Cisco IOS Commands for the Catalyst 4500 Series Switches

This chapter contains an alphabetical listing of Cisco IOS commands for the Catalyst 4500 series switches. For information about Cisco IOS commands that are not included in this publication, refer to Cisco IOS Release 12.1 Configuration Guides and Command References at this URL:

http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products_product_indices_list.html

#macro keywords

To specify the help string for macro keywords, use the **#macro keywords** command.

#macro keywords [keyword1] [keyword2] [keyword3]

Syntax Description

keyword 1	(Optional) Specifies a keyword that is needed while applying a macro to an interface.
keyword 2	(Optional) Specifies a keyword that is needed while applying a macro to an interface.
keyword 3	(Optional) Specifies a keyword that is needed while applying a macro to an interface.

Defaults

This command has no default settings.

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 do not specify the mandatory keywords for a macro, the macro is to be considered invalid and fails when you attempt to apply it. By entering **#macro keywords**, you will receive a message indicating what you need to include to make the syntax valid.

Examples

This example shows how to specify the help string for keywords associated with a macro named test:

```
Switch(config)# macro name test
macro name test
Enter macro commands one per line. End with the character '@'.
#macro keywords $VLAN $MAX
swichport
@

Switch(config)# int gi1/1
Switch(config-if)# macro apply test ?
  WORD  Keyword to replace with a value e.g $VLAN, $MAX   << It is shown as help
  <cr>
```

Related Commands

macro apply cisco-desktop
macro apply cisco-phone
macro apply cisco-router
macro apply cisco-switch

aaa accounting dot1x default start-stop group radius

To enable accounting for dot.1x authentication sessions, use the **aaa accounting dot1x default start-stop group radius** command. Use the **no** form of this command to disable accounting.

aaa accounting dot1x default start-stop group radius

no aaa accounting dot1x default start-stop group radius

Syntax Description

This command has no arguments or keywords.

Defaults

Accounting 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

802.1x accounting requires a RADIUS server.

This command enables the Authentication, Authorization, and Accounting (AAA) client's accounting feature to forward 802.1x update and watchdog packets from the 802.1x supplicant (workstation client) to the authentication (RADIUS) server. (Watchdog packets are defined as EAPOL-LOGON, EAPOL-LOGOFF, and EAPOL-INTERIM messages.) Successful authentication and authorization of the supplicant by the authentication server is required before these packets are considered valid and are forwarded. When the client is reauthenticated, an interim-update accounting notice is sent to the accounting server.

Examples

The following example shows how to configure 802.1x accounting:

```
Switch(config)# aaa accounting dot1x default start-stop group radius
```

Note The RADIUS authentication server must be properly configured to accept and log update or watchdog packets from the AAA client.

Related Commands

aaa accounting system default start-stop group radius

aaa accounting system default start-stop group radius

To receive session termination messages after the switch reboots, use the **aaa accounting system default start-stop group radius** command. Use the **no** form of this command to disable accounting.

aaa accounting system default start-stop group radius

no aaa accounting system default start-stop group radius

Syntax Description

This command has no arguments or keywords.

Defaults

Accounting is disabled.

Command Modes

Global configuration mode

Command History

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

Usage Guidelines

802.1x accounting requires the RADIUS server.

This command enables the AAA client's accounting feature to forward 802.1x update and watchdog packets from the 802.1x supplicant (workstation client) to the authentication (RADIUS) server. (Watchdog packets are defined as EAPOL-LOGON, EAPOL-LOGOFF, and EAPOL-INTERIM messages.) Successful authentication and authorization of the supplicant by the authentication server is required before these packets are considered valid and are forwarded. When the client is reauthenticated, an interim-update accounting notice is sent to the accounting server.

Examples

The following example shows how to generate a logoff after a switch reboots:

```
Switch(config)# aaa accounting system default start-stop group radius
```

Note The RADIUS authentication server must be properly configured to accept and log update or watchdog packets from the AAA client.

Related Commands

aaa accounting dot1x default start-stop group radius

access-group mode

To specify override modes (for example, VACL overrides PACL) and non-override modes (for example, merge or strict mode), use the **access-group mode** command. Use the **no** form of this command to return to preferred port mode.

access-group mode {**prefer** {**port** | **vlan**} | **merge**}

no access-group mode {**prefer** {**port** | **vlan**} | **merge**}

Syntax Description

prefer port	Specifies that the PACL mode take precedence if PACLs are configured. If no PACL features are configured on the port, other features applicable to the interface are merged and applied on the interface.
prefer vlan	Specifies that the VLAN-based ACL mode take precedence. If no VLAN-based ACL features are configured on the port's VLAN, the PACL features on the port are applied.
merge	Merges applicable ACL features before they are programmed into the hardware.

Defaults

PACL override mode

Command Modes

Interface configuration

Command History

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

Usage Guidelines

On the Layer 2 interface, prefer port, prefer VLAN, and merge modes are supported. A Layer 2 interface can have one IP ACL applied in either direction (one inbound and one outbound).

Examples

This example shows how to make the PACL mode on the switch take effect:

```
(config-if)# access-group mode prefer port
```

This example shows how to merge applicable ACL features:

```
(config-if)# access-group mode merge
```

Related Commands

show access-group mode interface
show ip interface (refer to Cisco IOS documentation)
show mac access-group interface

access-list hardware entries

To designate how ACLs are programmed into the switch hardware, use the **access-list hardware entries** command.

access-list hardware entries {**packed** | **scattered**}

Syntax Description

packed	Directs the software to use the first entry with a matching mask when selecting an entry from the ACL TCAM for programming the ACEs in an ACL.
scattered	Directs the software to use the first entry with a free mask when selecting an entry from the ACL TCAM for programming the ACEs in an ACL.

Defaults

The ACLs are programmed as packed.

Command Modes

Global configuration

Command History

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

Usage Guidelines

Two types of hardware resources are used when ACLs are programmed: entries and masks. If one of these resources is consumed, no additional ACLs can be programmed into the hardware. If the masks are consumed, but the entries are available, change the programming algorithm from **packed** to **scattered** to make masks available, which allows additional ACLs to be programmed into the hardware.

The goal is to use TCAM resources more efficiently; that is, to minimize the number of masks per ACL entries. To compare TCAM utilization when employing the **scattered** or **packed** algorithms, use the **show platform hardware acl statistics utilization brief** command. To change the algorithm from **packed** to **scattered**, use the **access-list hardware entries** command.

Examples

This example shows how to program ACLs into the hardware as packed. After they are programmed, you will need 89 percent of the masks to program only 49 percent of the ACL entries.

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# access-list hardware entries packed
Switch(config)# end
Switch#
01:15:34: %SYS-5-CONFIG_I: Configured from console by console
Switch#
Switch# show platform hardware acl statistics utilization brief
Entries/Total(%)  Masks/Total(%)
```

```
                                    -----------------  ---------------
            Input  Acl(PortAndVlan)  2016 / 4096 ( 49)   460 /  512 ( 89)
            Input  Acl(PortOrVlan)      6 / 4096 (  0)     4 /  512 (  0)
            Input  Qos(PortAndVlan)     0 / 4096 (  0)     0 /  512 (  0)
            Input  Qos(PortOrVlan)      0 / 4096 (  0)     0 /  512 (  0)
            Output Acl(PortAndVlan)     0 / 4096 (  0)     0 /  512 (  0)
            Output Acl(PortOrVlan)      0 / 4096 (  0)     0 /  512 (  0)
            Output Qos(PortAndVlan)     0 / 4096 (  0)     0 /  512 (  0)
            Output Qos(PortOrVlan)      0 / 4096 (  0)     0 /  512 (  0)

            L4Ops: used 2 out of 64
Switch#
```

This example shows how to reserve space (scatter) between ACL entries in the hardware. The number of masks required to program 49 percent of the entries has decreased to 49 percent.

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# access-list hardware entries scattered
Switch(config)# end
Switch#
01:39:37: %SYS-5-CONFIG_I: Configured from console by console
Switch#
Switch# show platform hardware acl statistics utilization brief
Entries/Total(%)  Masks/Total(%)
                                    -----------------  ---------------
            Input  Acl(PortAndVlan)  2016 / 4096 ( 49)   252 /  512 ( 49)
            Input  Acl(PortOrVlan)      6 / 4096 (  0)     5 /  512 (  0)
            Input  Qos(PortAndVlan)     0 / 4096 (  0)     0 /  512 (  0)
            Input  Qos(PortOrVlan)      0 / 4096 (  0)     0 /  512 (  0)
            Output Acl(PortAndVlan)     0 / 4096 (  0)     0 /  512 (  0)
            Output Acl(PortOrVlan)      0 / 4096 (  0)     0 /  512 (  0)
            Output Qos(PortAndVlan)     0 / 4096 (  0)     0 /  512 (  0)
            Output Qos(PortOrVlan)      0 / 4096 (  0)     0 /  512 (  0)

            L4Ops: used 2 out of 64
Switch#
```

action

To specify an action to be taken when a match occurs in a VACL, use the **action** command. To remove an action clause, use the **no** form of this command.

action {**drop** | **forward**}

no action {**drop** | **forward**}

Syntax Description

drop	Sets the action to drop packets.
forward	Sets the action to forward packets to their destination.

