot/port} | {{tengigabitethernet slot/port} | {{port-channel number}}} |
learn {{cgmp | pim-dvmrp}}
```

Syntax Description

vlan <i>vlan-id</i>	Specifies the VLAN ID number to use in the command; valid values are from 1 to 4094.
interface	Specifies the next-hop interface to a multicast switch.
fastethernet <i>slot/port</i>	Specifies the Fast Ethernet interface; number of the slot and port.
gigabitethernet <i>slot/port</i>	Specifies the Gigabit Ethernet interface; number of the slot and port.
tengigabitethernet <i>slot/port</i>	Specifies the 10-Gigabit Ethernet interface; number of the slot and port.
port-channel <i>number</i>	Port-channel number; valid values are from 1 to 64.
learn	Specifies the multicast switch learning method.
cgmp	Specifies the multicast switch snooping CGMP packets.
pim-dvmrp	Specifies the multicast switch snooping PIM-DVMRP packets.

Defaults

Multicast switch snooping PIM-DVMRP packets are specified.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(12c)EW	Support for extended addressing was added.
12.2(25)EW	Support for the 10-Gigabit Ethernet interface was introduced on the Catalyst 4500 series switch.

Usage Guidelines

You enter this command in VLAN interface configuration mode only.

The interface to the switch must be in the VLAN where you are entering the command. It must be both administratively up and line protocol up.

The CGMP learning method can decrease control traffic.

The learning method that you configure is saved in NVRAM.

The static connections to multicast interfaces are supported only on switch interfaces.

Examples

This example shows how to specify the next-hop interface to a multicast switch:

```
Switch(config-if)# ip igmp snooping 400 mrouter interface fastethernet 5/6
Switch(config-if)#
```

This example shows how to specify the multicast switch learning method:

```
Switch(config-if)# ip igmp snooping 400 mrouter learn cgmp
Switch(config-if)#
```

Related Commands

[ip igmp snooping](#)
[ip igmp snooping vlan immediate-leave](#)
[ip igmp snooping vlan static](#)
[show ip igmp snooping](#)
[show ip igmp snooping mrouter](#)

ip igmp snooping vlan static

To configure a Layer 2 interface as a member of a group, use the **ip igmp snooping vlan static** command. To remove the configuration, use the **no** form of this command.

ip igmp snooping vlan *vlan_num* **static** *mac-address* **{interface {fastethernet slot/port} | {gigabitethernet slot/port} | {tengigabitethernet slot/port} | {port-channel number}}**

no ip igmp snooping vlan *vlan_num* **static** *mac-address* **{interface {fastethernet slot/port} | {gigabitethernet slot/port} | {tengigabitethernet mod/interface-number} | {port-channel number}}**

Syntax Description

vlan <i>vlan_num</i>	Number of the VLAN.
static <i>mac-address</i>	Group MAC address.
interface	Specifies the next-hop interface to multicast switch.
fastethernet <i>slot/port</i>	Specifies the Fast Ethernet interface; number of the slot and port.
gigabitethernet <i>slot/port</i>	Specifies the Gigabit Ethernet interface; number of the slot and port.
tengigabitethernet <i>slot/port</i>	Specifies the 10-Gigabit Ethernet interface; number of the slot and port.
port-channel <i>number</i>	Port-channel number; valid values are from 1 through 64.

Defaults

This command has no default settings.

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.2(25)EW	Support for the 10-Gigabit Ethernet interface was introduced on the Catalyst 4500 series switch.

Examples

This example shows how to configure a host statically on an interface:

```
Switch(config)# ip igmp snooping vlan 4 static 0100.5e02.0203 interface fastethernet 5/11
Configuring port FastEthernet5/11 on group 0100.5e02.0203 vlan 4
Switch(config)#
```

Related Commands

[ip igmp snooping](#)
[ip igmp snooping vlan immediate-leave](#)
[ip igmp snooping vlan mrouter](#)
[show mac-address-table multicast](#)

ip local-proxy-arp

To enable the local proxy ARP feature, use the **ip local-proxy-arp** command. To disable the local proxy ARP feature, use the **no** form of this command.

ip local-proxy-arp

no ip local-proxy-arp

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	Local proxy ARP is disabled.
-----------------	------------------------------

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	Use this feature only on subnets where hosts are intentionally prevented from communicating directly to the switch on which they are connected. ICMP redirect is disabled on interfaces where the local proxy ARP feature is enabled.
-------------------------	--

Examples	This example shows how to enable the local proxy ARP feature: Switch(config-if) # ip local-proxy-arp Switch(config-if) #
-----------------	---

ip mfib fastdrop

To enable MFIB fast drop, use the **ip mfib fastdrop** command. To disable MFIB fast drop, use the **no** form of this command.

ip mfib fastdrop

no ip mfib fastdrop

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	MFIB fast drop is enabled.
-----------------	----------------------------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Examples	This example shows how to enable MFIB fast drops: <pre>Switch# ip mfib fastdrop Switch#</pre>
-----------------	--

Related Commands	clear ip mfib fastdrop show ip mfib fastdrop
-------------------------	--

ip route-cache flow

To enable NetFlow statistics for IP routing, use the **ip route-cache flow** command. To disable NetFlow statistics, use the **no** form of this command.

ip route-cache flow [infer-fields]

no ip route-cache flow [infer-fields]

Syntax Description

infer-fields	(Optional) Includes the NetFlow fields as inferred by the software: Input identifier, Output identifier, and Routing information.
---------------------	---

Defaults

NetFlow statistics is disabled.
Inferred information is excluded.

Command Modes

Configuration

Command History

Release	Modification
12.1(13)EW	Support for this command was introduced on the Catalyst 4500 series switches.
12.1(19)EW	Command enhanced to support infer fields.

Usage Guidelines

To use these commands, you need to install the Supervisor Engine IV and the NetFlow Service Card.

The NetFlow statistics feature captures a set of traffic statistics. These traffic statistics include the source IP address, destination IP address, Layer 4 port information, protocol, input and output identifiers, and other routing information that can be used for network analysis, planning, accounting, billing and identifying DoS attacks.

NetFlow switching is supported on IP and IP-encapsulated traffic over all interface types.

If you enter the **ip route-cache flow infer-fields** command after the **ip route-cache flow** command, you will purge the existing cache, and vice versa. This action is done to avoid having flows with and without inferred fields in the cache simultaneously.

For additional information on NetFlow switching, refer to the *Catalyst 4500 Series Switch Cisco IOS Software Configuration Guide*.



Note

NetFlow consumes additional memory and CPU resources compared to other switching modes. You need to know the resources required on your switch before enabling NetFlow.

Examples

This example shows how to enable NetFlow switching on the switch:

```
Switch# config terminal  
Switch(config)# ip route-cache flow  
Switch(config)# exit  
Switch#
```

**Note**

This command does not work on a per-interface basis.

ip source binding

To add or delete a static IP source binding entry, use the **ip source binding** command. To delete the corresponding IP source binding entry, use the **no** form of this command.

ip source binding *ip-address mac-address vlan vlan-id interface interface-name*

no ip source binding *ip-address mac-address vlan vlan-id interface interface-name*

Syntax Description	<i>ip-address</i>	Binding IP address.
	<i>mac-address</i>	Binding MAC address.
	vlan <i>vlan-id</i>	VLAN number.
	interface <i>interface-name</i>	Binding interface.

Defaults This command has no default settings.

Command Modes Global configuration

Command History	Release	Modification
	12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines The **ip source binding** command is used to add a static IP source binding entry only.

The **no** form of this command deletes the corresponding IP source binding entry. For the deletion to succeed, all required parameters must match.

Each static IP binding entry is keyed by a MAC address and VLAN number. If the CLI contains an existing MAC and VLAN, the existing binding entry will be updated with the new parameters; a separate binding entry will not be created.

Examples This example shows how to configure the static IP source binding:

```
Switch# config terminal
Switch(config)# ip source binding 11.0.0.1 0000.000A.000B vlan 10 interface
fastethernet6/10
Switch(config)#
```

Related Commands [show ip source binding](#)

ip sticky-arp

To enable sticky ARP, use the **ip sticky-arp** command. Use the **no** form of this command to disable sticky ARP.

ip sticky-arp

no ip sticky-arp

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	Enabled
-----------------	---------

Command Modes	Global configuration
----------------------	----------------------

Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	This command is supported on PVLANS only. ARP entries that are learned on Layer3 PVLAN interfaces are sticky ARP entries. (You should display and verify ARP entries on the PVLAN interface using the show arp command). For security reasons, sticky ARP entries on the PVLAN interface do not age out. Connecting new equipment with the same IP address generates a message and the ARP entry is not created. Because the ARP entries on the PVLAN interface do not age out, you must manually remove ARP entries on the PVLAN interface if a MAC address changes. Unlike static entries, sticky-ARP entries are not stored and restored when you enter the reboot and restart commands.
-------------------------	---

Examples	This example shows how to enable sticky ARP:
-----------------	--

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config) ip sticky-arp
Switch(config)# end
Switch#
```

This example shows how to disable sticky ARP:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config) no ip sticky-arp
Switch(config)# end
Switch#
```

Related Commands**arp** (refer to Cisco IOS documentation)**show arp** (refer to Cisco IOS documentation)

ip verify header vlan all

To enable IP header validation for Layer 2-switched IPv4 packets, use the **ip verify header vlan all** command. To disable the IP header validation, use the **no** form of this command.

ip verify header vlan all

no ip verify header vlan all

Syntax Description

This command has no default settings.

Defaults

The IP header is validated for bridged and routed IPv4 packets.

Command Modes

Configuration

Command History

Release	Modification
12.1(20)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

This command does not apply to Layer 3-switched (routed) packets.

The Catalyst 4500 series switch checks the validity of the following fields in the IPv4 header for all switched IPv4 packets:

- The version must be 4.
- The header length must be greater than or equal to 20 bytes.
- The total length must be greater than or equal to four times the header length and greater than the Layer 2 packet size minus the Layer 2 encapsulation size.

If an IPv4 packet fails the IP header validation, the packet is dropped. If you disable the header validation, the packets with the invalid IP headers are bridged but are not routed even if routing was intended. The IPv4 access lists also are not applied to the IP headers.

Examples

This example shows how to disable the IP header validation for the Layer 2-switched IPv4 packets:

```
Switch# config terminal
Switch(config)# no ip verify header vlan all
Switch(config)# end
Switch#
```

ip verify source

To enable IP source guard on untrusted Layer 2 interfaces, use the **ip verify source** command. To disable IP source guard on untrusted Layer 2 interfaces, use the **no** form of this command.

ip verify source {vlan dhcp-snooping | tracking} [port-security]

no ip verify source {vlan dhcp-snooping | tracking} [port-security]

Syntax Description

vlan dhcp-snooping	Enables IP source guard on untrusted Layer 2 DHCP snooping interfaces.
tracking	Enables IP port security to learn static IP address learning on a port.
port-security	(Optional) Filters both source IP and MAC addresses using the port security feature.

Defaults

IP source guard is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.2(37)SG	Added support for IP port security and tracking.

Examples

This example shows how to enable IP source guard on VLANs 10 through 20 on a per-port basis:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# ip dhcp snooping
Switch(config)# ip dhcp snooping vlan 10 20
Switch(config)# interface fastethernet6/1
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk native vlan 10
Switch(config-if)# switchport trunk allowed vlan 11-20
Switch(config-if)# no ip dhcp snooping trust
Switch(config-if)# ip verify source vlan dhcp-snooping
Switch(config)# end
Switch# show ip verify source interface f6/1
```

Interface	Filter-type	Filter-mode	IP-address	Mac-address	Vlan
Fa6/1	ip-mac	active	10.0.0.1		10
Fa6/1	ip-mac	active	deny-all		11-20

```
Switch#
```

This example shows how to enable IP Port Security with IP-Mac filters on a Layer 2 access port:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# ip device tracking
Switch(config)# interface fastEthernet 4/3
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 1
Switch(config-if)# ip device tracking maximum 5
Switch(config-if)# switchport port-security
Switch(config-if)# switchport port-security maximum 5
Switch(config-if)# ip verify source tracking port-security
Switch(config-if)# end
```

You can verify your settings by entering the **show ip verify source** privileged EXEC command.

Related Commands

debug ip verify source packet (refer to Cisco IOS documentation)

ip device tracking maximum

ip dhcp snooping

ip dhcp snooping limit rate

ip dhcp snooping information option

ip dhcp snooping trust

ip source binding (refer to Cisco IOS documentation)

show ip dhcp snooping

show ip dhcp snooping binding

show ip verify source (refer to Cisco IOS documentation)

show ip source binding (refer to Cisco IOS documentation)

issu abortversion

To cancel the ISSU upgrade or the downgrade process in progress and to restore the Catalyst 4500 series switch to its state before the start of the process, use the **issu abortversion** command.

issu abortversion *active-slot* [*active-image-new*]

Syntax Description

<i>active-slot</i>	Specifies the slot number for the current standby supervisor engine.
<i>active-image-new</i>	(Optional) Name of the new image present in the current standby supervisor engine.

Defaults

There are no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(31)SGA	This command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

You can use the **issu abortversion** command at any time to stop the ISSU process to complete the process by entering the **issu commitversion** command. Before any action is taken, a check ensures that both supervisor engines are either in the run version (RV) or load version (LV) state.

When the **issu abortversion** command is entered before the **issu runversion** command, the standby supervisor engine is reset and reloaded with the old image. When the **issu abortversion** command is entered after the **issu runversion** command, a change takes place and the new standby supervisor engine is reset and reloaded with the old image.

Examples

This example shows how you can reset and reload the standby supervisor engine:

```
Switch# issu abortversion 2  
Switch#
```

Related Commands

[issu acceptversion](#)
[issu commitversion](#)
[issu loadversion](#)
[issu runversion](#)
[show issu state](#)

issu acceptversion

To halt the rollback timer and to ensure that the new Cisco IOS software image is not automatically stopped during the ISSU process, use the **issu acceptversion** command.

issu acceptversion *active-slot* [*active-image-new*]

Syntax Description

<i>active-slot</i>	Specifies the slot number for the currently active supervisor engine.
<i>active-image-new</i>	(Optional) Name of the new image on the current lyactive supervisor engine.

Defaults

Rollback timer resets automatically 45 minutes after you issue the **issu runversion** command.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(31)SGA	This command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

After you are satisfied with the new image and have confirmed the new supervisor engine is reachable by both the console and the network, enter the **issu acceptversion** command to halt the rollback timer. If the **issu acceptversion** command is not entered within 45 minutes from the time the **issu runversion** command is entered, the entire ISSU process is automatically rolled back to the previous version of the software. The rollback timer starts immediately after you issue the **issu runversion** command.

If the rollback timer expires before the standby supervisor engine goes to a hot standby state, the timer is automatically extended by up to 15 minutes. If the standby state goes to a hot-standby state within this extension time or the 15 minute extension expires, the switch aborts the ISSU process. A warning message that requires your intervention is displayed every 1 minute of the timer extension.

If the rollback timer is set to a long period of time, such as the default of 45 minutes, and the standby supervisor engine goes into the hot standby state in 7 minutes, you have 38 minutes (45 minus 7) to roll back if necessary.

Use the **issu set rollback-timer** to configure the rollback timer.

Examples

This example shows how to halt the rollback timer and allow the ISSU process to continue:

```
Switch# issu acceptversion 2
Switch#
```

Related Commands

[issu abortversion](#)
[issu commitversion](#)
[issu loadversion](#)
[issu runversion](#)
[issu set rollback-timer](#)
[show issu state](#)

issu commitversion

To load the new Cisco IOS software image into the new standby supervisor engine, use the **issu commitversion** command.

issu commitversion *standby-slot standby-image-new*

Syntax Description	<i>standby-slot</i>	Specifies the slot number for the currently active supervisor engine.
	<i>active-image-new</i>	(Optional) Name of the new image on the current lyactive supervisor engine.

Defaults	Enabled by default.
-----------------	---------------------

Command Modes	Privileged EXEC
----------------------	-----------------

Command History	Release	Modification
	12.2(31)SGA	This command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	The issu commitversion command checks that the standby supervisor engine has the new Cisco IOS software image in its file system and that both supervisor engines are in the run version (RV) state. If these conditions are met, the following actions take place: • The standby supervisor engine is reset and booted with the new version of Cisco IOS software. • The standby supervisor engine moves into the Stateful Switchover (SSO) mode and is fully stateful for all clients and applications with which the standby supervisor engine is compatible. • The supervisor engines are moved into final state, which is the same as initial state. Entering the issu commitversion command completes the In Service Software Upgrade (ISSU) process. This process cannot be stopped or reverted to its original state without starting a new ISSU process. Entering the issu commitversion command without entering the issu acceptversion command is equivalent to entering both the issu acceptversion and the issu commitversion commands. Use the issu commitversion command if you do not intend to run in the current state for an extended period of time and are satisfied with the new software version.
-------------------------	--

Examples	This example shows how you can configure the standby supervisor engine to be reset and reloaded with the new Cisco IOS software version: <pre>Switch# issu commitversion 1 Switch#</pre>
-----------------	--

Related Commands

[issu acceptversion](#)
[issu commitversion](#)
[issu loadversion](#)
[issu runversion](#)
[show issu state](#)

issu config-sync mismatched-commands

If the IOS version differs on your active and standby supervisors, some CLIs will not be compatible between them. If such commands are already present in the running configuration of the active supervisor engine and the syntax-check for the command fails at the standby supervisor engine while it is booting, the **issu config-sync mismatched-commands** command moves the active supervisor engine into the Mismatched Command List (MCL) and resets the standby supervisor engine.

issu config-sync {ignore | validate} mismatched-commands

Syntax Description	ignore	Ignore the mismatched command list.
	validate	Revalidate the mismatched command list with the modified running-configuration.

Defaults This command has no default settings.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.2(31)SGA	This command was introduced on the Catalyst 4500 series switch.

Usage Guidelines The following is an example log entry for Mismatched Commands:

```
00:06:31: Config Sync: Bulk-sync failure due to Servicing Incompatibility. Please check
full list of mismatched commands via:
  show issu config-sync failures mcl
00:06:31: Config Sync: Starting lines from MCL file:
interface GigabitEthernet7/7
! <submode> "interface"
- ip address 11.0.0.1 255.0.0.0
! </submode> "interface"
```

To display all Mismatched Commands, use the **show issu config-sync failures mcl** command.

To clean the MCL, use the following steps:

-
- Step 1** Remove all mismatched commands from the active supervisor engines running-configuration.
 - Step 2** Revalidate the MCL with a modified running-configuration using the **issu config-sync validate mismatched-commands** command.
 - Step 3** Reload the standby supervisor engine.
-

You could also ignore the MCL by doing the following:

Step 1 Issue the **issu config-sync ignore mismatched-commands** command.

Step 2 Reload the standby supervisor engine; the system changes to SSO mode.



Note If you ignore the mismatched commands, the *out-of-sync* configuration at the active supervisor engine and the standby supervisor engine still exists.

Step 3 You can verify the ignored MCL with the **show issu config-sync ignored mcl** command.

Examples

This example shows how you can validate removal of entries from the MCL:

```
Switch# issu config-sync validate mismatched-commands  
Switch#
```

Related Commands

[show issu config-sync](#)

issu loadversion

To start the ISSU process, use the **issu loadversion** command.

issue loadversion *active-slot active-image-new standby-slot standby-image-new* [**force**]

Syntax Description

<i>active-slot</i>	Specifies the slot number for the currently active supervisor engine.
<i>active-image-new</i>	Specifies the name of the new image on the currently active supervisor engine.
<i>standby-slot</i>	Specifies the standby slot on the networking device.
<i>standby-image-new</i>	Specifies the name of the new image on the standby supervisor engine.
force	(Optional) Overrides the automatic rollback when the new Cisco IOS software version is detected to be incompatible.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(31)SGA	This command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

The **issue loadversion** command causes the standby supervisor engine to be reset and booted with the new Cisco IOS software image specified by the command. If both the old image and the new image are ISSU capable, ISSU compatible, and have no configuration mismatches, the standby supervisor engine moves into Stateful Switchover (SSO) mode, and both supervisor engines move into the load version (LV) state.

It will take several seconds after the **issu loadversion** command is entered for Cisco IOS software to load onto the standby supervisor engine and the standby supervisor engine to transition to SSO mode.

Examples

This example shows how to initiate the ISSU process:

```
Switch# issu loadversion 1 bootflash:new-image 2 slavebootflash:new-image
Switch#
```

Related Commands

[issu abortversion](#)
[issu acceptversion](#)
[issu commitversion](#)
[issu runversion](#)
[show issu state](#)

issu runversion

To force a change from the active supervisor engine to the standby supervisor engine and to cause the newly active supervisor engine to run the new image specified in the **issu loadversion** command, use the **issu runversion** command.

issu runversion *standby-slot* [*standby-image-new*]

Syntax Description

<i>standby-slot</i>	Specifies the standby slot on the networking device.
<i>standby-image-new</i>	Specifies the name of the new image on the standby supervisor engine.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(31)SGA	This command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

The **issu runversion** command changes the currently active-supervisor engine to standby-supervisor engine and the real standby-supervisor engine is booted with the old image version following and resets the switch. As soon as the standby-supervisor engine moves into the standby state, the rollback timer is started.

Examples

This example shows how to force a change of the active-supervisor engine to standby-supervisor engine:

```
Switch# issu runversion 2
Switch#
```

Related Commands

[issu abortversion](#)
[issu acceptversion](#)
[issu commitversion](#)
[issu loadversion](#)
[show issu state](#)

issu set rollback-timer

To configure the In Service Software Upgrade (ISSU) rollback timer value, use the **issu set rollback-timer** command.

issu set rollback-timer *seconds*

Syntax Description

<i>seconds</i>	Specifies the rollback timer value, in seconds. The valid timer value range is from 0 to 7200 seconds (2 hours). A value of 0 seconds disables the rollback timer.
----------------	--

Defaults

Rollback timer value is 2700 seconds.

Command Modes

Global configuration

Command History

Release	Modification
12.2(31)SGA	This command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

Use the **issue set rollback-timer** command to configure the rollback timer value. You can only enable this command when the supervisor engines are in the init state.

Examples

This example shows how you can set the rollback timer value to 3600 seconds, or 1 hour:

```
Switch# configure terminal
Switch(config)# issu set rollback-timer 3600
Switch(config)# end
Switch#
```

Related Commands

[issu acceptversion](#)
[issu set rollback-timer](#)

l2protocol-tunnel

To enable protocol tunneling on an interface, use the **l2protocol-tunnel** command. You can enable tunneling for the Cisco Discovery Protocol (CDP), Spanning Tree Protocol (STP), or VLAN Trunking Protocol (VTP) packets. To disable tunneling on the interface, use the **no** form of this command.

l2protocol-tunnel [cdp | stp | vtp]

no l2protocol-tunnel [cdp | stp | vtp]

Syntax Description

cdp	(Optional) Enables tunneling of CDP.
stp	(Optional) Enables tunneling of STP.
vtp	(Optional) Enables tunneling of VTP.

Defaults

The default is that no Layer 2 protocol packets are tunneled.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

You must enter this command, with or without protocol types, to tunnel Layer 2 packets.

Layer 2 protocol tunneling across a service-provider network ensures that Layer 2 information is propagated across the network to all customer locations. When protocol tunneling is enabled, protocol packets are encapsulated with a well-known Cisco multicast address for transmission across the network. When the packets reach their destination, the well-known MAC address is replaced by the Layer 2 protocol MAC address.

You can enable Layer 2 protocol tunneling for CDP, STP, and VTP individually or for all three protocols.

Examples

This example shows how to enable protocol tunneling for the CDP packets:

```
Switch(config-if)# l2protocol-tunnel cdp
Switch(config-if)#
```

Related Commands

[l2protocol-tunnel cos](#)
[l2protocol-tunnel drop-threshold](#)
[l2protocol-tunnel shutdown-threshold](#)

l2protocol-tunnel cos

To configure the class of service (CoS) value for all tunneled Layer 2 protocol packets, use the **l2protocol-tunnel cos** command. To return to the default value of zero, use the **no** form of this command.

l2protocol-tunnel cos *value*

no l2protocol-tunnel cos

Syntax Description

value Specifies the CoS priority value for tunneled Layer 2 protocol packets. The range is 0 to 7, with 7 being the highest priority.

Defaults

The default is to use the CoS value that is configured for data on the interface. If no CoS value is configured, the default is 5 for all tunneled Layer 2 protocol packets.

Command Modes

Global configuration

Command History

Release	Modification
12.2(18)EW	This command was first introduced on the Catalyst 4500 series switch.

Usage Guidelines

When enabled, the tunneled Layer 2 protocol packets use this CoS value.
The value is saved in NVRAM.

Examples

This example shows how to configure a Layer 2 protocol tunnel CoS value of 7:

```
Switch(config)# l2protocol-tunnel cos 7
Switch(config)#
```

Related Commands

[l2protocol-tunnel](#)
[l2protocol-tunnel drop-threshold](#)
[l2protocol-tunnel shutdown-threshold](#)

l2protocol-tunnel drop-threshold

To set a drop threshold for the maximum rate of Layer 2 protocol packets per second to be received before an interface drops packets, use the **l2protocol-tunnel drop-threshold** command. You can set the drop threshold for the Cisco Discovery Protocol (CDP), Spanning Tree Protocol (STP), or VLAN Trunking Protocol (VTP) packets. To disable the drop threshold on the interface, use the **no** form of this command.

l2protocol-tunnel drop-threshold [**cdp** | **stp** | **vtp**] *value*

no l2protocol-tunnel drop-threshold [**cdp** | **stp** | **vtp**] *value*

Syntax Description

cdp	(Optional) Specifies a drop threshold for CDP.
stp	(Optional) Specifies a drop threshold for STP.
vtp	(Optional) Specifies a drop threshold for VTP.
<i>value</i>	Specifies a threshold in packets per second to be received for encapsulation before the interface shuts down, or specifies the threshold before the interface drops packets. The range is 1 to 4096. The default is no threshold.

Defaults

The default is no drop threshold for the number of the Layer 2 protocol packets.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

The **l2protocol-tunnel drop-threshold** command controls the number of protocol packets per second that are received on an interface before it drops packets. When no protocol option is specified with a keyword, the threshold is applied to each of the tunneled Layer 2 protocol types. If you also set a shutdown threshold on the interface, the drop-threshold value must be less than or equal to the shutdown-threshold value.

When the drop threshold is reached, the interface drops the Layer 2 protocol packets until the rate at which they are received is below the drop threshold.

Examples

This example shows how to configure the drop threshold rate:

```
Switch(config-if) # l2protocol-tunnel drop-threshold cdp 50
Switch(config-if) #
```

■ `l2protocol-tunnel drop-threshold`

Related Commands

[l2protocol-tunnel](#)

[l2protocol-tunnel cos](#)

[l2protocol-tunnel shutdown-threshold](#)

l2protocol-tunnel shutdown-threshold

To configure the protocol tunneling encapsulation rate, use the **l2protocol-tunnel shutdown-threshold** command. You can set the encapsulation rate for the Cisco Discovery Protocol (CDP), Spanning Tree Protocol (STP), or VLAN Trunking Protocol (VTP) packets. To disable the encapsulation rate on the interface, use the **no** form of this command.

l2protocol-tunnel shutdown-threshold [**cdp** | **stp** | **vtp**] *value*

no l2protocol-tunnel shutdown-threshold [**cdp** | **stp** | **vtp**] *value*

Syntax Description	cdp	(Optional) Specifies a shutdown threshold for CDP.
	stp	(Optional) Specifies a shutdown threshold for STP.
	vtp	(Optional) Specifies a shutdown threshold for VTP.
	<i>value</i>	Specifies a threshold in packets per second to be received for encapsulation before the interface shuts down. The range is 1 to 4096. The default is no threshold.

Defaults	The default is no shutdown threshold for the number of Layer 2 protocol packets.
-----------------	--

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	The l2-protocol-tunnel shutdown-threshold command controls the number of protocol packets per second that are received on an interface before it shuts down. When no protocol option is specified with the keyword, the threshold is applied to each of the tunneled Layer 2 protocol types. If you also set a drop threshold on the interface, the shutdown-threshold value must be greater than or equal to the drop-threshold value.
-------------------------	---

When the shutdown threshold is reached, the interface is error disabled. If you enable error recovery by entering the **errdisable recovery cause l2ptguard** command, the interface is brought out of the error-disabled state and allowed to retry the operation again when all the causes have timed out. If the error recovery feature generation is not enabled for **l2ptguard**, the interface stays in the error-disabled state until you enter the **shutdown** and **no shutdown** commands.

Examples	This example shows how to configure the maximum rate:
-----------------	---

```
Switch(config-if)# l2protocol-tunnel shutdown-threshold cdp 50
Switch(config-if)#
```

■ l2protocol-tunnel shutdown-threshold

Related Commands

[l2protocol-tunnel](#)
[l2protocol-tunnel cos](#)
[l2protocol-tunnel shutdown-threshold](#)

lacp port-priority

To set the LACP priority for the physical interfaces, use the **lacp port-priority** command.

lacp port-priority *priority*

Syntax Description	<i>priority</i> Priority for the physical interfaces; valid values are from 1 to 65535.
---------------------------	---

Defaults	Priority is set to 32768.
-----------------	---------------------------

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.1(13)EW	This command was introduced on the Catalyst 4500 series switches.

Usage Guidelines	This command is not supported on the systems that are configured with a Supervisor Engine I.
	You must assign each port in the switch a port priority that can be specified automatically or by entering the lacp port-priority command. The port priority is used with the port number to form the port identifier. The port priority is used to decide which ports should be put in standby mode when there is a hardware limitation that prevents all compatible ports from aggregating.
	Although this command is a global configuration command, the <i>priority</i> value is supported only on port channels with LACP-enabled physical interfaces. This command is supported on LACP-enabled interfaces.
	When setting the priority, the higher numbers indicate lower priorities.

Examples	This example shows how to set the priority for the interface:
-----------------	---

```
Switch(config-if)# lacp port-priority 23748
Switch(config-if)#
```

Related Commands	channel-group channel-protocol lacp system-priority show lacp
-------------------------	--

lacp system-priority

To set the priority of the system for LACP, use the **lacp system-priority** command.

lacp system-priority *priority*

Syntax Description	<i>priority</i> Priority of the system; valid values are from 1 to 65535.
---------------------------	---

Defaults	Priority is set to 32768.
-----------------	---------------------------

Command Modes	Global configuration mode
----------------------	---------------------------

Command History	Release	Modification
	12.1(13)EW	This command was introduced on the Catalyst 4500 series switches.

Usage Guidelines	This command is not supported on systems that are configured with a Supervisor Engine I.
	You must assign each switch that is running LACP a system priority that can be specified automatically or by entering the lacp system-priority command. The system priority is used with the switch MAC address to form the system ID and is also used during negotiation with other systems.
	Although this command is a global configuration command, the <i>priority</i> value is supported on port channels with LACP-enabled physical interfaces.
	When setting the priority, the higher numbers indicate lower priorities.
	You can also enter the lacp system-priority command in interface configuration mode. After you enter the command, the system defaults to global configuration mode.

Examples	This example shows how to set the system priority:
	Switch(config)# lacp system-priority 23748
	Switch(config)#

Related Commands	channel-group channel-protocol lacp port-priority show lacp
-------------------------	--

logging event link-status global (global configuration)

To change the default switch-wide global link-status event messaging settings, use the **logging event link-status global** command. Use the **no** form of this command to disable the link-status event messaging.

logging event link-status global

no logging event link-status global

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	The global link-status messaging is disabled.
-----------------	---

Command Modes	Global configuration
----------------------	----------------------

Command History	Release	Modification
	12.2(25)SG	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	If link-status logging event is not configured at the interface level, this global link-status setting takes effect for each interface.
-------------------------	---

Examples	This example shows how to globally enable link status message on each interface:
-----------------	--

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# logging event link-status global
Switch(config)# end
Switch#
```

Related Commands	logging event link-status global (global configuration)
-------------------------	---

logging event link-status (interface configuration)

To enable the link-status event messaging on an interface, use the **logging event link-status** command. Use the **no** form of this command to disable link-status event messaging. Use the **logging event link-status use-global** command to apply the global link-status setting.

logging event link-status

no logging event link-status

logging event link-status use-global

Defaults

Global link-status messaging is enabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(25)SG	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

To enable system logging of interface state-change events on a specific interface, enter the **logging event link-status** command in interface configuration mode.

To enable system logging of interface state-change events on all interfaces in the system, enter the **logging event link-status global** command in global configuration mode. All interfaces without the state change event configuration use the global setting.

Examples

This example shows how to enable logging event state-change events on interface gi11/1:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gi11/1
Switch(config-if)# logging event link-status
Switch(config-if)# end
Switch#
```

This example shows how to turn off logging event link status regardless of the global setting:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gi11/1
Switch(config-if)# no logging event link-status
Switch(config-if)# end
Switch#
```

This example shows how to enable the global event link-status setting on interface gi11/1:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gi11/1
Switch(config-if)# logging event link-status use-global
```

```
Switch(config-if)# end  
Switch#
```

Related Commands [logging event link-status global \(global configuration\)](#)

logging event trunk-status global (global configuration)

To enable the trunk-status event messaging globally, use the **logging event trunk-status global** command. Use the **no** form of this command to disable trunk-status event messaging.

logging event trunk-status global

no logging event trunk-status global

Syntax Description This command has no arguments or keywords.

Defaults Global trunk-status messaging is disabled.

Command Modes Global configuration

Command History	Release	Modification
	12.2(25)SG	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines If trunk-status logging event is not configured at the interface level, the global trunk-status setting takes effect for each interface.

Examples This example shows how to globally enable link status messaging on each interface:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# logging event trunk-status global
Switch(config)# end
Switch#
```

Related Commands [logging event trunk-status global \(global configuration\)](#)

logging event trunk-status (interface configuration)

To enable the trunk-status event messaging on an interface, use the **logging event trunk-status** command. Use the **no** form of this command to disable the trunk-status event messaging. Use the **logging event trunk-status use-global** command to apply the global trunk-status setting.

logging event trunk-status

no logging event trunk-status

logging event trunk-status use-global

Defaults

Global trunk-status messaging is enabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(25)SG	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

To enable system logging of interface state-change events on a specific interface, enter the **logging event trunk-status** command in interface configuration mode.

To enable system logging of interface state-change events on all interfaces in the system, enter the **logging event trunk-status use-global** command in global configuration mode. All interfaces without the state change event configuration use the global setting.

Examples

This example shows how to enable logging event state-change events on interface gi11/1:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gi11/1
Switch(config-if)# logging event trunk-status
Switch(config-if)# end
Switch#
```

This example shows how to turn off logging event trunk status regardless of the global setting:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gi11/1
Switch(config-if)# no logging event trunk-status
Switch(config-if)# end
Switch#
```

logging event trunk-status (interface configuration)

This example shows how to enable the global event trunk-status setting on interface gi11/1:

```
Switch# config terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Switch(config)# interface gi11/1  
Switch(config-if)# logging event trunk-status use-global  
Switch(config-if)# end  
Switch#
```

Related Commands

[logging event trunk-status global \(global configuration\)](#)

mac access-list extended

mac access-list extended

no

mac access-list extended *name*

no mac access-list extended *name*

Syntax Description

name ACL to which the entry belongs.

Defaults

Command Modes

Command History

12.1(12c)EW Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

- Maximum of 31 characters long and can include a-z, A-Z, 0-9, the dash character (-), the underscore character (_), and the period character (.)

Must start with an alpha character and must be unique across all ACLs of all types

Case sensitive

Cannot be a number

Must not be a keyword; keywords to avoid are all, default-action, map, help, and editbuffer

When you enter the **mac access-list extended** *name* command, you use the [no] {permit | deny} [{src-mac mask | any} [dest-mac mask]] [protocol-family {appletalk | arp-non-ipv4 | decnet | ipx | ipv6 | rarp-ipv4 | rarp-non-ipv4 | vines | xns}] subset to create or delete entries in a MAC layer access list.

Table 2-8 describes the syntax of the **mac access-list extended** subcommands.

Table 2-8 mac access-list extended Subcommands

Subcommand	Description
deny	Prevents access if the conditions are matched.
no	(Optional) Deletes a statement from an access list.
permit	Allows access if the conditions are matched.
<i>src-mac mask</i>	Source MAC address in the form: <i>source-mac-address source-mac-address-mask.</i>
any	Specifies any protocol type.

Table 2-8 *mac access-list extended Subcommands (continued)*

Subcommand	Description
<i>dest-mac mask</i>	(Optional) Destination MAC address in the form: <i>dest-mac-address dest-mac-address-mask</i> .
<i>protocol-family</i>	(Optional) Name of the protocol family. Table 2-9 lists which packets are mapped to a particular protocol family.

[Table 2-9](#) describes mapping an Ethernet packet to a protocol family.

Table 2-9 *Mapping an Ethernet Packet to a Protocol Family*

Protocol Family	Ethertype in Packet Header
Appletalk	0x809B, 0x80F3
Arp-Non-Ipv4	0x0806 and protocol header of Arp is a non-Ip protocol family
Decnet	0x6000-0x6009, 0x8038-0x8042
Ipx	0x8137-0x8138
Ipv6	0x86DD
Rarp-Ipv4	0x8035 and protocol header of Rarp is Ipv4
Rarp-Non-Ipv4	0x8035 and protocol header of Rarp is a non-Ipv4 protocol family
Vines	0x0BAD, 0x0BAE, 0x0BAF
Xns	0x0600, 0x0807

When you enter the *src-mac mask* or *dest-mac mask* value, follow these guidelines:

- Enter the MAC addresses as three 4-byte values in dotted hexadecimal format such as 0030.9629.9f84.
- Enter the MAC address masks as three 4-byte values in dotted hexadecimal format. Use 1 bit as a wildcard. For example, to match an address exactly, use 0000.0000.0000 (can be entered as 0.0.0).
- For the optional *protocol* parameter, you can enter either the EtherType or the keyword.
- Entries without a *protocol* parameter match any protocol.
- The access list entries are scanned in the order that you enter them. The first matching entry is used. To improve performance, place the most commonly used entries near the beginning of the access list.
- An implicit **deny any any** entry exists at the end of an access list unless you include an explicit **permit any any** entry at the end of the list.
- All new entries to an existing list are placed at the end of the list. You cannot add entries to the middle of a list.

Examples

This example shows how to create a MAC layer access list named `mac_layer` that denies traffic from 0000.4700.0001, which is going to 0000.4700.0009, and permits all other traffic:

```
Switch(config)# mac access-list extended mac_layer
Switch(config-ext-macl)# deny 0000.4700.0001 0.0.0 0000.4700.0009 0.0.0 protocol-family appletalk
Switch(config-ext-macl)# permit any any
Switch(config-ext-macl)# end
Switch#
```

Related Commands [show vlan access-map](#)

mac-address-table aging-time

To configure the aging time for the entries in the Layer 2 table, use the **mac-address-table aging-time** command. To reset the *seconds* value to the default setting, use the **no** form of this command.

mac-address-table aging-time *seconds* [**vlan** *vlan_id*]

no mac-address-table aging-time *seconds* [**vlan** *vlan_id*]

Syntax Description

<i>seconds</i>	Aging time in seconds; valid values are 0 and from 10 to 1000000 seconds.
vlan <i>vlan_id</i>	(Optional) Single VLAN number or a range of VLANs; valid values are from 1 to 4094.

Defaults

Aging time is set to 300 seconds.

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(12c)EW	Support for extended addressing was added.

Usage Guidelines

If you do not enter a VLAN, the change is applied to all routed-port VLANs.
Enter 0 seconds to disable aging.

Examples

This example shows how to configure the aging time to 400 seconds:

```
Switch(config)# mac-address-table aging-time 400
Switch(config)#
```

This example shows how to disable aging:

```
Switch(config)# mac-address-table aging-time 0
Switch(config)
```

Related Commands

[show mac-address-table aging-time](#)

mac-address-table dynamic group protocols

To enable the learning of MAC addresses in both the “ip” and “other” protocol buckets, even though the incoming packet may belong to only one of the protocol buckets, use the **mac-address-table dynamic group protocols** command. To disable grouped learning, use the **no** form of this command.

mac-address-table dynamic group protocols {ip | other} {ip | other}

[no] mac-address-table dynamic group protocols {ip | other} {ip | other}

Syntax Description	ip	Specifies the “ip” protocol bucket.
	other	Specifies the “other” protocol bucket.

Defaults The group learning feature is disabled.

Command Modes global configuration

Command History	Release	Modification
	12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines The entries within the “ip” and “other” protocol buckets are created according to the protocol of the incoming traffic.

When you use the **mac-address-table dynamic group protocols** command, an incoming MAC address that might belong to either the “ip” or the “other” protocol bucket, is learned on both protocol buckets. Therefore, any traffic destined to this MAC address and belonging to any of the protocol buckets is unicast to that MAC address, rather than flooded. This reduces the unicast Layer 2 flooding that might be caused if the incoming traffic from a host belongs to a different protocol bucket than the traffic that is destined to the sending host.

Examples This example shows that the MAC addresses are initially assigned to either the “ip” or the “other” protocol bucket:

```
Switch# show mac-address-table dynamic
Unicast Entries
  vlan  mac address      type      protocols      port
-----+-----+-----+-----+-----
    1    0000.0000.5000    dynamic  other          GigabitEthernet1/1
    1    0001.0234.6616    dynamic  ip             GigabitEthernet3/1
    1    0003.3178.ec0a     dynamic  assigned       GigabitEthernet3/1
    1    0003.4700.24c3     dynamic  ip             GigabitEthernet3/1
    1    0003.4716.f475     dynamic  ip             GigabitEthernet3/1
    1    0003.4748.75c5     dynamic  ip             GigabitEthernet3/1
    1    0003.47f0.d6a3     dynamic  ip             GigabitEthernet3/1
    1    0003.47f6.a91a     dynamic  ip             GigabitEthernet3/1
```

mac-address-table dynamic group protocols

```

1      0003.ba06.4538      dynamic ip      GigabitEthernet3/1
1      0003.fd63.3eb4      dynamic ip      GigabitEthernet3/1
1      0004.2326.18a1      dynamic ip      GigabitEthernet3/1
1      0004.5a5d.de53      dynamic ip      GigabitEthernet3/1
1      0004.5a5e.6ecc      dynamic ip      GigabitEthernet3/1
1      0004.5a5e.f60e      dynamic ip      GigabitEthernet3/1
1      0004.5a5f.06f7      dynamic ip      GigabitEthernet3/1
1      0004.5a5f.072f      dynamic ip      GigabitEthernet3/1
1      0004.5a5f.08f6      dynamic ip      GigabitEthernet3/1
1      0004.5a5f.090b      dynamic ip      GigabitEthernet3/1
1      0004.5a88.b075      dynamic ip      GigabitEthernet3/1
1      0004.c1bd.1b40      dynamic ip      GigabitEthernet3/1
1      0004.c1d8.b3c0      dynamic ip      GigabitEthernet3/1
1      0004.c1d8.bd00      dynamic ip      GigabitEthernet3/1
1      0007.e997.74dd      dynamic ip      GigabitEthernet3/1
1      0007.e997.7e8f      dynamic ip      GigabitEthernet3/1
1      0007.e9ad.5e24      dynamic ip      GigabitEthernet3/1
1      000b.5f0a.f1d8      dynamic ip      GigabitEthernet3/1
1      000b.fdf3.c498      dynamic ip      GigabitEthernet3/1
1      0010.7be8.3794      dynamic assigned GigabitEthernet3/1
1      0012.436f.c07f      dynamic ip      GigabitEthernet3/1
1      0050.0407.5fe1      dynamic ip      GigabitEthernet3/1
1      0050.6901.65af      dynamic ip      GigabitEthernet3/1
1      0050.da6c.81cb      dynamic ip      GigabitEthernet3/1
1      0050.dad0.af07      dynamic ip      GigabitEthernet3/1
1      00a0.ccd7.20ac      dynamic ip      GigabitEthernet3/1
1      00b0.64fd.1c23      dynamic ip      GigabitEthernet3/1
1      00b0.64fd.2d8f      dynamic assigned GigabitEthernet3/1
1      00d0.b775.c8bc      dynamic ip      GigabitEthernet3/1
1      00d0.b79e.de1d      dynamic ip      GigabitEthernet3/1
1      00e0.4c79.1939      dynamic ip      GigabitEthernet3/1
1      00e0.4c7b.d765      dynamic ip      GigabitEthernet3/1
1      00e0.4c82.66b7      dynamic ip      GigabitEthernet3/1
1      00e0.4c8b.f83e      dynamic ip      GigabitEthernet3/1
1      00e0.4cbc.a04f      dynamic ip      GigabitEthernet3/1
1      0800.20cf.8977      dynamic ip      GigabitEthernet3/1
1      0800.20f2.82e5      dynamic ip      GigabitEthernet3/1
Switch#

```

This example shows how to assign MAC addresses that belong to either the “ip” or the “other” bucket to both buckets:

```

Switch(config)# mac-address-table dynamic group protocols ip other
Switch(config)# exit
Switch# show mac address-table dynamic
Unicast Entries

```

vlan	mac address	type	protocols	port
1	0000.0000.5000	dynamic	ip, other	GigabitEthernet1/1
1	0001.0234.6616	dynamic	ip, other	GigabitEthernet3/1
1	0003.4700.24c3	dynamic	ip, other	GigabitEthernet3/1
1	0003.4716.f475	dynamic	ip, other	GigabitEthernet3/1
1	0003.4748.75c5	dynamic	ip, other	GigabitEthernet3/1
1	0003.47c4.06c1	dynamic	ip, other	GigabitEthernet3/1
1	0003.47f0.d6a3	dynamic	ip, other	GigabitEthernet3/1
1	0003.47f6.a91a	dynamic	ip, other	GigabitEthernet3/1
1	0003.ba0e.24a1	dynamic	ip, other	GigabitEthernet3/1
1	0003.fd63.3eb4	dynamic	ip, other	GigabitEthernet3/1
1	0004.2326.18a1	dynamic	ip, other	GigabitEthernet3/1
1	0004.5a5d.de53	dynamic	ip, other	GigabitEthernet3/1
1	0004.5a5d.de55	dynamic	ip, other	GigabitEthernet3/1
1	0004.5a5e.6ecc	dynamic	ip, other	GigabitEthernet3/1
1	0004.5a5e.f60e	dynamic	ip, other	GigabitEthernet3/1
1	0004.5a5f.08f6	dynamic	ip, other	GigabitEthernet3/1

```

1      0004.5a5f.090b    dynamic ip,other      GigabitEthernet3/1
1      0004.5a64.f813    dynamic ip,other      GigabitEthernet3/1
1      0004.5a66.1a77    dynamic ip,other      GigabitEthernet3/1
1      0004.5a6b.56b2    dynamic ip,other      GigabitEthernet3/1
1      0004.5a6c.6a07    dynamic ip,other      GigabitEthernet3/1
1      0004.5a88.b075    dynamic ip,other      GigabitEthernet3/1
1      0004.c1bd.1b40    dynamic ip,other      GigabitEthernet3/1
1      0004.c1d8.b3c0    dynamic ip,other      GigabitEthernet3/1
1      0004.c1d8.bd00    dynamic ip,other      GigabitEthernet3/1
1      0005.dce0.7c0a    dynamic assigned      GigabitEthernet3/1
1      0007.e997.74dd    dynamic ip,other      GigabitEthernet3/1
1      0007.e997.7e8f    dynamic ip,other      GigabitEthernet3/1
1      0007.e9ad.5e24    dynamic ip,other      GigabitEthernet3/1
1      0007.e9c9.0bc9    dynamic ip,other      GigabitEthernet3/1
1      000b.5f0a.f1d8    dynamic ip,other      GigabitEthernet3/1
1      000b.fdf3.c498    dynamic ip,other      GigabitEthernet3/1
1      0012.436f.c07f    dynamic ip,other      GigabitEthernet3/1
1      0050.0407.5fe1    dynamic ip,other      GigabitEthernet3/1
1      0050.6901.65af    dynamic ip,other      GigabitEthernet3/1
1      0050.da6c.81cb    dynamic ip,other      GigabitEthernet3/1
1      0050.dad0.af07    dynamic ip,other      GigabitEthernet3/1
1      00a0.ccd7.20ac    dynamic ip,other      GigabitEthernet3/1
1      00b0.64fd.1b84    dynamic assigned      GigabitEthernet3/1
1      00d0.b775.c8bc    dynamic ip,other      GigabitEthernet3/1
1      00d0.b775.c8ee    dynamic ip,other      GigabitEthernet3/1
1      00d0.b79e.de1d    dynamic ip,other      GigabitEthernet3/1
1      00e0.4c79.1939    dynamic ip,other      GigabitEthernet3/1
1      00e0.4c7b.d765    dynamic ip,other      GigabitEthernet3/1
1      00e0.4c82.66b7    dynamic ip,other      GigabitEthernet3/1
1      00e0.4c8b.f83e    dynamic ip,other      GigabitEthernet3/1
1      00e0.4c8c.0861    dynamic ip,other      GigabitEthernet3/1
1      0800.20d1.bf09    dynamic ip,other      GigabitEthernet3/1
Switch#

```

Related Commands **mac-address-table dynamic** (refer to Cisco IOS documentation)

mac-address-table notification

To enable MAC address notification on a switch, use the **mac-address-table notification** command. To return to the default setting, use the **no** form of this command

mac-address-table notification { **change** [**history-size** *hs_value*] | [**interval** *intv_value*]} | [**mac-move**] | [**threshold** [**limit** *percentage*] | [**interval** *time*]}

no mac-address-table notification { **change** [**history-size** *hs_value*] | [**interval** *intv_value*]} | [**mac-move**] | [**threshold** [**limit** *percentage*] | [**interval** *time*]}

Syntax Description	
change	(Optional) Specifies enabling MAC change notification.
history-size <i>hs_value</i>	(Optional) Maximum number of entries in the MAC change notification history table. The range is 0 to 500 entries.
interval <i>intv_value</i>	(Optional) Notification trap interval, set interval time between two consecutive traps. The range is 0 to 2,147,483,647 seconds.
mac-move	(Optional) Specifies enabling MAC move notification.
threshold	(Optional) Specifies enabling MAC threshold notification.
limit <i>percentage</i>	(Optional) Specifies the percentage of MAT utilization threshold; valid values are from 1 to 100 percent.
interval <i>time</i>	(Optional) Specifies the time between MAC threshold notifications; valid values are greater than or equal to 120 seconds.

Defaults

MAC address notification feature is disabled.

The default MAC change trap interval value is 1 second.

The default number of entries in the history table is 1.

MAC move notification is disabled.

MAC threshold monitoring feature is disabled.

The default limit is 50 percent.

The default time is 120 seconds.

Command Modes

Global configuration

Command History

Release	Modification
12.2(31)SG	Support for this command was introduced on the Catalyst 4500 series switch

Usage Guidelines

We can enable the MAC change notification feature by using the **mac address-table notification change** command. We must also enable MAC notification traps on an interface by using the **snmp trap mac-notification change interface** configuration command and configure the switch to send MAC change traps to the NMS by using the **snmp-server enable traps mac-notification** global configuration command.

When the *history-size* option is configured, the existing MAC change history table is deleted, and a new table is created.

Examples

This example shows how to set the MAC address notification history table size to 300 entries:

```
Switch(config)# mac-address-table notification change history-size 300
Switch(config)#
```

This example shows how to set the MAC address notification interval time to 1250 seconds:

```
Switch(config)# mac-address-table notification change interval 1250
Switch(config)#
```

Related Commands

[clear mac-address-table](#)
[show mac-address-table notification](#)
[snmp-server enable traps](#)
[snmp trap mac-notification change](#)

mac-address-table static

To configure the static MAC addresses for a VLAN interface or drop unicast traffic for a MAC address for a VLAN interface, use the **mac-address-table static** command. To remove the static MAC address configurations, use the **no** form of this command.

mac-address-table static *mac-addr* {**vlan** *vlan-id*} {**interface** *type* | **drop**}

no mac-address-table static *mac-addr* {**vlan** *vlan-id*} {**interface** *type*} {**drop**}

Syntax Description

<i>mac-addr</i>	MAC address; optional when using the no form of this command.
vlan <i>vlan-id</i>	VLAN and valid VLAN number; valid values are from 1 to 4094.
interface <i>type</i>	Interface type and number; valid options are FastEthernet and GigabitEthernet .
drop	Drops all traffic received from and going to the configured MAC address in the specified VLAN.

Defaults

This command has no default settings.

Command Modes

Global configuration

Command History

Release	Modification
12.1(13)EW	Support for this command was introduced on the Catalyst 4500 series switches.

Usage Guidelines

When a static MAC address is installed, it is associated with a port.

The output interface specified must be a Layer 2 interface and not an SVI.

If you do not enter a protocol type, an entry is automatically created for each of the four protocol types.

Entering the **no** form of this command does not remove the system MAC addresses.

When removing a MAC address, entering **interface** *int* is optional. For unicast entries, the entry is removed automatically. For multicast entries, if you do not specify an interface, the entire entry is removed. You can specify the selected ports to be removed by specifying the interface.

Examples

This example shows how to add the static entries to the MAC address table:

```
Switch(config)# mac-address-table static 0050.3e8d.6400 vlan 100 interface fastethernet5/7
Switch(config)#
```

Related Commands

[show mac-address-table static](#)

macro apply cisco-desktop

To enable the Cisco-recommended features and settings that are suitable for connecting a switch port to a standard desktop, use the **macro apply cisco-desktop** command.

macro apply cisco-desktop \$AVID access_vlanid

Syntax Description	\$AVID access_vlanid Specifies an access VLAN ID.
--------------------	--

Defaults	This command has no default settings.
----------	---------------------------------------

Command Modes	Interface configuration
---------------	-------------------------

Command History	Release	Modification
	12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	This command can only be viewed and applied; it cannot be modified. Ensure that the existing configuration on the interface does not conflict with the intended macro configuration. Before you apply the macro, clear the configuration on the interface with the default interface command.
------------------	--

Examples	This example shows how to enable the Cisco-recommended features and settings on port fa2/1:
----------	--

```
Switch(config)# interface FastEthernet2/1
Switch(config-if)# macro apply cisco-desktop $AVID 50
Switch(config-if)#
```

The contents of this macro are as follows:

```
# Basic interface - Enable data VLAN only
# Recommended value for access vlan (AVID) should not be 1
switchport access vlan $AVID [access_vlanid]
switchport mode access
# Enable port security limiting port to a single
# MAC address -- that of desktop
switchport port-security
# Ensure port-security age is greater than one minute
# and use inactivity timer
# "Port-security maximum 1" is the default and will not
# Show up in the config
switchport port-security violation restrict
switchport port-security aging time 2
switchport port-security aging type inactivity
# Configure port as an edge network port
spanning-tree portfast
spanning-tree bpduguard enable
```

■ `macro apply cisco-desktop`

Related Commands

[macro apply cisco-phone](#)
[macro apply cisco-router](#)
[macro apply cisco-switch](#)

macro apply cisco-phone

To enable the Cisco-recommended features and settings that are suitable for connecting a switch port to a standard desktop and a Cisco IP phone, use the **macro apply cisco-phone** command.

macro apply cisco-phone \$AVID *access_vlanid* \$VVID *voice_vlanid*

Syntax Description	\$AVID <i>access_vlanid</i>	Specifies an access VLAN ID.
	\$VVID <i>voice_vlanid</i>	Specifies a voice VLAN ID.

Defaults This command has no default settings.

Command Modes Interface configuration

Command History	Release	Modification
	12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines This command can only be viewed and applied; it cannot be modified.

Ensure that the existing configuration on the interface does not conflict with the intended macro configuration. Before you apply the macro, clear the configuration on the interface with the **default interface** command.