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

In a VLAN access map, if at least one ACL is configured for a packet type (IP or MAC), the default action for the packet type is **drop** (deny).

If an ACL is not configured for a packet type, the default action for the packet type is **forward** (permit).

If an ACL for a packet type is configured and the ACL is empty or undefined, the configured action will be applied to the packet type.

Examples

This example shows how to define a drop action:

```
Switch(config-access-map)# action drop
Switch(config-access-map)#
```

This example shows how to define a forward action:

```
Switch(config-access-map)# action forward
Switch(config-access-map)#
```

Related Commands

match
show vlan access-map
vlan access-map

apply

To implement a new VLAN database, increment the configuration number, save the configuration number in NVRAM, and propagate the configuration number throughout the administrative domain, use the **apply** command.

apply

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.

Usage Guidelines

The **apply** command implements the configuration changes you made after you entered VLAN database mode and uses them for the running configuration. This command keeps you in VLAN database mode.

You cannot use this command when the switch is in the VTP client mode.

You can verify that VLAN database changes occurred by entering the **show vlan** command from privileged EXEC mode.

Examples

This example shows how to implement the proposed new VLAN database and to recognize it as the current database:

```
Switch(config-vlan)# apply
Switch(config-vlan)#
```

Related Commands

abort (refer to Cisco IOS documentation)
exit (refer to Cisco IOS documentation)
reset
show vlan
shutdown vlan (refer to Cisco IOS documentation)
vtp (global configuration mode)

arp access-list

To define an ARP access list or add clauses at the end of a predefined list, use the **arp access-list** command.

arp access-list *name*

Syntax Description

name	Specifies the access control list name.

Defaults

None

Command Modes

Configuration

Command History

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

Examples

The following example shows how to define an ARP access list named static-hosts:

```
Switch(config)# arp access-list static-hosts
Switch(config)#
```

Related Commands

deny
ip arp inspection filter vlan
permit

attach module

To remotely connect to a specific module, use the **attach module** configuration command.

attach module *mod*

Syntax Description

mod	Target module for the command.

Defaults

This command has no default settings.

Command Modes

Privileged

Command History

Release	Modification
12.1(19)EW	This command was first introduced.

Usage Guidelines

This command applies only to the Access Gateway Module on Catalyst 4500 series switches.

The valid values for *mod* depend on the chassis used. For example, if you have a Catalyst 4006 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 **attach module** *mod* command, the prompt changes to Gateway#.

This command is identical in the resulting action to the **session module** *mod* and the **remote login module** *mod* commands.

Examples

This example shows how to remotely log in to an Access Gateway Module:

```
Switch# attach module 5
Attaching console to module 5
Type 'exit' at the remote prompt to end the session

Gateway>
```

Related Commands

remote login module
session module

auto qos voip

To automatically configure quality of service (auto-QoS) for voice over IP (VoIP) within a QoS domain, use the **auto qos voip** interface configuration command. Use the **no** form of this command to change the auto-QoS configuration settings to the standard QoS defaults.

auto qos voip {**cisco-phone** | **trust**}

no auto qos voip {**cisco-phone** | **trust**}

Syntax Description

cisco-phone	Connects the interface to a Cisco IP phone and automatically configures QoS for VoIP. The CoS labels of incoming packets are trusted only when the telephone is detected.
trust	Connects the interface to a trusted switch or router and automatically configures QoS for VoIP. The CoS and DSCP labels of incoming packets are trusted.

Defaults

Auto-QoS is disabled on all interfaces.

Command Modes

Interface configuration

Command History

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

Usage Guidelines

Use this command to configure the QoS appropriate for VoIP traffic within the QoS domain. The QoS domain includes the switch, the interior of the network, and the edge devices that can classify incoming traffic for QoS.

Use the **cisco-phone** keyword on ports at the edge of the network that are connected to Cisco IP phones. The switch detects the telephone through the Cisco Discovery Protocol (CDP) and trusts the CoS labels in packets received from the telephone.

Use the **trust** keyword on ports connected to the interior of the network. Because it is assumed that traffic has already been classified by other edge devices, the CoS/DSCP labels in these packets are trusted.

When you enable the auto-QoS feature on the specified interface, these actions automatically occur:

- QoS is globally enabled (**qos** global configuration command).
- DBL is enabled globally (**qos dbl** global configuration command).
- When you enter the **auto qos voip cisco-phone** interface configuration command, the trusted boundary feature is enabled. It uses the Cisco Discovery Protocol (CDP) to detect the presence or absence of a Cisco IP phone. When a Cisco IP phone is detected, the ingress classification on the specific interface is set to trust the CoS label received in the packet because some old phones do not mark DSCP. When a Cisco IP phone is absent, the ingress classification is set to not trust the CoS label in the packet.

- When you enter the **auto qos voip trust** interface configuration command, the ingress classification on the specified interface is set to trust the CoS label received in the packet if the specified interface is configured as Layer 2 (and is set to trust DSCP if the interface is configured as Layer 3).

You can enable auto-QoS on static, dynamic-access, voice VLAN access, and trunk ports.

To display the QoS configuration that is automatically generated when auto-QoS is enabled, enable debugging before you enable auto-QoS. Use the **debug auto qos** privileged EXEC command to enable auto-QoS debugging.

To disable auto-QoS on an interface, use the **no auto qos voip** interface configuration command. When you enter this command, the switch enables standard QoS and changes the auto-QoS settings to the standard QoS default settings for that interface. This action will not change any global configuration performed by auto-QoS; the global configuration remains the same.

Examples

This example shows how to enable auto-QoS and to trust the CoS and DSCP labels received in incoming packets when the switch or router connected to Gigabit Ethernet interface 1/1 is a trusted device:

```
Switch(config)# interface gigabitethernet1/1
Switch(config-if)# auto qos voip trust
```

This example shows how to enable auto-QoS and to trust the CoS labels received in incoming packets when the device connected to Fast Ethernet interface 2/1 is detected as a Cisco IP phone:

```
Switch(config)# interface fastethernet2/1
Switch(config-if)# auto qos voip cisco-phone
```

This example shows how to display the QoS configuration that is automatically generated when auto-QoS is enabled:

```
Switch# debug auto qos
AutoQoS debugging is on
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet1/1
Switch(config-if)# auto qos voip trust
Switch(config-if)#
00:00:56:qos
00:00:57:qos map cos 3 to dscp 26
00:00:57:qos map cos 5 to dscp 46
00:00:58:qos map dscp 32 to tx-queue 1
00:00:58:qos dbl
00:01:00:policy-map autoqos-voip-policy
00:01:00:  class class-default
00:01:00:   dbl
00:01:00:interface GigabitEthernet1/1
00:01:00: qos trust cos
00:01:00: tx-queue 3
00:01:00:  priority high
00:01:00:  shape percent 33
00:01:00:  service-policy output autoqos-voip-policy
Switchconfig-if)# interface gigabitethernet1/1
Switch(config-if)# auto qos voip cisco-phone
Switch(config-if)#
00:00:55:qos
00:00:56:qos map cos 3 to dscp 26
00:00:57:qos map cos 5 to dscp 46
00:00:58:qos map dscp 32 to tx-queue 1
00:00:58:qos dbl
00:00:59:policy-map autoqos-voip-policy
00:00:59:  class class-default
```

```
00:00:59:   dbl
00:00:59:interface GigabitEthernet1/1
00:00:59: qos trust device cisco-phone
00:00:59: qos trust cos
00:00:59: tx-queue 3
00:00:59:  priority high
00:00:59:  shape percent 33
00:00:59:  bandwidth percent 33
00:00:59:  service-policy output autoqos-voip-policy
```

You can verify your settings by entering the **show auto qos interface** command.