Examples This example shows how to enable the Cisco-recommended features and settings on port fa2/1:

```
Switch(config)# interface FastEthernet2/1
Switch(config-if)# macro apply cisco-phone $AVID 10 $VVID 50
Switch(config-if)#
```

The contents of this macro are as follows:

```
# VoIP enabled interface - Enable data VLAN
# and voice VLAN (VVID)
# Recommended value for access vlan (AVID) should not be 1\
switchport access vlan $AVID [access_vlan_id]
switchport mode access
# Update the Voice VLAN (VVID) value which should be
# different from data VLAN
# Recommended value for voice vlan (VVID) should not be 1
switchport voice vlan $VVID [voice_vlan_id]
# Enable port security limiting port to a 3 MAC
# addressees -- One for desktop and two for phone
switchport port-security
switchport port-security maximum 3
# Ensure port-security age is greater than one minute
# and use inactivity timer
switchport port-security violation restrict
switchport port-security aging time 2
```

macro apply cisco-phone

```
switchport port-security aging type inactivity
# Enable auto-qos to extend trust to attached Cisco phone
auto qos voip cisco-phone
# Configure port as an edge network port
spanning-tree portfast
spanning-tree bpduguard enable
```

Related Commands

[macro apply cisco-desktop](#)
[macro apply cisco-router](#)
[macro apply cisco-switch](#)

macro apply cisco-router

To enable the Cisco-recommended features and settings that are suitable for connecting a switch port to a router, use the **macro apply cisco-router** command.

macro apply cisco-router \$NVID native_vlanid

Syntax Description	\$NVID native_vlanid Specifies a native VLAN ID.
--------------------	---

Defaults	This command has no default settings.
----------	---------------------------------------

Command Modes	Interface configuration
---------------	-------------------------

Command History	Release	Modification
	12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	This command can only be viewed and applied; it cannot be modified. Ensure that the existing configuration on the interface does not conflict with the intended macro configuration. Before you apply the macro apply cisco-router command, clear the configuration on the interface with the default interface command.
------------------	--

Examples	This example shows how to enable the Cisco-recommended features and settings on port fa2/1:
----------	--

```
Switch(config)# interface FastEthernet2/1
Switch(config-if)# macro apply cisco-router $NVID 80
Switch(config-if)#
```

The contents of this macro are as follows:

```
# Access Uplink to Distribution
switchport trunk encapsulation dot1q
# Define unique Native VLAN on trunk ports
# Recommended value for native vlan (NVID) should not be 1
switchport trunk native vlan $NVID [native_vlan_id]
# Update the allowed VLAN range (VRANGE) such that it
# includes data, voice and native VLANs
# switchport trunk allowed vlan $VRANGE [vlan_range]
# Hardcode trunk and disable negotiation to
# speed up convergence
# Hardcode speed and duplex to router
switchport mode trunk
switchport nonegotiate
speed 100
duplex full
# Configure qos to trust this interface
auto qos voip trust
qos trust dscp
```

macro apply cisco-router

```
# Ensure fast access to the network when enabling the interface.  
# Ensure that switch devices cannot become active on the interface.  
spanning-tree portfast  
spanning-tree bpduguard enable
```

Related Commands

[macro apply cisco-desktop](#)
[macro apply cisco-phone](#)
[macro apply cisco-switch](#)

macro apply cisco-switch

To enable the Cisco-recommended features and settings that are suitable for connecting a switch port to another switch, use the **macro apply cisco-switch** command.

macro apply cisco-switch \$NVID native_vlanid

Syntax Description	\$NVID native_vlanid	Specifies a native VLAN ID.
--------------------	----------------------	-----------------------------

Defaults	This command has no default settings.
----------	---------------------------------------

Command Modes	Interface configuration
---------------	-------------------------

Command History	Release	Modification
	12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	This command can only be viewed and applied; it cannot be modified. Ensure that the existing configuration on the interface does not conflict with the intended macro configuration. Before you apply this macro, clear the configuration on the interface with the default interface command.
------------------	---

Examples	This example shows how to enable the Cisco-recommended features and settings on port fa2/1:
----------	---

```
Switch(config)# interface FastEthernet2/1
Switch(config-if)# macro apply cisco-switch $NVID 45
Switch(config-if)#
```

The contents of this macro are as follows:

```
# Access Uplink to Distribution
switchport trunk encapsulation dot1q
# Define unique Native VLAN on trunk ports
# Recommended value for native vlan (NVID) should not be 1
switchport trunk native vlan $NVID [native_vlan_id]
# Update the allowed VLAN range (VRANGE) such that it
# includes data, voice and native VLANs
# switchport trunk allowed vlan $VRANGE
# Hardcode trunk and disable negotiation to
# speed up convergence
switchport mode trunk
switchport nonegotiate
# Configure qos to trust this interface
auto qos voip trust
# 802.1w defines the link as pt-pt for rapid convergence
spanning-tree link-type point-to-point
```

■ `macro apply cisco-switch`

Related Commands

`macro apply cisco-desktop`
`macro apply cisco-phone`
`macro apply cisco-router`

macro global apply cisco-global

To apply the system-defined default template to the switch, use the **macro global apply cisco-global** global configuration command on the switch stack or on a standalone switch.

macro global apply cisco-global

Syntax Description	This command has no keywords or variables.
---------------------------	--

Defaults	This command has no default setting.
-----------------	--------------------------------------

Command Modes	Global configuration
----------------------	----------------------

Command History	Release	Modification
	12.2(31)SG	Support for this command was introduced on the Catalyst 4500 series switch

Examples	These examples show how to apply the system-defined default to the switch: <pre>Switch(config)#macro global apply cisco-global Changing VTP domain name from gsg-vtp to [smartports] Device mode already VTP TRANSPARENT. Switch(config)#</pre>
-----------------	---

macro global apply system-cpp

To apply the control plane policing default template to the switch, use the **macro global apply system-cpp** global configuration command on the switch stack or on a standalone switch.

macro global apply system-cpp

Syntax Description This command has no keywords or variables.

Defaults This command has no default setting.

Command Modes Global configuration

Command History	Release	Modification
	12.2(31)SG	Support for this command was introduced on the Catalyst 4500 series switch.

Examples These examples show how to apply the system-defined default to the switch:

```
Switch (config)# macro global apply system-cpp
Switch (config)#
```

Related Commands [macro global apply cisco-global](#)
[macro global description](#)

macro global description

To enter a description about the macros that are applied to the switch, use the **macro global description** global configuration command on the switch stack or on a standalone switch. Use the no form of this command to remove the description.

macro global description *text*

no macro global description *text*

Syntax Description

description *text* Enter a description about the macros that are applied to the switch.

Defaults

This command has no default setting.

Command Modes

Global configuration

Command History

Release	Modification
12.2(31)SG	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

Use the **description** keyword to associate comment text, or the macro name, with a switch. When multiple macros are applied on a switch, the description text will be from the last applied macro.

This example shows how to add a description to a switch:

```
Switch(config)# macro global description uddld aggressive mode enabled
```

You can verify your settings by entering the **show parser macro description** privileged EXEC command.

Related Commands

[macro global apply cisco-global](#)

main-cpu

To enter the main CPU submode and manually synchronize the configurations on the two supervisor engines, use the **main-cpu** command.

main-cpu

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Redundancy

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch (Catalyst 4507R only).

Usage Guidelines

The main CPU submode is used to manually synchronize the configurations on the two supervisor engines.

From the main CPU submode, use the **auto-sync** command to enable automatic synchronization of the configuration files in NVRAM.



Note

After you enter the main CPU submode, you can use the **auto-sync** command to automatically synchronize the configuration between the primary and secondary route processors based on the primary configuration. In addition, you can use all of the redundancy commands that are applicable to the main CPU.

Examples

This example shows how to reenable the default automatic synchronization feature using the auto-sync standard command to synchronize the startup-config and config-register configuration of the active supervisor engine with the standby supervisor engine. The updates for the boot variables are automatic and cannot be disabled.

```
Switch(config)# redundancy
Switch(config-red)# main-cpu
Switch(config-r-mc)# auto-sync standard
Switch(config-r-mc)# end
Switch# copy running-config startup-config
Switch#
```

Related Commands

auto-sync

match

To specify a match clause by selecting one or more ACLs for a VLAN access-map sequence, use the **match** subcommand. To remove the match clause, use the **no** form of this command.

match {**ip address** {*acl-number* | *acl-name*}} | {**mac address** *acl-name*}

no match {**ip address** {*acl-number* | *acl-name*}} | {**mac address** *acl-name*}



Note

If a match clause is not specified, the action for the VLAN access-map sequence is applied to all packets. All packets are matched against that sequence in the access map.

Syntax Description

ip address <i>acl-number</i>	Selects one or more IP ACLs for a VLAN access-map sequence; valid values are from 1 to 199 and from 1300 to 2699.
ip address <i>acl-name</i>	Selects an IP ACL by name.
mac address <i>acl-name</i>	Selects one or more MAC ACLs for a VLAN access-map sequence.

Defaults

This command has no default settings.

Command Modes

VLAN access-map

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

The match clause specifies the IP or MAC ACL for traffic filtering.

The MAC sequence is not effective for IP packets. IP packets should be access controlled by IP match clauses.

Refer to the *Catalyst 4500 Series Switch Cisco IOS Software Configuration Guide* for additional configuration guidelines and restrictions.

Refer to the *Cisco IOS Command Reference* publication for additional **match** command information.

Examples

This example shows how to define a match clause for a VLAN access map:

```
Switch(config)# vlan access-map ganymede 10
Switch(config-access-map)# match ip address 13
Switch(config-access-map)#
```

Related Commands

[show vlan access-map](#)
[vlan access-map](#)

match flow ip

To specify match criteria to treat flows with a unique source or destination address as new flows, use the **match flow ip** command. To disable this function, use the **no** form of this command.

match flow ip {source-address [ip destination-address ip protocol L4 source-address L4 destination-address] | destination-address}

no match flow ip {source-address [ip destination-address ip protocol L4 source-address L4 destination-address] | destination-address}

Syntax Description

source-address	Establishes a new flow from a flow with a unique IP source address.
ip destination-address ip protocol L4 source-address L4 destination-address	Comprises the full flow keyword; treats each flow with unique IP source, destination, protocol, and Layer 4 source and destination address as a new flow.
destination-address	Establishes a new flow from a flow with a unique IP destination address.

Defaults

None.

Command Modes

class-map configuration submode

Command History

Release	Modification
12.2(25)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.2(25)SG	Support for the full flow option was added.

Usage Guidelines

When you specify the source-address keyword, each flow with a unique source address is treated as a new flow.

When you specify the destination-address keyword, each flow with a unique destination address is treated as a new flow.

A policy map is called a *flow-based* policy map when you configure the flow keywords on the class map that it uses. To attach a flow-based policy map as a child to an aggregate policy map, use the **service-policy** command.



Note

The **match flow** command is available on the Catalyst 4500 series switch only when Supervisor Engine VI (WS-X4516-10GE) is present.

Examples

This example shows how to create a flow-based class map associated with a source address:

```
Switch(config)# class-map match-all c1
Switch(config-cmap)# match flow ip source-address
Switch(config-cmap)# end
Switch#
Switch# show class-map c1
Class Map match-all c1 (id 2)
  Match flow ip source-address
Switch#
```

This example shows how to create a flow-based class map associated with a destination address:

```
Switch(config)# class-map match-all c1
Switch(config-cmap)# match flow ip destination-address
Switch(config-cmap)# end
Switch#

Switch# show class-map c1
Class Map match-all c1 (id 2)
  Match flow ip destination-address
Switch#
```

Assume there are two active flows on the Fast Ethernet interface 6/1 with source addresses 192.168.10.20 and 192.168.10.21. The following example shows how to maintain each flow to 1 Mbps with an allowed burst value of 9000 bytes:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# class-map c1
Switch(config-cmap)# match flow ip source-address
Switch(config-cmap)# exit
Switch(config)# policy-map p1
Switch(config-pmap)# class c1
Switch(config-pmap-c)# police 1000000 9000
Switch(config-pmap-c)# exit
Switch(config-pmap)# exit
Switch(config)# interface fastethernet6/1
Switch(config-if)# service-policy input p1
Switch(config-if)# end
Switch# write memory

Switch# show policy-map interface
FastEthernet6/1

Service-policy input: p1

Class-map: c1 (match-all)
  15432182 packets
  Match: flow ip source-address
  police: Per-interface
    Conform: 64995654 bytes Exceed: 2376965424 bytes

Class-map: class-default (match-any)
  0 packets
  Match: any
  0 packets
Switch#
```

This example shows two active flows on the Fast Ethernet interface 6/1 with destination addresses of 192.168.20.20 and 192.168.20.21. The following example shows how to maintain each flow to 1 Mbps with an allowed burst value of 9000 bytes:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# class-map c1
Switch(config-cmap)# match flow ip destination-address
Switch(config-cmap)# exit
Switch(config)# policy-map p1
Switch(config-pmap)# class c1
Switch(config-pmap-c)# police 1000000 9000
Switch(config-pmap-c)# exit
Switch(config-pmap)# exit
Switch(config)# interface fastEthernet6/1
Switch(config-if)# service-policy input p1
Switch(config-if)# end
Switch# write memory
```

```
Switch# show policy-map interface
FastEthernet6/1

Service-policy input: p1

Class-map: c1 (match-all)
  2965072 packets
  Match: flow ip destination-address
  police: Per-interface
    Conform: 6105636 bytes Exceed: 476652528 bytes

Class-map: class-default (match-any)
  0 packets
  Match: any
    0 packets
Switch#
```

Assume there are two active flows as shown below on the Fast Ethernet interface 6/1:

SrcIp	DstIp	IpProt	SrcL4Port	DstL4Port
192.168.10.10	192.168.20.20	20	6789	81
192.168.10.10	192.168.20.20	20	6789	21

With the following configuration, each flow is policed to a 1000000 bps with an allowed 9000-byte burst value.



Note

If you use the **match flow ip source-address|destination-address** command, these two flows are consolidated into one flow because they have the same source and destination address.

```
Switch# conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# class-map c1
Switch(config-cmap)# match flow ip source-address ip destination-address ip protocol 14
source-port 14 destination-port
Switch(config-cmap)# exit
Switch(config)# policy-map p1
Switch(config-pmap)# class c1
Switch(config-pmap-c)# police 1000000 9000
Switch(config-pmap-c)# exit
Switch(config-pmap)# exit
Switch(config)# interface fastEthernet 6/1
```

```

Switch(config-if)# service-policy input p1
Switch(config-if)# end
Switch# write memory
Switch# show policy-map interface
FastEthernet6/1

class-map c1
  match flow ip source-address ip destination-address ip protocol 14 source-port 14
  destination-port
!
  policy-map p1
    class c1
      police 1000000 bps 9000 byte conform-action transmit exceed-action drop
!
interface FastEthernet 6/1
  service-policy input p1

Switch# show class-map c1
Class Map match-all c1 (id 2)
  Match flow ip source-address ip destination-address ip protocol 14 source-port 14
  destination-port

Switch# show policy-map p1
Policy Map p1
  Class c1
    police 1000000 bps 9000 byte conform-action transmit exceed-action drop

Switch# show policy-map interface
FastEthernet6/1

Service-policy input: p1

Class-map: c1 (match-all)
  15432182 packets
  Match: flow ip source-address ip destination-address ip protocol 14 source-port 14
  destination-port
  police: Per-interface
    Conform: 64995654 bytes Exceed: 2376965424 bytes

Class-map: class-default (match-any)
  0 packets
  Match: any
    0 packets
Switch#

```

Related Commands

[service-policy](#)
[show class-map](#)
[show policy-map](#)
[show policy-map interfaces](#) (refer to Cisco IOS documentation)

mdix auto

To enable the automatic medium-dependent interface crossover (auto-MDIX) feature on the interface, use the **mdix auto** command. When auto-MDIX is enabled, the interface automatically detects the required cable connection type (straight-through or crossover) and configures the connection appropriately. Use the no form of this command to disable auto-MDIX.

mdix auto

no mdix auto

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	Auto-MDIX is enabled.
-----------------	-----------------------

Command Modes	interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.2(31)SGA	Support for this command was first introduced on the Catalyst 4500 series switch

Usage Guidelines	Linecards that support auto-MDIX configuration on their copper media ports include: WS-X4124-RJ45, WS-X4148-RJ with hardware revision 3.0 or higher, and WS-X4232-GB-RJ with hardware revision 3.0 or higher.
-------------------------	---

Linecards that support auto-MDIX by default, when port auto-negotiation enabled, and cannot be turned off using an mdix CLI command include: WS-X4448-GB-RJ45 and WS-X4548-GB-RJ45.

Linecards that are not capable of supporting auto-MDIX functionality, neither by default or CLI commands, include: WS-X4548-GB-RJ45V, WS-X4524-GB-RJ45V, and WS-X4506-GB-T.

When you enable auto-MDIX on an interface, you must also set the interface speed to be autonegotiated so that the feature operates correctly.

When auto-MDIX (and autonegotiation of speed) is enabled on one or both of connected interfaces, link up occurs, even if the cable type (straight-through or crossover) is incorrect.

Examples	This example shows how to enable auto MDIX on a port:
-----------------	---

```
Switch# configure terminal
Switch(config)# interface FastEthernet6/3
Switch(config-if)# speed auto
Switch(config-if)# mdix auto
Switch(config-if)# end
```

Related Commands

[speed](#)
[show interfaces](#)
[show interfaces capabilities](#)
[show interfaces status](#)

media-type

To select the connector for a dual-mode capable port, use the **media-type** command.

media-type { **rj45** | **sfp** }

Syntax Description	rj45	Uses the RJ-45 connector.
	sfp	Uses the SFP connector.

Defaults	sfp
-----------------	------------

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.2(20)EWA	Support for this command was introduced for the WS-X4306-GB-T module and the WS-X4948 chassis.

Usage Guidelines	This command is supported on all ports on the WS-X4306-GB-T module and ports 1/45-48 on the WS-X4948 chassis.
	Entering the show interface capabilities command provides the Multiple Media Types field, which displays the value no if a port is not dual-mode capable and lists the media types (sfp and rj45) for dual-mode capable ports.

Examples	This example shows how to configure port 5/45 on a WS-X4948 chassis to use the RJ-45 connector:
	<pre>Switch(config)# interface gigabitethernet 5/45 Switch(config-if)# media-type rj45</pre>

mode

To set the redundancy mode, use the **mode** command.

```
mode { rpr | sso }
```

Syntax Description

rpr	Specifies RPR mode.
sso	Specifies SSO mode.

Defaults

For Catalyst 4500 series switches that are configured with Supervisor Engine II+, Supervisor Engine IV, and Supervisor Engine V, the defaults are as follows:

- SSO, if the supervisor engine is using Cisco IOS Release 12.2(20)EWA.
- RPR, if the supervisor engine is using Cisco IOS Release 12.1(12c)EW through Release 12.2(18)EW, as well as Release 12.1(xx)E.



Note

If you are upgrading the current supervisor engine from Release 12.2(18)EW or an earlier release to Release 12.2(20)EWA, and the RPR mode has been saved to the startup configuration, both supervisor engines will continue to operate in RPR mode after the software upgrade. To use SSO mode, you must manually change the redundancy mode to SSO.

Command Modes

Redundancy configuration

Command History

Release	Modification
12.2(20)EWA	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

RPR and SSO mode are not supported on Catalyst 4500 series switches that are configured with Supervisor Engine II.

The **mode** command can be entered only from within redundancy configuration mode.

Follow these guidelines when configuring your system to RPR or SSO mode:

- You must use identical Cisco IOS images and supervisor engines to support RPR and SSO mode. Redundancy may not work due to differences between the Cisco IOS release and supervisor engine capabilities.
- Any modules that are not online at the time of a switchover are reset and reloaded on a switchover.
- If you perform an OIR of the module within 60 seconds before a stateful switchover, the module resets during the stateful switchover and the port states are restarted.
- The FIB tables are cleared on a switchover. Routed traffic is interrupted until route tables reconverge.

The redundant supervisor engine reloads on any mode change and begins to work in the current mode.

Examples

This example shows how to set the redundancy mode to SSO:

```
Switch(config)# redundancy  
Switch(config-red)# mode sso  
Switch(config-red)#
```

Related Commands

[redundancy](#)
[redundancy force-switchover](#)
[show redundancy](#)
[show running-config](#)

monitor session

To enable the SPAN sessions on interfaces or VLANs, use the **monitor session** command. To remove one or more source or destination interfaces from a SPAN session, or a source VLAN from a SPAN session, use the **no** form of this command.

```
monitor session session { destination interface { FastEthernet interface-number | GigabitEthernet interface-number } [ encapsulation { isl | dot1q } ] [ ingress [ vlan vlan_id ] [ learning ] ] } | { remote vlan vlan_id } | { source { interface { FastEthernet interface-number | GigabitEthernet interface-number | Port-channel interface-number } } | [ vlan vlan_id ] | { remote vlan vlan_id } | { cpu [ queue queue_id ] } [ , | - | rx | tx | both ] } | { filter { ip access-group [ name | id ] } { vlan vlan_id [ , | - ] } | { packet-type { good | bad } } | { address-type { unicast | multicast | broadcast } [ rx | tx | both ] }
```

```
no monitor session session { destination interface { FastEthernet interface-number | GigabitEthernet interface-number } [ encapsulation { isl | dot1q } ] [ ingress [ vlan vlan_id ] [ learning ] ] } | { remote vlan vlan_id } | { source { interface { FastEthernet interface-number | GigabitEthernet interface-number | Port-channel interface-number } } | [ vlan vlan_id ] | { remote vlan vlan_id } | { cpu [ queue queue_id ] } [ , | - | rx | tx | both ] } | { filter { ip access-group [ name | id ] } { vlan vlan_id [ , | - ] } | { packet-type { good | bad } } | { address-type { unicast | multicast | broadcast } [ rx | tx | both ] }
```

Syntax Description

<i>session</i>	Number of a SPAN session; valid values are from 1 to 6.
destination	Specifies a SPAN destination.
interface	Specifies an interface.
FastEthernet <i>interface-number</i>	Specifies a Fast Ethernet module and port number; valid values are from 1 to 6.
GigabitEthernet <i>interface-number</i>	Specifies a Gigabit Ethernet module and port number; valid values are from 1 to 6.
encapsulation	(Optional) Specifies the encapsulation type of the destination port.
isl	(Optional) Specifies ISL encapsulation.
dot1q	(Optional) Specifies dot1q encapsulation.
ingress	(Optional) Indicates whether the ingress option is enabled.
vlan <i>vlan_id</i>	(Optional) Specifies the VLAN; valid values are from 1 to 4094.
learning	(Optional) Enables host learning on ingress-enabled destination ports.
remote vlan <i>vlan_id</i>	Specifies an RSPAN source or destination session on a switch.
source	Specifies a SPAN source.
Port-channel <i>interface-number</i>	Specifies a port-channel interface; valid values are from 1 to 64.
cpu	Causes traffic received or sent from the CPU to be copied to the destination of the session.

queue <i>queue_id</i>	(Optional) Specifies that only traffic received on the specific CPU subqueue should be copied to the destination of the session. Valid values are from 1 to 32, or by the following names: all, control-packet, rpf-failure, adj-same-if, nfl, mtu-exceeded, unknown-sa, span, acl input, acl input log, acl input error, acl input forward, acl input punt, acl output, acl output log, acl output error, acl output forward, acl output punt, bridged, bridged 1, bridged 2, bridged 3, bridged 4, routed received, routed received 1, routed received 2, routed received 3, routed received 4, routed forward, routed forward 1, routed forward 2, routed forward 3, and routed forward 4.
,	(Optional) Symbol to specify another range of SPAN VLANs; valid values are from 1 to 4094.
-	(Optional) Symbol to specify a range of SPAN VLANs.
both	(Optional) Monitors and filters received and transmitted traffic.
rx	(Optional) Monitors and filters received traffic only.
tx	(Optional) Monitors and filters transmitted traffic only.
filter	Limits SPAN source traffic to specific VLANs.
ip access-group	(Optional) Specifies an IP access group filter, either a name or a number.
name	(Optional) Specifies an IP access list name.
id	(Optional) Specifies an IP access list number. Valid values are 1 to 199 for an IP access list and 1300 to 2699 for an IP expanded access list.
vlan <i>vlan_id</i>	(Optional) Specifies the VLAN to be filtered. The number is entered as a single value or a range; valid values are from 1 to 4094.
packet-type	Limits SPAN source traffic to packets of a specified type.
good	Specifies a good packet type
bad	Specifies a bad packet type.
address-type unicast multicast broadcast	Limits SPAN source traffic to packets of a specified address type. Valid types are unicast, multicast, and broadcast.

Defaults

Received and transmitted traffic, as well as all VLANs, packet types, and address types are monitored on a trunking interface.

Packets are transmitted untagged out the destination port; ingress and learning are disabled.

All packets are permitted and forwarded “as is” on the destination port.

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(11b)EW	Support for differing directions within a single-user session and extended VLAN addressing was added.
12.1(19)EW	Support for ingress packets, encapsulation specification, packet and address type filtering, and CPU source sniffing enhancements was added.
12.1(20)EW	Support for remote SPAN and host learning on ingress-enabled destination ports was added.
12.2(20)EW	Support for an IP access group filter was added.

Usage Guidelines

Only one SPAN destination for a SPAN session is supported. If you attempt to add another destination interface to a session that already has a destination interface that is configured, you will get an error. You must first remove a SPAN destination interface before changing the SPAN destination to a different interface.

Beginning in Cisco IOS Release 12.1(12c)EW, you can configure sources from different directions within a single user session.



Note Beginning in Cisco IOS Release 12.1(12c)EW, SPAN is limited to two sessions containing ingress sources and four sessions containing egress sources. Bidirectional sources support both ingress and egress sources.

A particular SPAN session can either monitor VLANs or monitor individual interfaces: you cannot have a SPAN session that monitors both specific interfaces and specific VLANs. If you first configure a SPAN session with a source interface, and then try to add a source VLAN to the same SPAN session, you will receive an error. You will also receive an error message if you configure a SPAN session with a source VLAN, and then try to add a source interface to that session. You must first clear any sources for a SPAN session before switching to another type of source. CPU sources may be combined with source interfaces and source VLANs.

When configuring the **ingress** option on a destination port, you must specify an ingress VLAN if the configured encapsulation type is untagged (the default) or is 802.1Q. If the encapsulation type is ISL, then no ingress VLAN specification is necessary.

By default, when you enable ingress, no host learning is performed on destination ports. When you enter the **learning** keyword, host learning is performed on the destination port, and traffic to learned hosts is forwarded out the destination port.

If you enter the **filter** keyword on a monitored trunking interface, only traffic on the set of specified VLANs is monitored. Port-channel interfaces are displayed in the list of **interface** options if you have them configured. VLAN interfaces are not supported. However, you can span a particular VLAN by entering the **monitor session session source vlan vlan-id** command.

The packet-type filters are supported only in the Rx direction. You can specify both Rx- and Tx-type filters and multiple-type filters at the same time (for example, you can use **good** and **unicast** to only sniff nonerror unicast frames). As with VLAN filters, if you do not specify the type, the session will sniff all packet types.

The **queue** identifier allows sniffing for only traffic that is sent or received on the specified CPU queues. The queues may be identified either by number or by name. The queue names may contain multiple numbered queues for convenience.

Examples

This example shows how to configure IP access group 100 on a SPAN session:

```
Switch(config)# monitor session 1 filter ip access-group 100
Switch(config)#
```

This example shows how to add a source interface to a SPAN session:

```
Switch(config)# monitor session 1 source interface fa2/3
Switch(config)#
```

This example shows how to configure the sources with different directions within a SPAN session:

```
Switch(config)# monitor session 1 source interface fa2/3 rx
Switch(config)# monitor session 1 source interface fa2/2 tx
Switch(config)#
```

This example shows how to remove a source interface from a SPAN session:

```
Switch(config)# no monitor session 1 source interface fa2/3
Switch(config)#
```

This example shows how to limit SPAN traffic to VLANs 100 through 304:

```
Switch(config)# monitor session 1 filter vlan 100 - 304
Switch(config)#
```

This example shows how to configure RSPAN VLAN 20 as the destination:

```
Switch(config)# monitor session 2 destination remote vlan 20
Switch(config)#
```

Related Commands

[show monitor](#)

mtu

To enable jumbo frames on an interface by adjusting the maximum size of a packet or maximum transmission unit (MTU), use the **mtu** command. To return to the default setting, use the **no** form of this command.

mtu *bytes*

no mtu

Syntax Description

<i>bytes</i>	Byte size; valid values are from 1500 to 9198.
--------------	--

Defaults

The default settings are as follows:

- Jumbo frames are disabled
- 1500 bytes for all ports

Command Modes

Interface configuration mode

Command History

Release	Modification
12.1(13)EW	Support for this command was introduced on the Catalyst 4500 series switches.

Usage Guidelines

Jumbo frames are supported on nonblocking Gigabit Ethernet ports, switch virtual interfaces (SVI), and EtherChannels. Jumbo frames are not available for stub-based ports.

The baby giants feature uses the global **system mtu size** command to set the global baby giant MTU. It allows all stub-based port interfaces to support an Ethernet payload size of up to 1552 bytes.

Both the **system mtu** command and the per-interface **mtu** command work on interfaces that can support jumbo frames, but the per-interface **mtu** command takes precedence.

Examples

This example shows how to specify an MTU of 1800 bytes:

```
Switch(config)# interface GigabitEthernet 1/1  
Switch(config-if)# mtu 1800
```

Related Commands

[system mtu](#)

name

To set the MST region name, use the **name** command. To return to the default name, use the **no** form of this command.

name *name*

no name *name*

Syntax Description	<i>name</i>	Specifies the name of the MST region. The name can be any string with a maximum length of 32 characters.
---------------------------	-------------	--

Defaults	The MST region name is not set.
-----------------	---------------------------------

Command Modes	MST configuration
----------------------	-------------------

Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	Two or more Catalyst 4500 series switches with the same VLAN mapping and configuration version number are considered to be in different MST regions if the region names are different.
-------------------------	--

Examples	This example shows how to name a region:
-----------------	--

```
Switch(config-mst)# name Cisco
Switch(config-mst)#
```

Related Commands	instance revision show spanning-tree mst spanning-tree mst configuration
-------------------------	---

pagp learn-method

To learn the input interface of the incoming packets, use the **pagp learn-method** command. To return to the default value, use the **no** form of this command.

pagp learn-method { aggregation-port | physical-port }

no pagp learn-method

Syntax Description	aggregation-port	Specifies learning the address on the port channel.
	physical-port	Specifies learning the address on the physical port within the bundle.

Defaults	Aggregation port is enabled.
----------	------------------------------

Command Modes	Interface configuration
---------------	-------------------------

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Examples This example shows how to enable physical port address learning within the bundle:

```
Switch(config-if) # pagp learn-method physical-port  
Switch(config-if) #
```

This example shows how to enable aggregation port address learning within the bundle:

```
Switch(config-if) # pagp learn-method aggregation-port  
Switch(config-if) #
```

Related Commands	pagp learn-method show pagp
------------------	--

pagp port-priority

To select a port in hot standby mode, use the **pagp port-priority** command. To return to the default value, use the **no** form of this command.

pagp port-priority *priority*

no pagp port-priority

Syntax Description	<i>priority</i> Port priority number; valid values are from 1 to 255.	
Defaults	Port priority is set to 128.	
Command Modes	Interface configuration	
Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
Usage Guidelines	The higher the priority, the better the chances are that the port will be selected in the hot standby mode.	
Examples	This example shows how to set the port priority:	
	<pre>Switch(config-if)# pagp port-priority 45 Switch(config-if)#</pre>	
Related Commands	pagp learn-method show pagp	

passive-interface

To disable sending routing updates on an interface, use the **passive-interface** command. To reenable the sending of routing updates, use the **no** form of this command.

passive-interface [[**default**] {*interface-type interface-number*}] | {**range** *interface-type interface-number-interface-type interface-number*}

no passive-interface [[**default**] {*interface-type interface-number*}] | {**range** *interface-type interface-number-interface-type interface-number*}

Syntax Description	default	(Optional) All interfaces become passive.
	<i>interface-type</i>	Specifies the interface type.
	<i>interface-number</i>	Specifies the interface number.
	range <i>range</i>	Specifies the range of subinterfaces being configured; see the “Usage Guidelines” section.

Defaults Routing updates are sent on the interface.

Command Modes Router configuration

Command History	Release	Modification
	12.2(31)SG	Support for this command was introduced on the Catalyst 4500 series switch

Usage Guidelines You can use the **passive-interface range** command on the following interfaces: FastEthernet, GigabitEthernet, VLAN, Loopback, Port-channel, 10-GigabitEthernet, and Tunnel. When you use the **passive-interface range** command on a VLAN interface, the interface should be the existing VLAN SVIs. To display the VLAN SVIs, enter the **show running config** command. The VLANs that are not displayed cannot be used in the **passive-interface range** command.

The values that are entered with the **passive-interface range** command are applied to all the existing VLAN SVIs.

Before you can use a macro, you must define a range using the **define interface-range** command.

All configuration changes that are made to a port range through the **passive-interface range** command are retained in the running-configuration as individual passive-interface commands.

You can enter the **range** in two ways:

- Specifying up to five interface ranges
- Specifying a previously defined macro

You can either specify the interfaces or the name of an interface-range macro. An interface range must consist of the same interface type, and the interfaces within a range cannot span across the modules.

You can define up to five interface ranges on a single command; separate each range with a comma:

```
interface range gigabitethernet 5/1-20, gigabitethernet4/5-20.
```

Use this format when entering the *port-range*:

- *interface-type {mod}/{first-port} - {last-port}*

You cannot specify both a macro and an interface range in the same command. After creating a macro, you can enter additional ranges. If you have already entered an interface range, the CLI does not allow you to enter a macro.

You can specify a single interface in the **range** *range* value. This makes the command similar to the **passive-interface** *interface-number* command.


Note

The **range** keyword is only supported in OSPF, EIGRP, RIP, and ISIS router mode.

If you disable the sending of routing updates on an interface, the particular subnet will continue to be advertised to other interfaces, and updates from other routers on that interface continue to be received and processed.

The **default** keyword sets all interfaces as passive by default. You can then configure individual interfaces where adjacencies are desired using the **no passive-interface** command. The **default** keyword is useful in Internet service provider (ISP) and large enterprise networks where many of the distribution routers have more than 200 interfaces.

For the Open Shortest Path First (OSPF) protocol, OSPF routing information is neither sent nor received through the specified router interface. The specified interface address appears as a stub network in the OSPF domain.

For the Intermediate System-to-Intermediate System (IS-IS) protocol, this command instructs IS-IS to advertise the IP addresses for the specified interface without actually running IS-IS on that interface. The **no** form of this command for IS-IS disables advertising IP addresses for the specified address.


Note

For IS-IS you must keep at least one active interface and configure the interface with the **ip router isis** command.

Enhanced Interior Gateway Routing Protocol (EIGRP) is disabled on an interface that is configured as passive although it advertises the route.

Examples

The following example sends EIGRP updates to all interfaces on network 10.108.0.0 except GigabitEthernet interface 1/1:

```
Switch(config)# interface gigabitethernet 1/1
Switch(config-if)# router eigrp 109
Switch(config-router)# network 10.108.0.0
Switch(config-router)# passive-interface gigabitethernet 1/1
Switch(config-router)#
```

The following configuration enables IS-IS on Ethernet interface 1 and serial interface 0 and advertises the IP addresses of Ethernet interface 0 in its link-state protocol data units (PDUs):

```
Switch(config-if)# router isis Finance
Switch(config-router)# passive-interface Ethernet 0
Switch(config-router)# interface Ethernet 1
Switch(config-router)# ip router isis Finance
Switch(config-router)# interface serial 0
Switch(config-router)# ip router isis Finance
Switch(config-router)#
```

The following example sets all interfaces as passive, then activates Ethernet interface 0:

```
Switch(config-if)# router ospf 100
Switch(config-router)# passive-interface default
Switch(config-router)# no passive-interface ethernet0
Switch(config-router)# network 10.108.0.1 0.0.0.255 area 0
Switch(config-router)#
```

The following configuration sets the Ethernet ports 3 through 4 on module 0 and GigabitEthernet ports 4 through 7 on module 1 as passive:

```
Switch(config-if)# router ospf 100
Switch(config-router)# passive-interface range ethernet0/3-4,gigabitethernet1/4-7
Switch(config-router)#
```

permit

To permit an ARP packet based on matches against the DHCP bindings, use the **permit** command. To remove a specified ACE from an access list, use the **no** form of this command

```
permit [{request} ip {any | host sender-ip | sender-ip sender-ip-mask} mac {any | host sender-mac | sender-mac sender-mac-mask} | response ip {any | host sender-ip | sender-ip sender-ip-mask} [{any | host target-ip | target-ip target-ip-mask}] mac {any | host sender-mac | sender-mac sender-mac-mask} [{any | host target-mac | target-mac target-mac-mask}}] [log]
```

```
no permit [{request} ip {any | host sender-ip | sender-ip sender-ip-mask} mac {any | host sender-mac | sender-mac sender-mac-mask} | response ip {any | host sender-ip | sender-ip sender-ip-mask} [{any | host target-ip | target-ip target-ip-mask}] mac {any | host sender-mac | sender-mac sender-mac-mask} [{any | host target-mac | target-mac target-mac-mask}}] [log]
```

Syntax Description

request	(Optional) Requests a match for the ARP request. When request is not specified, matching is performed against all ARP packets.
ip	Specifies the sender IP address.
any	Specifies that any IP or MAC address will be accepted.
host <i>sender-ip</i>	Specifies that only a specific sender IP address will be accepted.
<i>sender-ip sender-ip-mask</i>	Specifies that a specific range of sender IP addresses will be accepted.
mac	Specifies the sender MAC address.
host <i>sender-mac</i>	Specifies that only a specific sender MAC address will be accepted.
<i>sender-mac sender-mac-mask</i>	Specifies that a specific range of sender MAC addresses will be accepted.
response	Specifies a match for the ARP responses.
ip	Specifies the IP address values for the ARP responses.
host <i>target-ip</i>	(Optional) Specifies that only a specific target IP address will be accepted.
<i>target-ip target-ip-mask</i>	(Optional) Specifies that a specific range of target IP addresses will be accepted.
mac	Specifies the MAC address values for the ARP responses.
host <i>target-mac</i>	(Optional) Specifies that only a specific target MAC address will be accepted.
<i>target-mac target-mac-mask</i>	(Optional) Specifies that a specific range of target MAC addresses will be accepted.
log	(Optional) Logs a packet when it matches the access control entry (ACE).

Defaults

This command has no default settings.

Command Modes

arp-nacl configuration

Command History	Release	Modification
	12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines Permit clauses can be added to forward or drop ARP packets based on some matching criteria.

Examples This example shows a host with a MAC address of 0000.0000.abcd and an IP address of 1.1.1.1. This example shows how to permit both requests and responses from this host:

```
Switch(config)# arp access-list static-hosts
Switch(config-arp-nacl)# permit ip host 1.1.1.1 mac host 0000.0000.abcd
Switch(config-arp-nacl)# end
Switch# show arp access-list

ARP access list static-hosts
    permit ip host 1.1.1.1 mac host 0000.0000.abcd
Switch#
```

Related Commands [arp access-list](#)
[deny](#)
[ip arp inspection filter vlan](#)

policy-map

To access the QoS policy map configuration mode to configure the QoS policy map, use the **policy-map** command. To delete a policy map, use the **no** form of this command.

policy-map *policy-map-name*

no policy-map *policy-map-name*

Syntax Description

policy-map-name Specifies the name of the policy map.

Defaults

This command has no default settings.

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

In QoS policy-map configuration mode, these configuration commands are available:

- **exit** exits QoS class map configuration mode.
- **no** removes an existing defined policy map.
- **class** *class-map-name* accesses the QoS class map configuration mode to specify a previously created class map to be included in the policy map or to create a class map. (See the [class-map](#) command for additional information.)
- **police** [*aggregate name*] *rate burst* [**conform-action** {**drop** | **transmit**}] [**exceed-action** {**drop** | **policed-dscp-transmit** | **transmit**}] defines a microflow or aggregate policer.
- **trust** {**cos** | **dscp**} sets the specified class trust values. Trust values that are set in this command supersede trust values that are set on specific interfaces.