Related Commands

debug auto qos (refer to Cisco IOS documentation)
qos map cos
qos trust
show auto qos
show qos
show qos interface
show qos maps

auto-sync

To enable automatic synchronization of the configuration files in NVRAM, use the **auto-sync** command. To disable automatic synchronization, use the **no** form of this command.

auto-sync {**startup-config** | **config-register** | **bootvar** | **standard**}

no auto-sync {**startup-config** | **config-register** | **bootvar** | **standard**}

Syntax Description

startup-config	Specifies automatic synchronization of the startup configuration.
config-register	Specifies automatic synchronization of the configuration register configuration.
bootvar	Specifies automatic synchronization of the BOOTVAR configuration.
standard	Specifies automatic synchronization of the startup configuration, BOOTVAR, and configuration registers.

Defaults

Standard automatic synchronization of all configuration files

Command Modes

Redundancy main-cpu

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

If you enter the **no auto-sync standard** command, no automatic synchronizations occur.

Examples

This example shows how (from the default configuration) to enable automatic synchronization of the configuration register in the main CPU:

```
Switch# config terminal
Switch (config)# redundancy
Switch (config-r)# main-cpu
Switch (config-r-mc)# no auto-sync standard
Switch (config-r-mc)# auto-sync configure-register
Switch (config-r-mc)#
```

Related Commands

redundancy

channel-group

To assign and configure an EtherChannel interface to an EtherChannel group, use the **channel-group** command. To remove a channel group configuration from an interface, use the **no** form of this command.

channel-group *number* **mode** {**active** | **on** | **auto** [**non-silent**]} | {**passive** | **desirable** [**non-silent**]}

no channel-group

Syntax Description

number	Specifies the channel group number; valid values are from 1 to 64.
mode	Specifies the EtherChannel mode of the interface.
active	Enables LACP unconditionally.
on	Forces the port to channel without PAgP.
auto	Places a port into a passive negotiating state, in which the port responds to PAgP packets it receives but does not initiate PAgP packet negotiation.
non-silent	(Optional) Used with the auto or desirable mode when traffic is expected from the other device.
passive	Enables LACP only if an LACP device is detected.
desirable	Places a port into an active negotiating state, in which the port initiates negotiations with other ports by sending PAgP packets.

Defaults

No channel groups are assigned.

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(13)EW	Support for LACP was added.

Usage Guidelines

You do not have to create a port channel interface before assigning a physical interface to a channel group. If a port channel interface has not been created, it is automatically created when the first physical interface for the channel group is created.

If a specific channel number is used for the PAgP-enabled interfaces of a channel group, that same channel number cannot be used for configuring a channel that has LACP-enabled interfaces or vice versa.

You can also create 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 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.

You do not have to disable the IP address that is assigned to a physical interface that is part of a channel group, but we recommend that you do so.

Any configuration or attribute changes you make to the port-channel interface are propagated to all interfaces within the same channel group as the port channel (for example, configuration changes are also propagated to the physical interfaces that are not part of the port channel, but are part of the channel group).

You can create in **on** mode a usable EtherChannel by connecting two port groups together.

Caution Do not enable Layer 3 addresses on the physical EtherChannel interfaces. Do not assign bridge groups on the physical EtherChannel interfaces because it creates loops.

Examples

This example shows how to add Gigabit Ethernet interface 1/1 to the EtherChannel group specified by port channel 45:

```
Switch(config-if)# channel-group 45 mode on
Creating a port-channel interface Port-channel45
Switch(config-if)#
```

Related Commands

interface port-channel
show interfaces port-channel (refer to Cisco IOS documentation)

channel-protocol

To enable LACP or PAgP on an interface, use the **channel-protocol** command. To disable the protocols, use the **no** form of this command.

channel-protocol {**lacp** | **pagp**}

no channel-protocol {**lacp** | **pagp**}

Syntax Description

lacp	Enables LACP to manage channeling.
pagp	Enables PAgP to manage channeling.

Defaults

PAgP

Command Modes

Interface configuration

Command History

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

Usage Guidelines

This command is not supported on systems configured with a Supervisor Engine 1.

You can also select the protocol using the **channel-group** command.

If the interface belongs to a channel, the **no** form of this command is rejected.

All ports in an EtherChannel must use the same protocol; you cannot run two protocols on one module.

PAgP and LACP are not compatible; both ends of a channel must use the same protocol.

You can manually configure a switch with PAgP on one side and LACP on the other side in the **on** mode.

You can change the protocol at any time, but this change causes all existing EtherChannels to reset to the default channel mode for the new protocol. You can use the **channel-protocol** command to restrict anyone from selecting a mode that is not applicable to the selected protocol.

Configure all ports in an EtherChannel to operate at the same speed and duplex mode (full duplex only for LACP mode).

For a complete list of guidelines, refer to the "Configuring EtherChannel" section of the *Catalyst 4500 Series Switch Cisco IOS Software Configuration Guide*.

Examples

This example shows how to select LACP to manage channeling on the interface:

```
Switch(config-if)# channel-protocol lacp
Switch(config-if)#
```

Related Commands

channel-group
show etherchannel

class-map

To access the QoS class map configuration mode to configure QoS class maps, use the **class-map** command. To delete a class map, use the **no** form of this command.

class-map [**match-all** | **match-any**] *name*

no class-map [**match-all** | **match-any**] *name*

Syntax Description

match-all	(Optional) Specifies that all match criteria in the class map must be matched.
match-any	(Optional) Specifies that one or more match criteria must match.
name	Name of the class map.

Defaults

Match all criteria.

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 variables *name* and *acl_name* are case sensitive.

Use the **class-map** command and its subcommands on individual interfaces to define packet classification, marking, aggregate, and flow policing as part of a globally named service policy.

These commands are available in QoS class map configuration mode:

- **exit**—Exits you from QoS class map configuration mode.
- **no**—Removes a match statement from a class map.
- **match**—Configures classification criteria.

  These optional subcommands are also available:

  - **access-group** {*acl_index* | **name** *acl_name*}
  - **ip** {**dscp** | **precedence**} *value1 value2... value8*
  - **any**

The following subcommands appear in the CLI help, but they are not supported on LAN interfaces:

- **input-interface** {*interface interface_number* | **null** *number* | **vlan** *vlan_id*}
- **protocol** *linktype*
- **destination-address mac** *mac_address*
- **source-address mac** *mac_address*
- **qos-group**

- **mpls**
- **no**

After you have configured the class map name and are in class map configuration mode, you can enter the **match** subcommands. The syntax for these subcommands is as follows:

match {[**access-group** {*acl_index* | **name** *acl_name*}] | [**ip** {**dscp** | **precedence**} *value1 value2... value8*]}

See Table 2-1 for a syntax description of the **match** subcommands.

Table 2-1 Syntax Description for the match Command

Optional Subcommand	Description
access-group *acl_index* | *acl_name*	Specifies the access list index or access list names; valid access list index values are from 1 to 2699.
access-group *acl_name*	Specifies the named access list.
ip dscp *value1 value2 ... value8*	Specifies IP DSCP values to match; valid values are from 0 to 63. Enter up to eight DSCP values separated by white spaces.
ip precedence *value1 value2 ... value8*	Specifies IP precedence values to match; valid values are from 0 to 7. Enter up to eight precedence values separated by white spaces.