Examples

This example shows how to create a policy map named **ipp5-policy** that uses the class-map named **ipp5** and is configured to rewrite the packet precedence to 6 and to aggregate police the traffic that matches the IP precedence value of 5:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# policy-map ipp5-policy
Switch(config-pmap)# class ipp5
Switch(config-pmap-c)# set ip precedence 6
Switch(config-pmap-c)# police 2000000000 2000000 conform-action transmit exceed-action
policed-dscp-transmit
Switch(config-pmap-c)# end
```

Related Commands

[class-map](#)
[service-policy](#)
[show class-map](#)
[show policy-map](#)
[show policy-map interface](#)

port-channel load-balance

To set the load-distribution method among the ports in the bundle, use the **port-channel load-balance** command. To reset the load distribution to the default, use the **no** form of this command.

port-channel load-balance *method*

no port-channel load-balance

Syntax Description	<i>method</i> Specifies the load distribution method. See the “Usage Guidelines” section for more information.				
Defaults	Load distribution on the source XOR destination IP address is enabled.				
Command Modes	Global configuration				
Command History	<table> <tr> <th>Release</th><th>Modification</th></tr> <tr> <td>12.1(8a)EW</td><td>Support for this command was introduced on the Catalyst 4500 series switch.</td></tr> </table>	Release	Modification	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
Release	Modification				
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.				

Usage Guidelines

The following values are valid for the load-distribution method:

- **dst-ip**—Load distribution on the destination IP address
- **dst-mac**—Load distribution on the destination MAC address
- **dst-port**—Load distribution on the destination TCP/UDP port
- **src-dst-ip**—Load distribution on the source XOR destination IP address
- **src-dst-mac**—Load distribution on the source XOR destination MAC address
- **src-dst-port**—Load distribution on the source XOR destination TCP/UDP port
- **src-ip**—Load distribution on the source IP address
- **src-mac**—Load distribution on the source MAC address
- **src-port**—Load distribution on the source port

Examples

This example shows how to set the load-distribution method to the destination IP address:

```
Switch(config)# port-channel load-balance dst-ip
Switch(config)#
```

This example shows how to set the load-distribution method to the source XOR destination IP address:

```
Switch(config)# port-channel load-balance src-dst-port
Switch(config)#
```

Related Commands

[interface port-channel](#)
[show etherchannel](#)

power dc input

To configure the power DC input parameters on the switch, use the **power dc input** command. To return to the default power settings, use the **no** form of this command.

power dc input *watts*

no power dc input

Syntax Description

dc input	Specifies the external DC source for both power supply slots.
<i>watts</i>	Sets the total capacity of the external DC source in watts; valid values are from 300 to 8500.

Defaults

DC power input is 2500 W.

Command Modes

Global configuration

Command History

Release	Modification
12.1(11)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(13)EW	Support for dc input was added.

Usage Guidelines

If your interface is not capable of supporting Power over Ethernet, you will receive this message:

Power over Ethernet not supported on interface Admin

Examples

This example shows how to set the total capacity of the external DC power source to 5000 W:

```
Switch(config)# power dc input 5000
Switch(config)#
```

Related Commands

[show power](#)

power inline

To set the inline-power state for the inline-power-capable interfaces, use the **power inline** command. To return to the default values, use the **no** form of this command.

power inline { **auto** [**max** *milliwatt*] | **never** | **static** [**max** *milliwatt*] | **consumption** *milliwatt* }

no power inline

Syntax Description		
auto		Sets the Power over Ethernet state to auto mode for inline-power-capable interfaces.
max <i>milliwatt</i>		(Optional) Maximum power that the equipment can consume; valid range is from 2000 to 15400 mW.
never		Disables both the detection and power for the inline-power capable interfaces.
static		Allocates power statically.
consumption <i>milliwatt</i>		Sets power allocation per interface; valid range is from 4000 to 15400. Any non-default value disables automatic adjustment of power allocation.

Defaults

The default settings are as follows:

- Auto mode for Power over Ethernet is set.
- Maximum mW mode is set to 15400.
- Default allocation is set to 15400.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(11)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(19)EW	Support added for static power allocation.
12.1(20)EW	Support added for Power over Ethernet.

Usage Guidelines

If your interface is not capable of supporting Power over Ethernet, you will receive this message:

Power over Ethernet not supported on interface Admin

Examples

This example shows how to set the inline-power detection and power for the inline-power-capable interfaces:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface fastethernet 4/1
Switch(config-if)# power inline auto
Switch(config-if)# end
Switch#
```

This example shows how to disable the inline-power detection and power for the inline-power-capable interfaces:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface fastethernet 4/1
Switch(config-if)# power inline never
Switch(config-if)# end
Switch#
```

This example shows how to set the permanent Power over Ethernet allocation to 8000 mW for Fast Ethernet interface 4/1 regardless what is mandated either by the 802.3af class of the discovered device or by any CDP packet that is received from the powered device:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface fastethernet 4/1
Switch(config-if)# power inline consumption 8000
Switch(config-if)# end
Switch#
```

Related Commands

[power inline consumption](#)
[show power](#)

power inline consumption

To set the default power that is allocated to an interface for all the inline-power-capable interfaces on the switch, use the **power inline consumption** command. To return to the default values, use the **no** form of this command.

power inline consumption default *milliwatts*

no power inline consumption default

Syntax Description

default	Specifies the switch to use the default allocation.
<i>milliwatts</i>	Sets the default power allocation in milliwatts; the valid range is from 4000 to 15400. Any non-default value disables automatic adjustment of power allocation.

Defaults

Milliwatt mode is set to 15400.

Command Modes

Global configuration

Command History

Release	Modification
12.1(11)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(20)EW	Support added for Power over Ethernet.

Usage Guidelines

If your interface is not capable of supporting Power over Ethernet, you will receive this message:

```
Power over Ethernet not supported on interface Admin
```

Examples

This example shows how to set the Power over Ethernet allocation to use 8000 mW, regardless of any CDP packet that is received from the powered device:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# power inline consumption default 8000
Switch(config)# end
Switch#
```

Related Commands

[power inline](#)
[show power](#)

power redundancy-mode

To configure the power settings for the chassis, use the **power redundancy-mode** command. To return to the default setting, use the **default** form of this command.

power redundancy-mode { redundant | combined }

default power redundancy-mode

Syntax Description

redundant	Configures the switch to redundant power management mode.
combined	Configures the switch to combined power management mode.

Defaults

Redundant power management mode

Command Modes

Global configuration

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch (Catalyst 4500 series switches only: 4503, 4506, and 4507).

Usage Guidelines

The two power supplies must be the same type and wattage.



Caution

If you have power supplies with different types or wattages installed in your switch, the switch will not recognize one of the power supplies. A switch set to redundant mode will not have power redundancy. A switch set to combined mode will use only one power supply.

In redundant mode, the power from a single power supply must provide enough power to support the switch configuration.

[Table 2-10](#) lists the maximum available power for chassis and Power over Ethernet for each power supply.

Table 2-10 Available Power

Power Supply	Redundant Mode (W)	Combined Mode (W)
1000 W AC	System ¹ = 1000 Inline = 0	System = 1667 Inline = 0
2800 W AC	System = 1360 Inline = 1400	System = 2473 Inline = 2333

1. The system power includes power for the supervisor engines, all modules, and the fan tray.

Examples

This example shows how to set the power management mode to combined:

```
Switch(config)# power redundancy-mode combined
Switch(config)#
```

Related Commands

[show power](#)

port-security mac-address

To configure a secure address on an interface for a specific VLAN or VLAN range, use the **port-security mac-address** command.

port-security mac-address *mac_address*

Syntax Description

<i>mac_address</i>	The MAC-address that needs to be secured.
--------------------	---

Command Modes

VLAN-range interface submenu

Command History

Release	Modification
12.2(25)EWA	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

Layer 2 interfaces can be part of multiple VLANs (for example, a typical trunk port). In conjunction with the **vlan** command, you can use the **port-security mac-address** command to specify different addresses on different VLANs.

Examples

This example shows how to configure the secure address 1.1.1 on interface Gigabit Ethernet 1/1 for VLANs 2-3:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet1/1
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# vlan 2-3
Switch(config-if-vlan-range)# port-security mac-address 1.1.1
Switch(config-if-vlan-range)# end
Switch#
```

Related Commands

[port-security mac-address sticky](#)
[port-security maximum](#)

port-security mac-address sticky

To configure a sticky address on an interface for a specific VLAN or VLAN range, use the **port-security mac-address sticky** command.

port-security mac-address sticky *mac_address*

Syntax Description

<i>mac_address</i>	The MAC-address that needs to be secured.
--------------------	---

Command Modes

VLAN-range interface submode

Command History

Release	Modification
12.2(25)EWA	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

The Sticky feature must be enabled on an interface before you can configure the **port-security mac-address sticky** command.

Usage Guidelines

Layer 2 interfaces can be part of multiple VLANs (for example, a typical trunk port). In conjunction with the **vlan** command, you can use the **port-security mac-address sticky** command to specify different sticky addresses on different VLANs.

The Sticky feature must be enabled on an interface before you can configure the **port-security mac-address sticky** command.

Examples

This example shows how to configure the sticky address 1.1.1 on interface Gigabit Ethernet 1/1 for VLANs 2-3:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet1/1
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# vlan 2-3
Switch(config-if-vlan-range)# port-security mac-address sticky 1.1.1
Switch(config-if-vlan-range)# end
Switch#
```

Related Commands

[port-security mac-address](#)
[port-security maximum](#)

port-security maximum

To configure the maximum number of addresses on an interface for a specific VLAN or VLAN range, use the **port-security maximum** command.

port-security maximum *max_value*

Syntax Description

<i>max_value</i>	The maximum number of MAC-addresses.
------------------	--------------------------------------

Command Modes

VLAN-range interface submode

Command History

Release	Modification
12.2(25)EWA	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

Layer 2 interfaces can be part of multiple VLANs (for example, a typical trunk port). In conjunction with the **vlan** command, you can use the **port-security maximum** command to specify the maximum number of secure addresses on different VLANs.

If a specific VLAN on a port is not configured with a maximum value, the maximum configured for the port is used for that VLAN. In this situation, the maximum number of addresses that can be secured on this VLAN is limited to the maximum value configured on the port.

Each VLAN can be configured with a maximum count that is greater than the value configured on the port. Also, the sum total of the maximum configured values for all the VLANs can exceed the maximum configured for the port. In either of these situations, the number of MAC addresses secured on each VLAN is limited to the lesser of the VLAN configuration maximum and the port configuration maximum.

Examples

This example shows how to configure a maximum number of addresses (5) on interface Gigabit Ethernet 1/1 for VLANs 2-3:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface g1/1
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# vlan 2-3
Switch(config-if-vlan-range)# port-security maximum 5
Switch(config-if-vlan-range)# exit
Switch#
```

Related Commands

[port-security mac-address](#)
[port-security mac-address sticky](#)

private-vlan

To configure private VLANs and the association between a private VLAN and a secondary VLAN, use the **private-vlan** command. To return to the default value, use the **no** form of this command.

private-vlan { **isolated** | **community** | **primary** }

private-vlan association *secondary-vlan-list* [{ **add** *secondary-vlan-list* } | { **remove** *secondary-vlan-list* }]

no private-vlan { **isolated** | **community** | **primary** }

no private-vlan association

Syntax Description		
isolated		Designates the VLAN as an isolated private VLAN.
community		Designates the VLAN as the community private VLAN.
primary		Designates the VLAN as the primary private VLAN.
association		Creates an association between a secondary VLAN and a primary VLAN.
<i>secondary-vlan-list</i>		Specifies the number of the secondary VLAN.
add		(Optional) Associates a secondary VLAN to a primary VLAN.
remove		(Optional) Clears the association between a secondary VLAN and a primary VLAN.

Defaults Private VLANs are not configured.

Command Modes VLAN configuration

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
	12.1(12c)EW	Support for extended addressing was added.
	12.2(20)EW	Support for community VLAN was added.

Usage Guidelines

You cannot configure VLAN 1 or VLANs 1001 to 1005 as private VLANs.

VTP does not support private VLANs. You must configure private VLANs on each device where you want private VLAN ports.

The *secondary_vlan_list* parameter cannot contain spaces; it can contain multiple comma-separated items. Each item can be a single private VLAN ID or a range of private VLAN IDs separated by hyphens.

The *secondary_vlan_list* parameter can contain multiple community VLAN IDs.

The *secondary_vlan_list* parameter can contain only one isolated VLAN ID. A private VLAN is defined as a set of private ports characterized by a common set of VLAN number pairs: each pair is made up of at least two special unidirectional VLANs and is used by isolated ports or by a community of ports to communicate with the switches.

An isolated VLAN is a VLAN that is used by the isolated ports to communicate with the promiscuous ports. The isolated VLAN traffic is blocked on all other private ports in the same VLAN and can be received only by the standard trunking ports and the promiscuous ports that are assigned to the corresponding primary VLAN.

A community VLAN is the VLAN that carries the traffic among the community ports and from the community ports to the promiscuous ports on the corresponding primary VLAN. A community VLAN is not allowed on a private VLAN trunk.

A promiscuous port is a private port that is assigned to a primary VLAN.

A primary VLAN is a VLAN that is used to convey the traffic from the switches to the customer end stations on the private ports.

You can specify only one isolated *vlan-id* value, while multiple community VLANs are allowed. You can only associate isolated and community VLANs to one VLAN. The associated VLAN list may not contain primary VLANs. Similarly, a VLAN that is already associated to a primary VLAN cannot be configured as a primary VLAN.

The **private-vlan** commands do not take effect until you exit the config-VLAN submode.

If you delete either the primary or secondary VLAN, the ports that are associated with the VLAN become inactive.

Refer to the *Catalyst 4500 Series Switch Cisco IOS Software Configuration Guide* for additional configuration guidelines.

Examples

This example shows how to configure VLAN 202 as a primary VLAN and verify the configuration:

```
Switch# configure terminal
Switch(config)# vlan 202
Switch(config-vlan)# private-vlan primary
Switch(config-vlan)# end
Switch# show vlan private-vlan
```

Primary	Secondary	Type	Interfaces
202		primary	

This example shows how to configure VLAN 303 as a community VLAN and verify the configuration:

```
Switch# configure terminal
Switch(config)# vlan 303
Switch(config-vlan)# private-vlan community
Switch(config-vlan)# end
Switch# show vlan private-vlan
```

Primary	Secondary	Type	Interfaces
202		primary	
	303	community	

This example shows how to configure VLAN 440 as an isolated VLAN and verify the configuration:

```
Switch# configure terminal
Switch(config)# vlan 440
Switch(config-vlan)# private-vlan isolated
Switch(config-vlan)# end
```

```
Switch# show vlan private-vlan
```

Primary	Secondary	Type	Interfaces
202		primary	
	303	community	
	440	isolated	

This example shows how to create a private VLAN relationship among the primary VLAN 14, the isolated VLAN 19, and community VLANs 20 and 21:

```
Switch(config)# vlan 19
Switch(config-vlan) # private-vlan isolated
Switch(config)# vlan 14
Switch(config-vlan) # private-vlan primary
Switch(config-vlan) # private-vlan association 19
```

This example shows how to remove a private VLAN relationship and delete the primary VLAN. The associated secondary VLANs are not deleted.

```
Switch(config-vlan) # no private-vlan 14
Switch(config-vlan) #
```

This example shows how to associate community VLANs 303 through 307 and 309 and isolated VLAN 440 with primary VLAN 202 and verify the configuration:

```
Switch# configure terminal
Switch(config)# vlan 202
Switch(config-vlan) # private-vlan association 303-307,309,440
Switch(config-vlan) # end
Switch# show vlan private-vlan
```

Primary	Secondary	Type	Interfaces
202	303	community	
202	304	community	
202	305	community	
202	306	community	
202	307	community	
202	309	community	
202	440	isolated	
	308	community	



Note

The secondary VLAN 308 has no associated primary VLAN.

This example shows how to remove an isolated VLAN from the private VLAN association:

```
Switch(config)# vlan 14
Switch(config-vlan) # private-vlan association remove 18
Switch(config-vlan) #
```

This example shows how to configure interface FastEthernet 5/1 as a PVLAN host port and verify the configuration:

```
Switch# configure terminal
Switch(config)# interface fastethernet 5/1
Switch(config-if) # switchport mode private-vlan host
Switch(config-if) # switchport private-vlan host-association 202 440
Switch(config-if) # end

Switch# show interfaces fastethernet 5/1 switchport
Name: Fa5/1
Switchport: Enabled
Administrative Mode: private-vlan host
```

private-vlan

```
Operational Mode: private-vlan host
Administrative Trunking Encapsulation: negotiate
Operational Trunking Encapsulation: native
Negotiation of Trunking: Off
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Appliance trust: none
Administrative Private Vlan
  Host Association: 202 (VLAN0202) 440 (VLAN0440)
  Promiscuous Mapping: none
  Trunk encapsulation : dot1q
  Trunk vlans:
Operational private-vlan(s):
  202 (VLAN0202) 440 (VLAN0440)
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
```

Related Commands

[show vlan](#)
[show vlan private-vlan](#)

private-vlan mapping

To create a mapping between the primary and the secondary VLANs so that both share the same primary VLAN SVI, use the **private-vlan mapping** command. To remove all PVLAN mappings from an SVI, use the **no** form of this command.

```
private-vlan mapping primary-vlan-id {[secondary-vlan-list | {add secondary-vlan-list} |
{remove secondary-vlan-list}]}
```

```
no private-vlan mapping
```

Syntax Description	<i>primary-vlan-id</i>	VLAN ID of the primary VLAN of the PVLAN relationship.
	<i>secondary-vlan-list</i>	(Optional) VLAN ID of the secondary VLANs to map to the primary VLAN.
	add	(Optional) Maps the secondary VLAN to the primary VLAN.
	remove	(Optional) Removes the mapping between the secondary VLAN and the primary VLAN.

Defaults All PVLAN mappings are removed.

Command Modes Interface configuration

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

The *secondary_vlan_list* parameter cannot contain spaces. It can contain multiple, comma-separated items. Each item can be a single PVLAN ID or a range of PVLAN IDs separated by hyphens.

This command is valid in the interface configuration mode of the primary VLAN.

The SVI of the primary VLAN is created at Layer 3.

The traffic that is received on the secondary VLAN is routed by the SVI of the primary VLAN.

The SVIs of the existing secondary VLANs do not function and are considered down after this command is entered.

A secondary SVI can be mapped to only one primary SVI. If the configured PVLANS association is different from what is specified in this command (if the specified *primary-vlan-id* is configured as a secondary VLAN), all the SVIs that are specified in this command are brought down.

If you configure a mapping between two VLANs that do not have a valid Layer 2 association, the mapping configuration does not take effect.

Examples

This example shows how to map the interface of VLAN 20 to the SVI of VLAN 18:

```
Switch(config)# interface vlan 18
Switch(config-if)# private-vlan mapping 18 20
Switch(config-if)#
```

This example shows how to permit the routing of the secondary VLAN ingress traffic from PVLANS 303 through 307, 309, and 440 and how to verify the configuration:

```
Switch# config terminal
Switch(config)# interface vlan 202
Switch(config-if)# private-vlan mapping add 303-307,309,440
Switch(config-if)# end
Switch# show interfaces private-vlan mapping
Interface Secondary VLAN Type
-----
vlan202 303 isolated
vlan202 304 isolated
vlan202 305 isolated
vlan202 306 isolated
vlan202 307 isolated
vlan202 309 isolated
vlan202 440 isolated
Switch#
```

This example shows the displayed message that you will see if the VLAN that you are adding is already mapped to the SVI of VLAN 18. You must delete the mapping from the SVI of VLAN 18 first.

```
Switch(config)# interface vlan 19
Switch(config-if)# private-vlan mapping 19 add 21
Command rejected: The interface for VLAN 21 is already mapped as s secondary.
Switch(config-if)#
```

This example shows how to remove all PVLAN mappings from the SVI of VLAN 19:

```
Switch(config)# interface vlan 19
Switch(config-if)# no private-vlan mapping
Switch(config-if)#
```

```
Switch# configure terminal
Switch(config)# interface vlan 202
Switch(config-if)# private-vlan mapping add 303-307,309,440
Switch(config-if)# end
Switch# show interfaces private-vlan mapping
Interface Secondary VLAN Type
-----
vlan202 303 community
vlan202 304 community
vlan202 305 community
vlan202 306 community
vlan202 307 community
vlan202 309 community
vlan202 440 isolated
Switch#
```

Related Commands

[show interfaces private-vlan mapping](#)
[show vlan](#)
[show vlan private-vlan](#)

private-vlan synchronize

To map the secondary VLANs to the same instance as the primary VLAN, use the **private-vlan synchronize** command.

private-vlan synchronize

Syntax Description This command has no arguments or keywords.

Defaults This command has no default settings.

Command Modes MST configuration

Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines If you do not map the VLANs to the same instance as the associated primary VLAN when you exit the MST configuration submode, a warning message displays and lists the secondary VLANs that are not mapped to the same instance as the associated primary VLAN. The **private-vlan synchronize** command automatically maps all secondary VLANs to the same instance as the associated primary VLANs.

Examples This example shows how to initialize PVLAN synchronization:

```
Switch(config-mst)# private-vlan synchronize
Switch(config-mst)#
```

This example assumes that a primary VLAN 2 and a secondary VLAN 3 are associated to VLAN 2, and that all VLANs are mapped to the CIST instance 1. This example also shows the output if you try to change the mapping for the primary VLAN 2 only:

```
Switch(config)# spanning-tree mst configuration
Switch(config-mst)# instance 1 vlan 2
Switch(config-mst)# exit
These secondary vlans are not mapped to the same instance as their primary:
->3
Switch(config)#
```

Related Commands [show spanning-tree mst](#)

qos (global configuration mode)

To globally enable QoS functionality on the switch, use the **qos** command. To globally disable QoS functionality, use the **no** form of this command.

qos

no qos

Syntax Description This command has no arguments or keywords.

Defaults QoS functionality is disabled.

Command Modes Global configuration

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines If QoS functionality is globally enabled, it is enabled on all interfaces, except on the interfaces where QoS has been disabled. If QoS functionality is globally disabled, all traffic is passed in QoS pass-through mode.

Examples This example shows how to enable QoS functionality globally on the switch:

```
Switch(config)# qos
Switch(config)#
```

Related Commands [qos \(interface configuration mode\)](#)
[show qos](#)

qos (interface configuration mode)

To enable QoS functionality on an interface, use the **qos** command. To disable QoS functionality on an interface, use the **no** form of this command.

qos

no qos

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	QoS is enabled.
-----------------	-----------------

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	If QoS functionality is globally disabled, it is also disabled on all interfaces.
-------------------------	---

Examples	This example shows how to enable QoS functionality on an interface:
-----------------	---

```
Switch(config-if) # qos  
Switch(config-if) #
```

Related Commands	show qos qos (global configuration mode)
-------------------------	---

qos account layer2 encapsulation

To include additional bytes to be accounted by the QoS features, use the **qos account layer2 encapsulation** command. To disable the use of additional bytes, use the **no** form of this command.

qos account layer2 encapsulation {arpa | dot1q | isl | length *len*}

no qos account layer2 encapsulation {arpa | dot1q | isl | length *len*}

Syntax Description

arpa	Specifies the account length of the Ethernet ARPA-encapsulated packet (18 bytes).
dot1q	Specifies the account length of the 802.1Q-encapsulated packet (22 bytes).
isl	Specifies the account length of the ISL-encapsulated packet (48 bytes).
length <i>len</i>	Specifies the additional packet length to account for; the valid range is from 0 to 64 bytes.

Defaults

By default, only the length that is specified in the IP header for the IP packets and the length that is specified in the Ethernet header for non-IP packets is included.

Command Modes

Global configuration

Command History

Release	Modification
12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

In the Catalyst 4500 series switch, the **qos account layer2 encapsulation** command indicates that the policing feature should consider the configured length in addition to the IP length of the packet when policing the IP packets.

Sharing and shaping always use the Ethernet ARPA length.



Note

The given length is included when policing all IP packets irrespective of the encapsulation with which it was received. When **qos account layer2 encapsulation isl** is configured, a fixed length of 48 bytes is included when policing all IP packets, not only those IP packets that are received with ISL encapsulation.

Sharing and shaping use the length that is specified in the Layer 2 headers.

Examples

This example shows how to include an additional 18 bytes when policing IP packets:

```
Switch# config terminal
Switch(conf)# qos account layer2 encapsulation length 18
Switch (conf)# end
Switch#
```

This example shows how to disable the consistent accounting of the Layer 2 encapsulation by the QoS features:

```
Switch# config terminal
Switch(config)# no qos account layer2 encapsulation
Switch (config)# end
Switch #
```

Related Commands

[show interfaces](#)
[switchport](#)
[switchport block](#)

qos aggregate-policer

To define a named aggregate policer, use the **qos aggregate-policer** command. To delete a named aggregate policer, use the **no** form of this command.

```
qos aggregate-policer name rate burst [conform-action {transmit | drop} |  
                                exceed-action {transmit | drop | policed-dscp-transmit}]
```

```
no qos aggregate-policer name
```

Syntax Description

<i>name</i>	Name of the aggregate policer.
<i>rate</i>	Maximum bits per second; valid values are from 32000 to 32000000000.
<i>burst</i>	Burst bytes; valid values are from 1000 to 512000000.
conform-action	(Optional) Specifies the action to be taken when the rate is not exceeded.
transmit	(Optional) Transmits the package.
drop	(Optional) Drops the packet.
exceed-action	(Optional) Specifies action when the QoS values are exceeded.
policed-dscp-transmit	(Optional) Sends the DSCP per the policed-DSCP map.

Defaults

The default settings are as follows:

- Conform-action transmits
- Exceed-action drops

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

This policer can be shared by different policy map classes and on different interfaces.

The Catalyst 4506 switch supports up to 1000 aggregate input policers and 1000 output policers.

The **qos aggregate-policer** command allows you to configure an aggregate flow and a policing rule for that aggregate. When you enter your rate and burst parameters, the range for the average rate is 32 Kbps to 32 Gbps, and the range for the burst size is 1 KB to 512 MB.

A rate can be entered in bits-per-second without a suffix. In addition, the suffixes described in [Table 2-11](#) are allowed.

Table 2-11 Rate Suffix

Suffix	Description
k	1000 bps
m	1,000,000 bps
g	1,000,000,000 bps

Bursts can be entered in bytes without a suffix. In addition, the suffixes shown in [Table 2-12](#) are allowed.

Table 2-12 Burst Suffix

Suffix	Description
k	1000 bytes
m	1,000,000 bytes
g	1,000,000,000 bytes

**Note**

Due to hardware granularity, the rate value is limited, so the burst that you configure might not be the value that is used.

Modifying an existing aggregate rate limit modifies that entry in NVRAM and in the switch if it is currently being used.

When you enter the aggregate policer name, follow these naming conventions:

- Maximum of 31 characters long and may include a-z, A-Z, 0-9, the dash (-), the underscore (_), and the period (.).
- Must start with an alphabetic character and must be unique across all ACLs of all types.
- Aggregate policer names are case sensitive.
- Cannot be a number.
- Must not be a keyword; keywords to avoid are **all**, **default-action**, **map**, **help**, and **editbuffer**.

An aggregate policer can be applied to one or more interfaces. However, if you apply the same policer to the input direction on one interface and to the output direction on a different interface, then you have created the equivalent of two different aggregate policers in the switching engine. Each policer has the same policing parameters, with one policing the ingress traffic on one interface and the other policing the egress traffic on another interface. If you apply an aggregate policer to multiple interfaces in the same direction, only one instance of the policer is created in the switching engine.

You can apply an aggregate policer to a physical interface or to a VLAN. If you apply the same aggregate policer to a physical interface and to a VLAN, then you have created the equivalent of two different aggregate policers in the switching engine. Each policer has the same policing parameters, with one policing the traffic on the configured physical interface and the other policing the traffic on the configured VLAN. If you apply an aggregate policer to only ports or only VLANs, then only one instance of the policer is created in the switching engine.

If you apply a single aggregate policer to the ports and the VLANs in different directions, then you have created the equivalent of four aggregate policers; one for all ports sharing the policer in the input direction, one for all ports sharing the policer in the output direction, one for all VLANs sharing the policer in the input direction, and one for all VLANs sharing the policer in the output direction.

qos aggregate-policer**Examples**

This example shows how to configure a QoS aggregate policer to allow a maximum of 100,000 bits per second with a normal burst size of 10,000 bytes, to transmit when these rates are not exceeded, and to drop packets when these rates are exceeded:

```
Switch(config)# qos aggregate-policer micro-one 100000 10000 conform-action transmit exceed-action drop
Switch(config)#
```

Related Commands [show qos aggregate policer](#)

qos cos

To define the default CoS value for an interface, use the **qos cos** command. To remove a prior entry, use the **no** form of this command.

qos cos *cos_value*

no qos cos *cos_value*

Syntax Description

<i>cos_value</i>	Default CoS value for the interface; valid values are from 0 to 7.
------------------	--

Defaults

The default CoS value is 0.



Note

CoS override is not configured.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

CoS values are configurable on physical LAN ports only.

Examples

This example shows how to configure the default QoS CoS value as 6:

```
Switch(config-if)# qos cos 6  
Switch(config-if)#
```

Related Commands

[show qos](#)

qos dbl

To enable Dynamic Buffer Limiting (DBL) globally on the switch, use the **qos dbl** command. To disable DBL, use the **no** form of this command.

```
qos dbl [buffers {aggressive-flow buffers} | credits {aggressive-flow credits |  
             maximum max} | dscp-based {value | value range} | exceed-action {ecn | probability  
             percent} | flow {include [layer4-ports] [vlan]}}
```

```
no qos dbl [buffers {aggressive-flow buffers} | credits {aggressive-flow credits |  
             maximum max} | dscp-based {value | value range} | exceed-action {ecn | probability  
             percent} | flow {include [layer4-ports] [vlan]}}
```

Syntax Description

buffers	(Optional) Specifies the buffer limit for aggressive flows.
aggressive-flow	(Optional) Specifies the aggressive flow.
<i>buffers</i>	(Optional) Number of buffers for aggressive flows; valid values are from 0 to 255.
credits	(Optional) Specifies the credit limit for aggressive flows and all flows.
<i>credits</i>	(Optional) Number of credits for aggressive flows; valid values are from 0 to 15.
maximum	(Optional) Specifies the maximum credit for all flows.
<i>max</i>	(Optional) Number of credits for all flows; valid values are from 0 to 15.
dscp-based	(Optional) Specifies the packets that belong to the list of internal DSCPs.
<i>value</i>	(Optional) A single DSCP value; valid values are from 0 to 63.
<i>value range</i>	(Optional) A range of DSCP values; valid values are from 0 to 63. Up to 8 command separated DSCP values can be specified.
exceed-action	(Optional) Specifies the packet marking when the limits are exceeded.
ecn	(Optional) Specifies the explicit congestion notification.
probability	(Optional) Specifies the probability of packet marking.
<i>percent</i>	(Optional) Probability number; valid values are from 0 to 100.
flow	(Optional) Specifies the flows for limiting.
include	(Optional) Allows the Layer 4 ports and VLANs to be included in the flows.
layer4-ports	(Optional) Includes the Layer 4 ports in flows.
vlan	(Optional) Includes the VLANs in flows.

Defaults

The default settings are as follows:

- QoS DBL is disabled.
- Aggressive-flow buffers is set to 2.
- Aggressive-flow credits is set to 2, with a limit of 10.
- Layer 4 ports are included.
- VLANs are included.
- 15 maximum credits are allowed.
- 15% drop probability is set.
- DSCP values are included.

Command Modes Global configuration
QoS policy-map class configuration

Command History	Release	Modification
	12.1(13)EW	Support for this command was introduced on the Catalyst 4500 series switch.
	12.2(37)SG	Added support for DSCP-based flow management.

Examples This example shows how to enable DBL globally on the switch:

```
Switch(config)# qos db1
Global DBL enabled
Switch(config)#
```

This example shows how to enable DBL in the QoS policy-map class configuration mode:

```
Switch(config)# class-map c1
Switch(config-cmap)# policy-map p1
Switch(config-pmap)# class c1
Switch(config-pmap-c)# db1
Switch(config-pmap-c)#
```

This example shows how to selectively enable DBL on DSCP values 1 through 10:

```
Switch# configure t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# qos db1 dscp-based 1-10
Switch(config)# end
Switch# show qos db1
  DBL flow includes vlan
  DBL flow includes layer4-ports
  DBL does not use ecn to indicate congestion
  DBL exceed-action probability: 15%
  DBL max credits: 15
  DBL aggressive credit limit: 10
  DBL aggressive buffer limit: 2 packets
  DBL DSCPs with default drop probability:
    1-10
```

This example shows how to selectively disable DBL on DSCP values 1 through 10:

```
Switch# configure t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# no qos db1 dscp-based 1-5, 7
Switch(config)# end
Switch# show qos db1
  DBL flow includes vlan
  DBL flow includes layer4-ports
  DBL does not use ecn to indicate congestion DBL exceed-action probability: 15% DBL max
  credits: 15 DBL aggressive credit limit: 10 DBL aggressive buffer limit: 2 packets DBL
  DSCPs with default drop probability:
    0,6,8-63
```

You can verify your settings by entering the **show qos db1** privileged EXEC command.

Related Commands [show qos db1](#)

qos dscp

To define the default CoS value for an interface, use the **qos dscp** command. To remove a prior entry, use the **no** form of this command.

qos dscp *dscp_value*

no qos dscp *dscp_value*

Syntax Description

<i>dscp_value</i>	Default DSCP value for the interface; valid values are from 0 to 63.
-------------------	--

Defaults

The default DSCP value is 0.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Examples

This example shows how to configure the default QoS DSCP value as 6:

```
Switch(config-if)# qos dscp 6
Switch(config-if)#
```

Related Commands

[show qos interface](#)

qos map cos

To define the ingress CoS-to-DSCP mapping for the trusted interfaces, use the **qos map cos to dscp** command. To remove a prior entry, use the **no** form of this command.



Note

You cannot remove a single entry from the table.

qos map cos *cos_values* **to dscp** *dscp1*

no qos map cos to dscp

Syntax Description

<i>cos_values</i>	CoS values; list up to eight CoS values separated by spaces.
to dscp	Defines mapping and specifies DSCP value.
<i>dscp1</i>	DSCP value to map to the CoS values; valid values are from 0 to 63.

Defaults

The default CoS-to-DSCP configuration settings are shown in the following table:

CoS	0	1	2	3	4	5	6	7
DSCP	0	8	16	24	32	40	48	56

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

The CoS-to-DSCP map is used to map the packet CoS (on the interfaces that are configured to trust CoS) to the internal DSCP value. This map is a table of eight CoS values (0 through 7) and their corresponding DSCP value. The switch has one map.

Examples

This example shows how to configure the ingress CoS-to-DSCP mapping for cos 0:

```
Switch(config)# qos map cos 0 to dscp 20
Switch(config)#
```

This example shows how to clear the entire CoS-to-DSCP mapping table:

```
Switch(config)# no qos map cos 0 to dscp 20
Switch(config)#
```

■ qos map cos

Related Commands

[qos map dscp](#)
[qos map dscp policed](#)
[show qos](#)

qos map dscp

To map the DSCP values to selected transmit queues and to map the DSCP-to-CoS value, use the **qos map dscp** command. To return to the default value, use the **no** form of this command.

qos map dscp *dscp-values* **to tx-queue** *queue-id*

no qos map dscp *dscp-values* **to cos** *cos-value*

Syntax Description

<i>dscp-values</i>	List of DSCP values to map to the queue ID; valid values are from 0 to 63.
to	Defines mapping.
tx-queue	Specifies a transmit queue.
<i>queue-id</i>	Transmit queue; valid values are from 1 to 4.
cos	Specifies the CoS value.
<i>cos-value</i>	Class of service; valid values are from 1 to 7.

Defaults

The default DSCP-to-CoS configuration settings are shown in the following table:

DSCP	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
CoS	0	1	2	3	4	5	6	7

Command Modes

Global configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

You use the DSCP-to-CoS map to map the final DSCP classification to a final CoS. The CoS map is written into the ISL header or 802.1Q tag of the transmitted packet on trunk interfaces and contains a table of 64 DSCP values and the corresponding CoS values. The switch has one map. You can enter up to eight DSCP values, separated by spaces, for a CoS value.

The DSCP-to-transmit-queue map is used to map the final DSCP classification to a transmit queue. You can enter up to eight DSCP values, separated by spaces, for a transmit queue.

Examples

This example shows how to configure the egress DSCP-to-CoS mapping:

```
Switch(config)# qos map dscp 20 25 to cos 3
Switch(config)#
```

qos map dscp

This example shows how to configure the egress DSCP-to-transmit queue:

```
Switch(config)# qos map dscp 20 25 to tx-queue 1  
Switch(config)#
```

Related Commands

[qos map cos](#)
[show qos interface](#)
[show qos](#)
[tx-queue](#)

qos map dscp policed

To set the mapping of the policed DSCP values to the marked-down DSCP values, use the **qos map dscp policed** command. To remove a prior entry, use the **no** form of this command.

qos map dscp policed *dscp_list* **to dscp** *policed_dscp*

no qos map dscp policed

Syntax Description	<i>dscp_list</i>	DSCP values; valid values are from 0 to 63.
	to dscp	Defines mapping.
	<i>policed_dscp</i>	Marked-down DSCP values; valid values are from 0 to 63.

Defaults Mapping of DSCP values is disabled.

Command Modes Global configuration

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines The DSCP-to-policed-DSCP map determines the marked-down DSCP value that is applied to the out-of-profile flows. The switch has one map.

You can enter up to eight DSCP values, separated by spaces.

You can enter only one policed DSCP value.



Note

To avoid out-of-sequence packets, configure the DSCP-to-policed-DSCP map so that marked-down packets remain in the same queue as in-profile traffic.

Examples This example shows how to map multiple DSCPs to a single policed-DSCP value:

```
Switch(config)# qos map dscp policed 20 25 43 to dscp 4
Switch(config)#
```

Related Commands

- qos map cos
- qos map dscp
- show qos

qos rewrite ip dscp

To enable DSCP rewrite for IP packets, use the **qos rewrite ip dscp** command. To disable IP DSCP rewrite, use the **no** form of this command.

qos rewrite ip dscp

no qos rewrite ip dscp

Syntax Description This command has no arguments or keywords.

Defaults IP DSCP rewrite is enabled.

Command Modes Global configuration

Command History	Release	Modification
	12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines If you disable IP DSCP rewrite and enable QoS globally, the following events occur:

- The ToS byte on the IP packet is not modified.
- Marked and marked-down DSCP values are used for queueing.
- The internally derived DSCP (as per the trust configuration on the interface or VLAN policy) is used for transmit queue and Layer 2 CoS determination. The DSCP is not rewritten on the IP packet header.

If you disable QoS, the CoS and DSCP of the incoming packet are preserved and are not rewritten.

Examples This example shows how to disable IP DSCP rewrite:

```
Switch(config)# no qos rewrite ip dscp
Switch(config)#
```

Related Commands **qos (global configuration mode)**
[show qos](#)

qos trust

To set the trusted state of an interface (for example, whether the packets arriving at an interface are trusted to carry the correct CoS, ToS, and DSCP classifications), use the **qos trust** command. To set an interface to the untrusted state, use the **no** form of this command.

```
qos trust {cos | device cisco-phone | dscp | extend [cos priority]}
```

```
no qos trust {cos | device cisco-phone | dscp | extend [cos priority]}
```

Syntax Description

cos	Specifies that the CoS bits in incoming frames are trusted and derives the internal DSCP value from the CoS bits.
<i>device cisco-phone</i>	Specifies the Cisco IP phone as the trust device for a port.
dscp	Specifies that the ToS bits in the incoming packets contain a DSCP value.
extend	Specifies to extend the trust to Port VLAN ID (PVID) packets coming from the PC.
cos priority	(Optional) Specifies that the CoS priority value is set to PVID packets; valid values are from 0 to 7.

Defaults

The default settings are as follows:

- If global QoS is enabled, trust is disabled on the port.
- If global QoS is disabled, trust DSCP is enabled on the port.
- The CoS priority level is 0.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(11)EW	Support for extending trust for voice was added.
12.1(19)EW	Support for trust device Cisco IP phone was added.

Usage Guidelines

You can only configure the trusted state on physical LAN interfaces.

By default, the trust state of an interface when QoS is enabled is untrusted; when QoS is disabled on the interface, the trust state is reset to trust DSCP.

When the interface trust state is **qos trust cos**, the transmit CoS is always the incoming packet CoS (or the default CoS for the interface, if the packet is not tagged).

When the interface trust state is not **qos trust dscp**, the security and QoS ACL classification will always use the interface DSCP and not the incoming packet DSCP.

Trusted boundary should not be configured on the ports that are part of an EtherChannel (that is, a port channel).

Examples

This example shows how to set the trusted state of an interface to CoS:

```
Switch(config-if) # qos trust cos  
Switch(config-if) #
```

This example shows how to set the trusted state of an interface to DSCP:

```
Switch(config-if) # qos trust dscp  
Switch(config-if) #
```

This example shows how to set the PVID CoS level to 6:

```
Switch(config-if) # qos trust extend cos 6  
Switch(config-if) #
```

This example shows how to set the Cisco phone as the trust device:

```
Switch(config-if) # qos trust device cisco-phone  
Switch(config-if) #
```

Related Commands

qos cos
qos vlan-based
show qos interface

qos vlan-based

To enable per-VLAN QoS for a Layer 2 interface, use the **qos vlan-based** command. To disable per-VLAN QoS for a Layer 2 interface, use the **no** form of this command.

qos vlan-based

no qos vlan-based

Syntax Description This command has no arguments or keywords.

Defaults Per-VLAN QoS is disabled.

Command Modes Interface configuration

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

In VLAN-based mode, the policy map that is attached to the Layer 2 interface is ignored, and QoS is driven by the policy map that is attached to the corresponding VLAN interface.

Per-VLAN QoS can be configured only on the Layer 2 interfaces.

If no input QoS policy is attached to a Layer 2 interface, then the input QoS policy that is attached to the VLAN (on which the packet is received), if any, is used even if the port is not configured as VLAN based.

If you do not want this default, attach a placeholder input QoS policy to the Layer 2 interface.

Similarly, if no output QoS policy is attached to a Layer 2 interface, then the output QoS policy that is attached to the VLAN (on which the packet is transmitted), if any, is used even if the port is not configured as VLAN based.

If you do not want this default, attach a placeholder output QoS policy to the Layer 2 interface.

Layer 3 interfaces are always in interface-based mode. Layer 3 VLAN interfaces are always in VLAN-based mode.

Examples This example shows how to enable per-VLAN QoS for a Layer 2 interface:

```
Switch(config-if) # qos vlan-based
Switch(config-if) #
```

Related Commands

[qos cos](#)
[show qos interface](#)

redundancy

To enter the redundancy configuration mode, use the **redundancy** command in the global configuration mode.

redundancy

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Global configuration

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch (Catalyst 4507R only).

Usage Guidelines

The redundancy configuration mode is used to enter the main CPU submode.

To enter the main CPU submode, use the **main-cpu** command in the redundancy configuration mode.

The main CPU submode is used to manually synchronize the configurations on the two supervisor engines.

From the main CPU submode, use the **auto-sync** command to enable automatic synchronization of the configuration files in NVRAM.

Use the **no** command to disable redundancy. If you disable redundancy, then reenabling redundancy, the switch returns to default redundancy settings.

Use the **exit** command to exit the redundancy configuration mode.

Examples

This example shows how to enter redundancy mode:

```
Switch(config)# redundancy
Switch(config-red)#
```

This example shows how to enter the main CPU submode:

```
Switch(config)# redundancy
Switch(config-red)# main-cpu
Switch(config-r-mc)#
```

Related Commands

auto-sync
main-cpu

redundancy force-switchover

To force a switchover from the active to the standby supervisor engine, use the **redundancy force-switchover** command.

redundancy force-switchover

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	This command has no default settings.
-----------------	---------------------------------------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch (Catalyst 4507R only).

Usage Guidelines	Before using this command, refer to the “Performing a Software Upgrade” section of the <i>Catalyst 4500 Series Switch Cisco IOS Software Configuration Guide</i> for additional information.
-------------------------	--

The **redundancy force-switchover** command conducts a manual switchover to the redundant supervisor engine. The redundant supervisor engine becomes the new active supervisor engine running the Cisco IOS image. The modules are reset.

The old active supervisor engine reboots with the new image and becomes the standby supervisor engine.

Examples	This example shows how to switch over manually from the active to the standby supervisor engine:
-----------------	--

```
Switch# redundancy force-switchover
Switch#
```

Related Commands	redundancy show redundancy
-------------------------	---

redundancy reload

To force a reload of one or both supervisor engines, use the **redundancy reload** command.

redundancy reload {peer | shelf}

Syntax Description	peer	Reloads the peer unit.
	shelf	Reboots both supervisor engines.

Defaults This command has no default settings.

Command Modes EXEC

Command History	Release	Modification
	12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch (Catalyst 4507R only).

Usage Guidelines Before using this command, refer to the “Performing a Software Upgrade” section of the *Catalyst 4500 Series Switch Cisco IOS Software Configuration Guide* for additional information.

The **redundancy reload shelf** command conducts a reboot of both supervisor engines. The modules are reset.

Examples This example shows how to manually reload one or both supervisor engines:

```
Switch# redundancy reload shelf
Switch#
```

Related Commands [redundancy](#)
[show redundancy](#)

remote login module

To remotely connect to a specific module, use the **remote login module** configuration command.

remote login module *mod*

Syntax Description	<i>mod</i> Target module for the command.
---------------------------	---

Defaults	This command has no default settings.
-----------------	---------------------------------------

Command Modes	Privileged
----------------------	------------

Command History	Release	Modification
	12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines	This command applies only to the Access Gateway Module on Catalyst 4500 series switches. The valid values for <i>mod</i> depends on the chassis used. For example, if you have a Catalyst 4506 chassis, valid values for the module are from 2 to 6. If you have a 4507R chassis, valid values are from 3 to 7. When you execute the remote login module <i>mod</i> command, the prompt changes to Gateway# The remote login module command is identical to the session module <i>mod</i> and the attach module <i>mod</i> commands.
-------------------------	--

Examples	This example shows how to remotely log in to the Access Gateway Module: <pre>Switch# remote login module 5 Attaching console to module 5 Type 'exit' at the remote prompt to end the session Gateway></pre>
-----------------	--

Related Commands	attach module session module
-------------------------	---

remote-span

To convert a VLAN into an RSPAN VLAN, use the **remote-span** command. To convert an RSPAN VLAN to a VLAN, use the **no** form of this command.

remote-span

no remote-span

Syntax Description	This command has no arguments or keywords.
---------------------------	--

Defaults	RSPAN is disabled.
-----------------	--------------------

Command Modes	VLAN configuration
----------------------	--------------------

Command History	Release	Modification
	12.1(20)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Examples	This example shows how to convert a VLAN into an RSPAN VLAN:
-----------------	--

```
Switch# config terminal
Switch(config)# vlan 20
Switch(config-vlan)# remote-span
Switch(config-vlan)# end
Switch#
```

Related Commands	monitor session
-------------------------	---------------------------------

renew ip dhcp snooping database

To renew the DHCP binding database, use the **renew ip dhcp snooping database** command.

renew ip dhcp snooping database [validation none] [url]

Syntax Description	validation none	(Optional) Specifies that the checksum associated with the contents of the file specified by the URL is not verified.
	url	(Optional) Specifies the file from which the read is performed.

Defaults This command has no default settings.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(19)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines If the URL is not provided, the switch tries to read the file from the configured URL.

Examples This example shows how to renew the DHCP binding database while bypassing the CRC checks:

```
Switch# renew ip dhcp snooping database validation none
Switch#
```

Related Commands

- [ip dhcp snooping](#)
- [ip dhcp snooping binding](#)
- [ip dhcp snooping information option](#)
- [ip dhcp snooping trust](#)
- [ip dhcp snooping vlan](#)
- [show ip dhcp snooping](#)
- [show ip dhcp snooping binding](#)

reset

To leave the proposed new VLAN database but remain in VLAN configuration mode and reset the proposed new database to be identical to the VLAN database currently implemented, use the **reset** command.

reset

Syntax Description This command has no arguments or keywords.

Defaults This command has no default settings.

Command Modes VLAN configuration

Command History	Release	Modification
	12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Examples This example shows how to reset the proposed new VLAN database to the current VLAN database:

```
Switch(vlan-config)# reset
RESET completed.
Switch(vlan-config)#
```

revision

To set the MST configuration revision number, use the **revision** command. To return to the default settings, use the **no** form of this command.

revision *version*

no revision

Syntax Description

<i>version</i>	Configuration revision number; valid values are from 0 to 65535.
----------------	--

Defaults

Revision version is set to 0.

Command Modes

MST configuration

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

If two Catalyst 4500 series switches have the same configuration but have different configuration revision numbers, they are considered to be part of two different regions.



Caution

Be careful when using the **revision** command to set the MST configuration revision number because a mistake can put the switch in a different region.

Examples

This example shows how to set the configuration revision number:

```
Switch(config-mst)# revision 5
Switch(config-mst)#
```

Related Commands

[instance](#)
[name](#)
[show spanning-tree mst](#)
[spanning-tree mst configuration](#)

service-policy

To attach a policy map to an interface or to apply different QoS policies on VLANs that an interface belongs to, use the **service-policy** command. To remove a policy map from an interface, use the **no** form of this command.

service-policy {**input** | **output**} *policy-map name*

no service-policy {**input** | **output**} *policy-map name*

Syntax Description

input	Specifies the input policy maps.
output	Specifies the output policy maps.
<i>policy-map name</i>	Name of a previously configured policy map.

Defaults

A policy map is not attached to an interface.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.2(25)EWA	Support for applying different QoS policies on VLANs was introduced.

Usage Guidelines

Layer 2 interfaces can be part of multiple VLANs (for example, a typical trunk port). In conjunction with the **vlan-range** command, you can use the **service-policy** command to specify different QoS policies on different VLANs.



Note

This capability is restricted to Layer 2 interfaces.

You cannot apply a policy-map under an interface and a VLAN range at the same time.

Examples

This example shows how to attach a policy map to Fast Ethernet interface 5/20:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface fastethernet 5/20
Switch(config-if)# service-policy input pmap1
Switch(config-if)# end
```

This example shows how to apply policy-map p1 for traffic in VLANs 20 and 400, and policy-map p2 for traffic in VLANs 300 through 301:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitEthernet 6/1
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport mode trunk
Switch(config-if)# vlan-range 20,400
Switch(config-if-vlan-range)# service-policy input p1
Switch(config-if-vlan-range)# exit
Switch(config-if)# vlan-range 300-301
Switch(config-if-vlan-range)# service-policy output p2
Switch(config-if-vlan-range)# end
Switch# show policy-map interface gigabitEthernet 6/1 vlan 20
GigabitEthernet6/1 vlan 20

Service-policy input: p1

Class-map: class-default (match-any)
  0 packets
Match: any
  0 packets
police: Per-interface
  Conform: 0 bytes Exceed: 0 bytes

Switch# show policy-map interface gigabitEthernet 6/1
GigabitEthernet6/1 vlan 20

Service-policy input: p1

Class-map: class-default (match-any)
  0 packets
Match: any
  0 packets
police: Per-interface
  Conform: 0 bytes Exceed: 0 bytes

GigabitEthernet6/1 vlan 300

Service-policy output: p2

Class-map: class-default (match-any)
  0 packets
Match: any
  0 packets
police: Per-interface
  Conform: 0 bytes Exceed: 0 bytes

GigabitEthernet6/1 vlan 301

Service-policy output: p2

Class-map: class-default (match-any)
  0 packets
Match: any
  0 packets
police: Per-interface
  Conform: 0 bytes Exceed: 0 bytes

GigabitEthernet6/1 vlan 400

Service-policy input: p1
```

```
Class-map: class-default (match-any)
  0 packets
  Match: any
    0 packets
  police: Per-interface
    Conform: 0 bytes Exceed: 0 bytes
```

Related Commands

[class-map](#)
[policy-map](#)
[service-policy](#)
[show policy-map interface vlan](#)

service-policy input (control-plane)

To attach a policy map to a control plane for aggregate control plane services, use the **service-policy input** command. Use the **no** form of this command to remove a service policy from a control plane.

service-policy input *policy-map-name*

Syntax Description	input	Applies the specified service policy to the packets that are entering the control plane.
	<i>policy-map-name</i>	Name of a service policy map (created using the policy-map command) to be attached.

Defaults No service policy is specified.

Command Modes Control-plane configuration

Command History	Release	Modification
	12.2(31)SG	Support for this command was introduced on the Catalyst 4500 series switch

Usage Guidelines In this release, the only policy-map accepted on the control-plane is system-cpp-policy. It is already attached to the control-plane at start up. If not (due to some error conditions), it is recommended to use the **global macro system-cpp** command to attach it to the control-plane. The system-cpp-policy created by the system contains system pre-defined classes. For these pre-defined classes, you can change the policing parameters but you should not make any other change to the classes.

You can define your own class-maps and append them to the end of the system-cpp-policy policy-map.

Examples This example shows how to configure trusted hosts with source addresses 10.1.1.1 and 10.1.1.2 to forward Telnet packets to the control plane without constraint, while allowing all remaining Telnet packets to be policed at the specified rate:

```
Switch(config)# access-list 140 deny tcp host 10.1.1.1 any eq telnet
! Allow 10.1.1.2 trusted host traffic.
Switch(config)# access-list 140 deny tcp host 10.1.1.2 any eq telnet
! Rate limit all other Telnet traffic.
Switch(config)# access-list 140 permit tcp any any eq telnet
! Define class-map "telnet-class."
Switch(config)# class-map telnet-class
Switch(config-cmap)# match access-group 140
Switch(config-cmap)# exit
Switch(config)# policy-map control-plane-policy
Switch(config-pmap)# class telnet-class
Switch(config-pmap-c)# police 80000 conform transmit exceed drop
Switch(config-pmap-c)# exit
Switch(config-pmap)# exit
! Define aggregate control plane service for the active Route Processor.
```

service-policy input (control-plane)

```
Switch(config)# control-plane  
Switch(config-cp)# service-policy input control-plane-policy  
Switch(config-cp)# exit
```

Related Commands

[control-plane](#)
[macro global apply system-cpp](#)
[policy-map](#)
[show policy-map control-plane](#)

session module



Note

This command is only supported in SSO mode and does not work in RPR mode.

To login to the standby supervisor engine using a virtual console, use the **session module** configuration command.

session module *mod*

Syntax Description

<i>mod</i>	Target module for the command.
------------	--------------------------------

Defaults

This command has no default settings.

Command Modes

Privileged

Command History

Release	Modification
12.2(31)SG	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines

Catalyst 4500 series switches can be configured with 2 supervisor engines to provide redundancy. When the switch is powered, one of the supervisor engines becomes active and remains active until a switchover occurs. The other supervisor engine remains in standby mode.

Each supervisor engine has its own console port. Access to the standby supervisor engine is possible only through the console port of the standby supervisor engine. Therefore, you must connect to the standby console to access, monitor or debug the standby supervisor.

Virtual Console for Standby Supervisor Engine enables you to access the standby console from the active supervisor engine without requiring a physical connection to the standby console. It uses IPC over EOBC to communicate with the standby supervisor engine and thus emulate the standby console on the active supervisor engine. Only one active standby console session is active at any time.

The Virtual Console for Standby Supervisor Engine allows users who are logged onto the active supervisor engine to remotely execute show commands on the standby supervisor engine and view the results on the active supervisor engine. Virtual Console is available only from the active supervisor engine.

You can access the standby virtual console from the active supervisor engine with the **attach module**, **session module**, or **remote login** commands on the active supervisor engine. You must be in privilege EXEC mode (level 15) to run these commands to access the standby console.



Note

The **session module** command is identical to the **attach module** *mod* and the **remote login module** *mod* commands.

Once you enter the standby virtual console, the terminal prompt automatically changes to "<hostname>-standby-console#" where hostname is the configured name of the switch. The prompt is restored back to the original prompt when you exit the virtual console.

You exit the virtual console with the **exit** or **quit** commands. When the inactivity period of the terminal on the active supervisor engine where you logged in exceeds the configured idle time, you are automatically logged out of the terminal on the active supervisor engine. In such a case, the virtual console session is also terminated. Virtual console session is also automatically terminated when the standby is rebooted. After the standby boots up, you need to create another virtual console session.

The following limitations apply to the standby virtual console:

All commands on the virtual console run to completion. It does not provide the auto-more feature; it behaves as if the **terminal length 0** command has been executed. It is also non-interactive. Therefore, a running command cannot be interrupted or aborted by any key sequence on the active supervisor engine. Therefore if a command produces considerable output, the virtual console displays it on the supervisor screen.

The virtual console is non-interactive. Because the virtual console does not detect the interactive nature of a command, any command that requires user interaction causes the virtual console to wait until the RPC timer aborts the command.

The virtual console timer is set to 60 seconds. The virtual console returns to its prompt after 60 seconds. During this time, you cannot abort the command from the key board. You must wait for the timer to expire before you continue.

You cannot use virtual console to view debug and syslog messages that are being displayed on the standby supervisor engine. The virtual console only displays the output of commands that are executed from the virtual console. Other information that is displayed on the real standby console does not appear on the virtual console.

Examples

To login to the standby supervisor engine using a virtual console, do the following:

```
Switch# session module 2
Connecting to standby virtual console
Type "exit" or "quit" to end this session
```

```
Switch-standby-console# exit
Switch#
```

If the standby console is not enabled, the following message appears.

```
Switch-standby-console#
Standby console disabled.
Valid commands are: exit, logout
```

Related Commands

[attach module](#)
[remote login module](#)

shape

To specify traffic shaping on an interface, use the **shape** command. To remove traffic shaping, use the **no** form of this command

shape [rate] [percent]

no shape [rate] [percent]

Syntax Description	rate	(Optional) Specifies an average rate for traffic shaping; the range is 16000 to 1000000000. Post-fix notation (k, m, and g) is optional and a decimal point is allowed.
	percent	(Optional) Specifies a percent of bandwidth for traffic shaping.

Defaults Default is no traffic shaping.

Command Modes Interface transmit queue configuration mode

Command History	Release	Modification
	12.2(18)EW	Support for this command was introduced on the Catalyst 4500 series switch.

Usage Guidelines Traffic shaping is available on all the ports, and it sets an upper limit on the bandwidth. When the high shape rates are configured on the Catalyst 4500 Supervisor Engine II-Plus-10GE (WS-X4013+10GE), the Catalyst 4500 Supervisor Engine V (WS-X4516), and the Catalyst 4500 Supervisor Engine V-10GE (WS-X4516-10GE), the shaped traffic rate may not be achieved in situations that involve contention and unusual packet size distributions. On the ports that are multiplexed through a Stub ASIC and connected to the backplane gigaports, the shape rates above 7 Mbps may not be achieved under worst-case conditions. On ports that are connected directly to the backplane gigaports, or the supervisor engine gigaports, the shape rates above 50 Mbps may not be achieved under worst-case conditions.

Some examples of ports that are connected directly to the backplane are as follows:

- Uplink ports on Supervisor Engine II+, II+10GE, III, IV, V, and V-10GE
- Ports on the WS-X4306-GB module
- The two 1000BASE-X ports on the WS-X4232-GB-RJ module
- The first two ports on the WS-X4418-GB module
- The two 1000BASE-X ports on the WS-X4412-2GB-TX module

All ports on the 24-port modules and the 48-port modules are multiplexed through a Stub ASIC. Some examples of ports multiplexed through a Stub ASIC are as follows:

- 10/100 ports on the WS-X4148-RJ45 module
- 10/100/1000 ports on the WS-X4124-GB-RJ45 module

- 10/100/1000 ports on the WS-X4448-GB-RJ45 module

Examples

This example shows how to configure a maximum bandwidth (70 percent) for the interface fa3/1:

```
Switch(config)# interface fastethernet3/1  
Switch(config-if)# tx-queue 3  
Switch(config-if-tx-queue)# shape 70m  
Switch(config-if-tx-queue)#
```