Examples

This example shows how to access the **class-map** commands and subcommands and to configure a class map named ipp5 and enter a match statement for ip precedence 5:

```
Switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# class-map ipp5
Switch(config-cmap)# match ip precedence 5
Switch(config-cmap)#
```

This example shows how to configure the class map to match an already configured access list:

```
Switch(config-cmap)# match access-group IPacl1
Switch(config-cmap)#
```

Related Commands

policy-map
service-policy
show class-map
show policy-map
show policy-map interface

clear counters

To clear interface counters, use the **clear counters** command.

clear counters [{**FastEthernet** *interface_number*} | {**GigabitEthernet** *interface_number*} | {**null** *interface_number*} | {**port-channel** *number*} | {**vlan** *vlan_id*}]

Syntax Description

FastEthernet *interface_number*	(Optional) Specifies the Fast Ethernet interface; valid values are from 1 to 9.
GigabitEthernet *interface_number*	(Optional) Specifies the Gigabit Ethernet interface; valid values are from 1 to 9.
null *interface_number*	(Optional) Specifies the null interface; the valid value is 0.
port-channel *number*	(Optional) Specifies the channel interface; valid values are from 1 to 64.
vlan *vlan_id*	(Optional) Specifies the VLAN; valid values are from 1 to 4096.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

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 was added.

Usage Guidelines

This command clears all the current interface counters from all interfaces unless you specify an interface.

Note This command does not clear counters retrieved using SNMP, but only those seen when you enter the **show interface counters** command.

Examples

This example shows how to clear all interface counters:

```
Switch# clear counters
Clear "show interface" counters on all interfaces [confirm] y
Switch#
```

This example shows how to clear counters on a specific interface:

```
Switch# clear counters vlan 200
Clear "show interface" counters on this interface [confirm]y
Switch#
```

Related Commands **show interface counters** (refer to Cisco IOS documentation)

clear hw-module slot password

To clear the password on an intelligent line module, use the **clear hw-module slot password** command:

clear hw-module slot *slot_num* **password**

Syntax Description

slot_num	(Optional) Specifies a slot on a line module.

Defaults

The password is not cleared.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

You only need to change the password once unless the password is reset.

Examples

This example shows how to clear the password from slot 5 on a line module:

```
Switch# clear hw-module slot 5 password
Switch#
```

Related Commands

hw-module power

clear interface gigabitethernet

To clear the hardware logic from a Gigabit Ethernet IEEE 802.3z interface, use the **clear interface gigabitethernet** command.

clear interface gigabitethernet *slot/port*

Syntax Description

slot/port	Number of the slot and port.

Defaults

This command has no default settings.

Command Modes

Privileged 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 clear the hardware logic from a Gigabit Ethernet IEEE 802.3z interface:

```
Switch# clear interface gigabitethernet 1/1
Switch#
```

Related Commands

show interfaces status

clear interface vlan

To clear the hardware logic from a VLAN, use the **clear interface vlan** command.

clear interface vlan *number*

Syntax Description

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

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

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.

Examples

This example shows how to clear the hardware logic from a specific VLAN:

```
Switch# clear interface vlan 5
Switch#
```

Related Commands

show interfaces status

clear ip access-template

To clear statistical information in access lists, use the **clear ip access-template** command.

clear ip access-template *access-list*

Syntax Description

access-list	Number of the access list; valid values are from 100 to 199 for an IP extended access list, and from 2000 to 2699 for an expanded range IP extended access list.

Defaults

This command has no default settings.

Command Modes

Privileged 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 clear statistical information for an access list:

```
Switch# clear ip access-template 201
Switch#
```

clear ip arp inspection log

To clear the status of the log buffer, use the **clear ip arp inspection log command.**

clear ip arp inspection log

Syntax Description

This command has no arguments or keywords.

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.

Examples

This example shows how to clear the contents of the log buffer:

```
Switch# clear ip arp inspection log
Switch#
```

Related Commands

arp access-list
show ip arp inspection log

clear ip arp inspection statistics

To clear the dynamic ARP inspection statistics, use the **clear ip arp inspection statistics command.**

clear ip arp inspection statistics [vlan *vlan-range***]**

Syntax Description

vlan *vlan-range*	(Optional) Specifies the VLAN range.

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.

Examples

This example shows how to clear the DAI statistics from VLAN 1 and how to verify the removal:

```
Switch# clear ip arp inspection statistics vlan 1
Switch# show ip arp inspection statistics vlan 1

 Vlan      Forwarded        Dropped     DHCP Drops     ACL Drops
 ----      ---------        -------     ----------     ----------
    1              0              0              0             0

 Vlan   DHCP Permits    ACL Permits   Source MAC Failures
 ----   ------------    -----------   -------------------
    1              0              0                     0

 Vlan   Dest MAC Failures   IP Validation Failures
 ----   -----------------   ----------------------
    1                  0                        0
Switch#
```

Related Commands

arp access-list
clear ip arp inspection log
show ip arp inspection

clear ip dhcp snooping database

To clear the DHCP binding database, use the **clear ip dhcp snooping database** command.

clear ip dhcp snooping database

Syntax Description

This command has no arguments or keywords.

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.

Examples

This example shows how to clear the DHCP binding database:

```
Switch# clear ip dhcp snooping database
Switch#
```

Related Commands

ip dhcp snooping
ip dhcp snooping binding interface (refer to Cisco IOS documentation)
ip dhcp snooping information option
ip dhcp snooping trust
ip dhcp snooping vlan
show ip dhcp snooping
show ip dhcp snooping binding

clear ip dhcp snooping database statistics

To clear DHCP binding database statistics, use the **clear ip dhcp snooping database statistics** command.

clear ip dhcp snooping database statistics

Syntax Description

This command has no arguments or keywords.

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.

Examples

This example shows how to clear the DHCP binding database:

```
Switch# clear ip dhcp snooping database statistics
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

clear ip igmp group

To delete IGMP group cache entries, use the **clear ip igmp group** command.

clear ip igmp group [{**fastethernet** *slot/port*} | {**GigabitEthernet** *slot/port*} | {*host_name* | *group_address*} {**Loopback** *interface_number*} | {**null** *interface_number*} | {**port-channel** *number*} | {**vlan** *vlan_id*}]

Syntax Description

fastethernet	(Optional) Specifies the Fast Ethernet interface.
slot/port	(Optional) Number of the slot and port.
GigabitEthernet	(Optional) Specifies the Gigabit Ethernet interface.
host_name	(Optional) Hostname, as defined in the DNS hosts table or with the **ip host** command.
group_address	(Optional) Address of the multicast group in four-part, dotted notation.
Loopback *interface_number*	(Optional) Specifies the loopback interface; valid values are from 0 to 2,147,483,647.
null *interface_number*	(Optional) Specifies the null interface; the valid value is 0.
port-channel *number*	(Optional) Specifies the channel interface; valid values are from 1 to 64.
vlan *vlan_id*	(Optional) Specifies the VLAN; valid values are from 1 to 4094.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

The IGMP cache contains a list of the multicast groups of which hosts on the directly connected LAN are members.

To delete all entries from the IGMP cache, enter the **clear ip igmp group** command with no arguments.

Examples

This example shows how to clear entries for a specific group from the IGMP cache:

```
Switch# clear ip igmp group 224.0.255.1
Switch#
```

This example shows how to clear IGMP group cache entries from a specific interface:

```
Switch# clear ip igmp group gigabitethernet 2/2
Switch#
```

Related Commands **ip host** (refer to Cisco IOS documentation)
show ip igmp groups (refer to Cisco IOS documentation)
show ip igmp interface

clear ip igmp snooping membership

To clear the explicit host tracking database, use the **clear ip igmp snooping membership** command.

clear ip igmp snooping membership [**vlan** *vlan_id*]

Syntax Description

vlan *vlan_id*	(Optional) Specifies a VLAN; valid values are from 1 to 1001 and from 1006 to 4094.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

By default, the explicit host tracking database maintains a maximum of 1 KB entries. After you reach this limit, no additional entries can be created in the database. To create more entries, you will need to delete the database with the **clear ip igmp snooping statistics vlan** command.

Examples

This example shows how to display IGMP snooping statistics for VLAN 25:

```
Switch# clear ip igmp snooping membership vlan 25
Switch#
```

Related Commands

ip igmp snooping vlan explicit-tracking
show ip igmp snooping membership

clear ip mfib counters

To clear global MFIB counters and counters for all active MFIB routes, use the **clear ip mfib counters** command.

clear ip mfib counters

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged 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 clear all the active MFIB routes and global counters:

```
Switch# clear ip mfib counters
Switch#
```

Related Commands

show ip mfib

clear ip mfib fastdrop

To clear all MFIB fast drop entries, use the **clear ip mfib fastdrop** command.

clear ip mfib fastdrop

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

If new fast-dropped packets arrive, new fast drop entries are created.

Examples

This example shows how to clear all fast drop entries:

```
Switch# clear ip mfib fastdrop
Switch#
```

Related Commands

ip mfib fastdrop
show ip mfib fastdrop

clear lacp counters

To clear statistics for all interfaces belonging to a specific channel group, use the **clear lacp counters** command.

clear lacp [*channel-group*] **counters**

Syntax Description

channel-group	(Optional) Channel group number; valid values are from 1 to 64.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC mode

Command History

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

Usage Guidelines

This command is not supported on systems configured with a Supervisor Engine 1.

If you do not specify a channel group, all channel groups are cleared.

If you enter this command for a channel group that contains members in PAgP mode, the command is ignored.

Examples

This example shows how to clear the statistics for a specific group:

```
Switch# clear lacp 1 counters
Switch#
```

Related Commands

show lacp

clear mac-address-table dynamic

To clear dynamic address entries from the Layer 2 MAC address table, use the **clear mac-address-table dynamic** command.

clear mac-address-table dynamic [{**address** *mac_addr*} | {**interface** *interface*}] [**vlan** *vlan_id*]

Syntax Description

address *mac_addr*	(Optional) Specifies the MAC address.
interface *interface*	(Optional) Specifies the interface and clear the entries associated with it; valid values are **FastEthernet** and **GigabitEthernet**.
vlan *vlan_id*	(Optional) Specifies the VLANs; valid values are from 1 to 4094.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

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

Enter the **clear mac-address-table dynamic** command with no arguments to remove all dynamic entries from the table.

Examples

This example shows how to clear all dynamic Layer 2 entries for a specific interface (gi1/1):

```
Switch# clear mac-address-table dynamic interface gi1/1
Switch#
```

Related Commands

mac-address-table aging-time
main-cpu
show mac-address-table address

clear pagp

To clear port channel information, use the **clear pagp** command.

clear pagp {*group-number* | **counters**}

Syntax Description

group-number	Channel group number; valid values are from 1 to 64.
counters	Clears traffic filters.

Defaults

This command has no default settings.

Command Modes

Privileged 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 clear port channel information for a specific group:

```
Switch# clear pagp 32
Switch#
```

This example shows how to clear all port channel traffic filters:

```
Switch# clear pagp counters
Switch#
```

Related Commands

show pagp

clear port-security

To delete from the MAC address table all secure addresses, all configured secure addresses, or a specific dynamic or sticky secure address on an interface, use the **clear port-security** command.

clear port-security {**all** | **dynamic**} [**address** *mac-addr* [**vlan** *vlan-id*]] | [**interface** *interface-id*]

Syntax Description

all	Deletes all secure MAC addresses.
dynamic	Deletes all dynamic secure MAC addresses.
address *mac-addr*	(Optional) Deletes the specified secure MAC address.
vlan *vlan-id*	(Optional) Deletes the specified secure MAC address from the specified VLAN.
interface *interface-id*	(Optional) Deletes secure MAC addresses on the specified physical port or port channel.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Usage Guidelines

If you enter the **clear port-security all** command, the switch removes all secure MAC addresses from the MAC address table.

If you enter the **clear port-security dynamic interface** *interface-id* command, the switch removes all dynamic secure MAC addresses on an interface from the MAC address table.

Command History

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

Examples

This example shows how to remove all secure addresses from the MAC address table:

```
Switch# clear port-security all
```

This example shows how to remove a dynamic secure address from the MAC address table:

```
Switch# clear port-security dynamic address 0008.0070.0007
```

This example shows how to remove all the dynamic secure addresses learned on a specific interface:

```
Switch# clear port-security dynamic interface gigabitethernet0/1
```

You can verify that the information was deleted by entering the **show port-security** command.

Related Commands

show port-security
switchport port-security

clear qos

To clear global and per-interface aggregate QoS counters, use the **clear qos** command.

clear qos [**aggregate-policer** [*name*] | **interface** {{**fastethernet** | **GigabitEthernet**} {*slot/interface*}} | **vlan** {*vlan_num*} | **port-channel** {*number*}]

Syntax Description

aggregate-policer *name*	(Optional) Specifies an aggregate policer.
interface	(Optional) Specifies an interface.
fastethernet	(Optional) Specifies the Fast Ethernet 802.3 interface.
GigabitEthernet	(Optional) Specifies the Gigabit Ethernet 802.3z interface.
slot/interface	(Optional) Number of the slot and interface.
vlan *vlan_num*	(Optional) Specifies a VLAN.
port-channel *number*	(Optional) Specifies the channel interface; valid values are from 1 to 64.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

Note When you enter the **clear qos** command, the way that the counters work is affected and traffic that is normally restricted could be forwarded for a short period of time.

The **clear qos** command resets the interface QoS policy counters. If no interface is specified, the **clear qos** command resets the QoS policy counters for all interfaces.

Examples

This example shows how to clear global and per-interface aggregate QoS counters for all protocols:

```
Switch# clear qos
Switch#
```

This example shows how to clear specific protocol aggregate QoS counters for all interfaces:

```
Switch# clear qos aggregate-policer
Switch#
```

Related Commands

show qos

clear vlan counters

To clear the software-cached counter values to start from zero again for a specified VLAN or all existing VLANs, use the **clear vlan counters** command.

clear vlan [*vlan-id*] **counters**

Syntax Description

vlan-id	(Optional) VLAN number; see "Usage Guidelines" for valid values.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

If you do not specify a *vlan-id* value; the software-cached counter values for all existing VLANs are cleared.

Examples

This example shows how to clear the software-cached counter values for a specific VLAN:

```
Switch# clear vlan 10 counters
Clear "show vlan" counters on this vlan [confirm]y
Switch#
```

Related Commands

show vlan counters

clear vmps statistics

To clear VMPS statistics, use the **clear vmps statistics** command.

clear vmps statistics

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Examples

This example shows how to clear VMPS statistics:

```
Switch# clear vmps statistics
Switch#
```

Related Commands

show vmps
vmps reconfirm (privileged EXEC)

debug adjacency

To display adjacency debugging information, use the **debug adjacency** command. To disable debugging output, use the **no** form of this command.

debug adjacency [**ipc**]

no debug adjacency

Syntax Description

ipc	(Optional) Displays IPC entries in the adjacency database.

Defaults

This command has no default settings.

Command Modes

Privileged 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 display information in the adjacency database:

```
Switch# debug adjacency
4d02h: ADJ: add 172.20.52.36 (GigabitEthernet1/1) via ARP will expire: 04:00:00
4d02h: ADJ: add 172.20.52.36 (GigabitEthernet1/1) via ARP will expire: 04:00:00
4d02h: ADJ: add 172.20.52.36 (GigabitEthernet1/1) via ARP will expire: 04:00:00
4d02h: ADJ: add 172.20.52.36 (GigabitEthernet1/1) via ARP will expire: 04:00:00
4d02h: ADJ: add 172.20.52.36 (GigabitEthernet1/1) via ARP will expire: 04:00:00
4d02h: ADJ: add 172.20.52.36 (GigabitEthernet1/1) via ARP will expire: 04:00:00
4d02h: ADJ: add 172.20.52.36 (GigabitEthernet1/1) via ARP will expire: 04:00:00
4d02h: ADJ: add 172.20.52.36 (GigabitEthernet1/1) via ARP will expire: 04:00:00
<... output truncated...>
Switch#
```

Related Commands

undebug adjacency (same as **no debug adjacency**)

debug backup

To debug backup events, use the **debug backup** command. To disable debugging output, use the **no** form of this command.

debug backup

no debug backup

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged 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 debug backup events:

```
Switch# debug backup
Backup events debugging is on
Switch#
```

Related Commands

undebug backup (same as **no debug backup**)

debug condition interface

To limit debugging output of interface-related activities, use the **debug condition interface** command. To disable debugging output, use the **no** form of this command.

debug condition interface {**fastethernet** *slot/port* | **GigabitEthernet** *slot/port* | **null** *interface_num* | **port-channel** *interface-num* | **vlan** *vlan_id*}

no debug condition interface {**fastethernet** *slot/port* | **GigabitEthernet** *slot/port* | **null** *interface_num* | **port-channel** *interface-num* | **vlan** *vlan_id*}

Syntax Description

fastethernet	Limits debugging to Fast Ethernet interfaces.
slot/port	Number of the slot and port.
GigabitEthernet	Limits debugging to Gigabit Ethernet interfaces.
null *interface-num*	Limits debugging to null interfaces; the valid value is 0.
port-channel *interface-num*	Limits debugging to port-channel interfaces; valid values are from 1 to 64.
vlan *vlan_id*	Specifies the VLAN interface number; valid values are from 1 to 4094.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

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.

Examples

This example shows how to limit debugging output to VLAN interface 1:

```
Switch# debug condition interface vlan 1
Condition 2 set
Switch#
```

Related Commands

debug interface
undebug condition interface (same as **no debug condition interface**)

debug condition standby

To limit debugging output for standby state changes, use the **debug condition standby** command. To disable debugging output, use the **no** form of this command.

debug condition standby {**fastethernet** *slot/port* | **GigabitEthernet** *slot/port* | **port-channel** *interface-num* | **vlan** *vlan_id group-number*}

no debug condition standby {**fastethernet** *slot/port* | **GigabitEthernet** *slot/port* | **port-channel** *interface-num* | **vlan** *vlan_id group-number*}

Syntax Description

fastethernet	Limits debugging to Fast Ethernet interfaces.
slot/port	Number of the slot and port.
GigabitEthernet	Limits debugging to Gigabit Ethernet interfaces.
port-channel *interface_num*	Limits debugging output to port-channel interfaces; valid values are from 1 to 64.
vlan *vlan_id*	Limits debugging of a condition on a VLAN interface; valid values are from 1 to 4094.
group-number	VLAN group number; valid values are from 0 to 255.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

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

If you attempt to remove the only condition set, you will be prompted with a message asking if you want to abort the removal operation. You can enter **n** to abort the removal or **y** to proceed with the removal. If you remove the only condition set, an excessive number of debugging messages might occur.

Examples

This example shows how to limit the debugging output to group 0 in VLAN 1:

```
Switch# debug condition standby vlan 1 0
Condition 3 set
Switch#
```

This example shows the display if you try to turn off the last standby debug condition:

```
Switch# no debug condition standby vlan 1 0
This condition is the last standby condition set.
Removing all conditions may cause a flood of debugging
messages to result, unless specific debugging flags
```

```
are first removed.

Proceed with removal? [yes/no]: n
% Operation aborted
Switch#
```

Related Commands **undebug condition standby** (same as **no debug condition standby**)

debug condition vlan

To limit VLAN debugging output for a specific VLAN, use the **debug condition vlan** command. To disable debugging output, use the **no** form of this command.

debug condition vlan {*vlan_id*}

no debug condition vlan {*vlan_id*}

Syntax Description

vlan_id	Number of the VLAN; valid values are from 1 to 4096.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

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

If you attempt to remove the only VLAN condition set, you will be prompted with a message asking if you want to abort the removal operation. You can enter **n** to abort the removal or **y** to proceed with the removal. If you remove the only condition set, it could result in the display of an excessive number of messages.

Examples

This example shows how to limit debugging output to VLAN 1:

```
Switch# debug condition vlan 1
Condition 4 set
Switch#
```

This example shows the message that is displayed when you attempt to disable the last VLAN debug condition:

```
Switch# no debug condition vlan 1
This condition is the last vlan condition set.
Removing all conditions may cause a flood of debugging
messages to result, unless specific debugging flags
are first removed.

Proceed with removal? [yes/no]: n
% Operation aborted
Switch#
```

Related Commands

undebug condition vlan (same as **no debug condition vlan**)

debug dot1x

To enable debugging for the 802.1x feature, use the **debug dot1x** command. Use the **no** form of this command to disable debugging output.

debug dot1x {**all** | **errors** | **events** | **packets** | **registry** | **state-machine**}

no debug dot1x {**all** | **errors** | **events** | **packets** | **registry** | **state-machine**}

Syntax Description

all	Enables debugging of all conditions.
errors	Enables debugging of print statements guarded by the dot1x error flag.
events	Enables debugging of print statements guarded by the dot1x events flag.
packets	All incoming dot1x packets are printed with packet and interface information.
registry	Enables debugging of print statements guarded by the dot1x registry flag.
state-machine	Enables debugging of print statements guarded by the dot1x registry flag.

Defaults

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

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

Related Commands

show dot1x
undebug dot1x (same as **no debug dot1x**)

debug etherchnl

To debug EtherChannel, use the **debug etherchnl** command. To disable debugging output, use the **no** form of this command.

debug etherchnl [**all** | **detail** | **error** | **event** | **idb** | **linecard**]

no debug etherchnl

Syntax Description

all	(Optional) Displays all EtherChannel debug messages.
detail	(Optional) Displays detailed EtherChannel debug messages.
error	(Optional) Displays EtherChannel error messages.
event	(Optional) Debugs major EtherChannel event messages.
idb	(Optional) Debugs PAgP IDB messages.
linecard	(Optional) Debugs SCP messages to the module.

Defaults

The default settings are as follows:

- Debug is disabled.
- All messages are displayed.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

If you do not specify a keyword, all debug messages are displayed.

Examples

This example shows how to display all EtherChannel debug messages:

```
Switch# debug etherchnl
PAgP Shim/FEC debugging is on
22:46:30:FEC:returning agport Po15 for port (Fa2/1)
22:46:31:FEC:returning agport Po15 for port (Fa4/14)
22:46:33:FEC:comparing GC values of Fa2/25 Fa2/15 flag = 1 1
22:46:33:FEC:port_attrib:Fa2/25 Fa2/15 same
22:46:33:FEC:EC - attrib incompatable for Fa2/25; duplex of Fa2/25 is half, Fa2/15 is full
22:46:33:FEC:pagp_switch_choose_unique:Fa2/25, port Fa2/15 in agport Po3 is incompatable
Switch#
```

This example shows how to display EtherChannel IDB debug messages:

```
Switch# debug etherchnl idb
Agport idb related debugging is on
Switch#
```

This example shows how to disable debugging:

```
Switch# no debug etherchnl
Switch#
```

Related Commands **undebug etherchnl** (same as **no debug etherchnl**)

debug interface

To abbreviate the entry of the **debug condition interface** command, use the **debug interface** command. To disable debugging output, use the **no** form of this command.

debug interface {**FastEthernet** *slot/port* | **GigabitEthernet** *slot/port* | **null** | **port-channel** *interface-num* | **vlan** *vlan_id*}

no debug interface {**FastEthernet** *slot/port* | **GigabitEthernet** *slot/port* | **null** | **port-channel** *interface-num* | **vlan** *vlan_id*}

Syntax Description

FastEthernet	Limits debugging to Fast Ethernet interfaces.
slot/port	Number of the slot and port.
GigabitEthernet	Limits debugging to Gigabit Ethernet interfaces.
null	Limits debugging to null interfaces; the only valid value is 0.
port-channel *interface-num*	Limits debugging to port-channel interfaces; valid values are from 1 to 64.
vlan *vlan_id*	Specifies the VLAN interface number; valid values are from 1 to 4094.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

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.

Examples

This example shows how to limit debugging to interface VLAN 1:

```
Switch# debug interface vlan 1
Condition 1 set
Switch#
```

Related Commands

debug condition interface
undebug interface (same as **no debug interface**)

debug ipc

To debug IPC activity, use the **debug ipc** command. To disable debugging output, use the **no** form of this command.

debug ipc {**all** | **errors** | **events** | **headers** | **packets** | **ports** | **seats**}

no debug ipc {**all** | **errors** | **events** | **headers** | **packets** | **ports** | **seats**}

Syntax Description

all	Enables all IPC debugging.
errors	Enables IPC error debugging.
events	Enables IPC event debugging.
headers	Enables IPC header debugging.
packets	Enables IPC packet debugging.
ports	Enables debugging of the creation and deletion of ports.
seats	Enables debugging of the creation and deletion of nodes.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

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 debugging of IPC events:

```
Switch# debug ipc events
Special Events debugging is on
Switch#
```

Related Commands

undebug ipc (same as **no debug ipc**)

debug ip dhcp snooping event

To debug DHCP snooping events, use the **debug ip dhcp snooping event** command. To disable debugging output, use the **no** form of this command.

debug ip dhcp snooping event

no debug ip dhcp snooping event

Syntax Description

This command has no arguments or keywords.

Defaults

Debugging of snooping event is disabled.

Command Modes

Privileged EXEC

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 debugging for DHCP snooping events:

```
Switch# debug ip dhcp snooping event
Switch#
```

This example shows how to disable debugging for DHCP snooping events:

```
Switch# no debug ip dhcp snooping event
Switch#
```

Related Commands

debug ip dhcp snooping packet

debug ip dhcp snooping packet

To debug DHCP snooping messages, use the **debug ip dhcp snooping packet** command. To disable debugging output, use the **no** form of this command.

debug ip dhcp snooping packet

no debug ip dhcp snooping packet

Syntax Description

This command has no arguments or keywords.

Defaults

Debugging of snooping packet is disabled.

Command Modes

Privileged EXEC

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 debugging for DHCP snooping packets:

```
Switch# debug ip dhcp snooping packet
Switch#
```

This example shows how to disable debugging for DHCP snooping packets:

```
Switch# no debug ip dhcp snooping packet
Switch#
```

Related Commands

debug ip dhcp snooping event

debug ip verify source packet

To debug IP source guard messages, use the **debug ip verify source packet** command. To disable debugging output, use the **no** form of this command.

debug ip verify source packet

no debug ip verify source packet

Syntax Description

This command has no arguments or keywords.

Defaults

Debugging of snooping security packets is disabled.

Command Modes

Privileged EXEC

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 debugging for IP source guard:

```
Switch# debug ip verify source packet
Switch#
```

This example shows how to disable debugging for IP source guard:

```
Switch# no debug ip verify source packet
Switch#
```

Related Commands

ip dhcp snooping
ip dhcp snooping information option
ip dhcp snooping limit rate
ip dhcp snooping trust
ip verify source vlan dhcp-snooping (refer to Cisco IOS documentation)
show ip dhcp snooping
show ip dhcp snooping binding
show ip verify source (refer to Cisco IOS documentation)

debug lacp

To debug LACP activity, use the **debug lacp** command. To disable debugging output, use the **no** form of this command.

debug lacp [**all** | **event** | **fsm** | **misc** | **packet**]

no debug lacp

Syntax Description

all	(Optional) Enables all LACP debugging.
event	(Optional) Enables debugging of LACP events.
fsm	(Optional) Enables debugging of the LACP finite state machine.
misc	(Optional) Enables miscellaneous LACP debugging.
packet	(Optional) Enables LACP packet debugging.

Defaults

Debugging of LACP activity is disabled.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

This command is supported by the supervisor engine only and can be entered only from the switch console.

Examples

This example shows how to enable LACP miscellaneous debugging:

```
Switch# debug lacp
Port Aggregation Protocol Miscellaneous debugging is on
Switch#
```

Related Commands

undebug pagp (same as **no debug pagp**)

debug monitor

To display monitoring activity, use the **debug monitor** command. To disable debugging output, use the **no** form of this command.

debug monitor {**all** | **errors** | **idb-update** | **list** | **notifications** | **platform** | **requests**}

no debug monitor {**all** | **errors** | **idb-update** | **list** | **notifications** | **platform** | **requests**}

Syntax Description

all	Displays all SPAN debugging messages.
errors	Displays SPAN error details.
idb-update	Displays SPAN IDB update traces.
list	Displays SPAN and VLAN list tracing.
notifications	Displays SPAN notifications.
platform	Displays SPAN platform tracing.
requests	Displays SPAN requests.

Defaults

This command has no default settings.

Command Modes

Privileged 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 debug monitoring errors:

```
Switch# debug monitor errors
SPAN error detail debugging is on
Switch#
```

Related Commands

undebug monitor (same as **no debug monitor**)

debug nvram

To debug NVRAM activity, use the **debug nvram** command. To disable debugging output, use the **no** form of this command.

debug nvram

no debug nvram

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged 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 debug NVRAM:

```
Switch# debug nvram
NVRAM behavior debugging is on
Switch#
```

Related Commands

undebug nvram (same as **no debug nvram**)

debug pagp

To debug PAgP activity, use the **debug pagp** command. To disable debugging output, use the **no** form of this command.

debug pagp [**all** | **event** | **fsm** | **misc** | **packet**]

no debug pagp

Syntax Description

all	(Optional) Enables all PAgP debugging.
event	(Optional) Enables debugging of PAgP events.
fsm	(Optional) Enables debugging of the PAgP finite state machine.
misc	(Optional) Enables miscellaneous PAgP debugging.
packet	(Optional) Enables PAgP packet debugging.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

This command is supported by the supervisor engine only and can be entered only from the switch console.

Examples

This example shows how to enable PAgP miscellaneous debugging:

```
Switch# debug pagp misc
Port Aggregation Protocol Miscellaneous debugging is on
Switch#
*Sep 30 10:13:03: SP: PAgP: pagp_h(Fa5/6) expired
*Sep 30 10:13:03: SP: PAgP: 135 bytes out Fa5/6
*Sep 30 10:13:03: SP: PAgP: Fa5/6 Transmitting information packet
*Sep 30 10:13:03: SP: PAgP: timer pagp_h(Fa5/6) started with interval 30000
<... output truncated...>
Switch#
```

Related Commands

undebug pagp (same as **no debug pagp**)

debug platform packet protocol lacp

To debug LACP protocol packets, use the **debug platform packet protocol lacp** command. To disable debugging output, use the **no** form of this command.

debug platform packet protocol lacp [**receive** | **transmit** | **vlan**]

no debug platform packet protocol lacp [**receive** | **transmit** | **vlan**]

Syntax Description

receive	(Optional) Enables platform packet reception debugging functions.
transmit	(Optional) Enables platform packet transmission debugging functions.
vlan	(Optional) Enables platform packet VLAN debugging functions.

Defaults

This command has no default settings.

Command Modes

Privileged 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 all PM debugging:

```
Switch# debug platform packet protocol lacp
Switch#
```

Related Commands

undebug platform packet protocol lacp (same as **no debug platform packet protocol lacp**)

debug platform packet protocol pagp

To debug PAgP protocol packets, use the **debug platform packet protocol lacp** command. To disable debugging output, use the **no** form of this command.

debug platform packet protocol pagp [**receive** | **transmit** | **vlan**]

no debug platform packet protocol pagp [**receive** | **transmit** | **vlan**]

Syntax Description

receive	Enables platform packet reception debugging functions.
transmit	Enables platform packet transmission debugging functions.
vlan	Enables platform packet VLAN debugging functions.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Examples

This example shows how to enable all PM debugging:

```
Switch# debug platform packet protocol pagp
Switch#
```

Related Commands

undebug platform packet protocol pagp (same as **no debug platform packet protocol pagp**)

debug pm

To debug port manager (PM) activity, use the **debug pm** command. To disable debugging output, use the **no** form of this command.

debug pm {**all** | **card** | **cookies** | **etherchnl** | **messages** | **port** | **registry** | **scp** | **sm** | **span** | **split** | **vlan** | **vp**}

no debug pm {**all** | **card** | **cookies** | **etherchnl** | **messages** | **port** | **registry** | **scp** | **sm** | **span** | **split** | **vlan** | **vp**}

Syntax Description

all	Displays all PM debugging messages.
card	Debugs module-related events.
cookies	Enables internal PM cookie validation.
etherchnl	Debugs EtherChannel-related events.
messages	Debugs PM messages.
port	Debugs port-related events.
registry	Debugs PM registry invocations.
scp	Debugs SCP module messaging.
sm	Debugs state machine-related events.
span	Debugs spanning tree-related events.
split	Debugs split-processor.
vlan	Debugs VLAN-related events.
vp	Debugs virtual port-related events.

Defaults

This command has no default settings.

Command Modes

Privileged 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 all PM debugging:

```
Switch# debug pm all
Switch#
```

Related Commands

undebug pm (same as **no debug pm**)

debug psecure

To debug port security, use the **debug psecure** command. To disable debugging output, use the **no** form of this command.

debug psecure

no debug psecure

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Examples

This example shows how to enable all PM debugging:

```
Switch# debug psecure
Switch#
```

Related Commands

switchport port-security

debug redundancy

To debug supervisor redundancy, use the **debug redundancy** command. To disable debugging output, use the **no** form of this command.

debug redundancy {**errors | fsm | kpa | msg | progression | status | timer**}

no debug redundancy

Syntax Description

errors	Enables redundancy facility for error debugging.
fsm	Enables redundancy facility for FSM event debugging.
kpa	Enables redundancy facility for keepalive debugging.
msg	Enables redundancy facility for messaging event debugging.
progression	Enables redundancy facility for progression event debugging.
status	Enables redundancy facility for status event debugging.
timer	Enables redundancy facility for timer event debugging.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Examples

This example shows how to debug redundancy facility timer event debugging:

```
Switch# debug redundancy timer
Redundancy timer debugging is on
Switch#
```

debug smf updates

To debug software MAC filter (SMF) address insertions and deletions, use the **debug smf updates** command. To disable debugging output, use the **no** form of this command.

debug smf updates

no debug smf updates

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged 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 debug SMF updates:

```
Switch# debug smf updates
Software MAC filter address insertions and deletions debugging is on
Switch#
```

Related Commands

undebug smf (same as **no debug smf**)

debug spanning-tree

To debug spanning tree activities, use the **debug spanning-tree** command. To disable debugging output, use the **no** form of this command.

debug spanning-tree {**all** | **bpdu** | **bpdu-opt** | **etherchannel** | **config** | **events** | **exceptions** | **general** | **mst** | **pvst+** | **root** | **snmp**}

no debug spanning-tree {**all** | **bpdu** | **bpdu-opt** | **etherchannel** | **config** | **events** | **exceptions** | **general** | **mst** | **pvst+** | **root** | **snmp**}

Syntax Description

all	Displays all spanning tree debugging messages.
bpdu	Debugs spanning tree BPDU.
bpdu-opt	Debugs optimized BPDU handling.
etherchannel	Debugs spanning tree EtherChannel support.
config	Debugs spanning tree configuration changes.
events	Debugs TCAM events.
exceptions	Debugs spanning tree exceptions.
general	Debugs general spanning tree activity.
mst	Debugs multiple spanning tree events.
pvst+	Debugs PVST+ events.
root	Debugs spanning tree root events.
snmp	Debugs spanning tree SNMP events.

Defaults

This command has no default settings.

Command Modes

Privileged 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 debug spanning tree PVST+:

```
Switch# debug spanning-tree pvst+
Spanning Tree PVST+ debugging is on
Switch#
```

Related Commands

undebug spanning-tree (same as **no debug spanning-tree**)

debug spanning-tree backbonefast

To enable debugging of spanning tree BackboneFast events, use the **debug spanning-tree backbonefast** command. To disable debugging output, use the **no** form of this command.

debug spanning-tree backbonefast [**detail** | **exceptions**]

no debug spanning-tree backbonefast

Syntax Description

detail	(Optional) Displays detailed BackboneFast debugging messages.
exceptions	(Optional) Enables debugging of spanning tree BackboneFast exceptions.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

This command is supported by the supervisor engine only and can be entered only from the switch console.

Examples

This example shows how to enable debugging and to display detailed spanning tree BackboneFast debugging information:

```
Switch# debug spanning-tree backbonefast detail
Spanning Tree backbonefast detail debugging is on
Switch#
```

Related Commands

undebug spanning-tree backbonefast (same as **no debug spanning-tree backbonefast**)

debug spanning-tree switch

To enable switch shim debugging, use the **debug spanning-tree switch** command. To disable debugging output, use the **no** form of this command.

debug spanning-tree switch {**all** | **errors** | **general** | **pm** | **rx** {**decode** | **errors** | **interrupt** | **process**} | **state** | **tx** [**decode**]}

no debug spanning-tree switch {**all** | **errors** | **general** | **pm** | **rx** {**decode** | **errors** | **interrupt** | **process**} | **state** | **tx** [**decode**]}

Syntax Description

all	Displays all spanning tree switch shim debugging messages.
errors	Enables debugging of switch shim errors or exceptions.
general	Enables debugging of general events.
pm	Enables debugging of port manager events.
rx	Displays received BPDU-handling debugging messages.
decode	Enables debugging of the decode received packets of the spanning tree switch shim.
errors	Enables debugging of the receive errors of the spanning tree switch shim.
interrupt	Enables shim ISR receive BPDU debugging on the spanning tree switch.
process	Enables process receive BPDU debugging on the spanning tree switch.
state	Enables debugging of the state changes on the spanning tree port.
tx	Enables transmit BPDU debugging on the spanning tree switch shim.
decode	(Optional) Enables decode transmitted packets debugging on the spanning tree switch shim.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

This command is supported only by the supervisor engine and can be entered only from the switch console.

Examples

This example shows how to enable transmit BPDU debugging on the spanning tree switch shim:

```
Switch# debug spanning-tree switch tx
Spanning Tree Switch Shim transmit bpdu debugging is on
*Sep 30 08:47:33: SP: STP SW: TX: bpdu of type ieee-st size 92 on FastEthernet5/9 303
*Sep 30 08:47:33: SP: STP SW: TX: bpdu of type ieee-st size 92 on FastEthernet5/9 304
*Sep 30 08:47:33: SP: STP SW: TX: bpdu of type ieee-st size 92 on FastEthernet5/9 305
*Sep 30 08:47:33: SP: STP SW: TX: bpdu of type ieee-st size 92 on FastEthernet5/9 349
*Sep 30 08:47:33: SP: STP SW: TX: bpdu of type ieee-st size 92 on FastEthernet5/9 350
*Sep 30 08:47:33: SP: STP SW: TX: bpdu of type ieee-st size 92 on FastEthernet5/9 351
*Sep 30 08:47:33: SP: STP SW: TX: bpdu of type ieee-st size 92 on FastEthernet5/9 801
<... output truncated...>
Switch#
```

Related Commands

undebug spanning-tree switch (same as **no debug spanning-tree switch**)

debug spanning-tree uplinkfast

To enable debugging of spanning tree UplinkFast events, use the **debug spanning-tree uplinkfast** command. To disable debugging output, use the **no** form of this command.

debug spanning-tree uplinkfast [**exceptions**]

no debug spanning-tree uplinkfast

Syntax Description

exceptions	(Optional) Enables debugging of spanning tree UplinkFast exceptions.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

This command is supported only by the supervisor engine and can be entered only from the switch console.

Examples

This example shows how to debug spanning tree UplinkFast exceptions:

```
Switch# debug spanning-tree uplinkfast exceptions
Spanning Tree uplinkfast exceptions debugging is on
Switch#
```

Related Commands

undebug spanning-tree uplinkfast (same as **no debug spanning-tree uplinkfast**)

debug sw-vlan

To debug VLAN manager activities, use the **debug sw-vlan** command. To disable debugging output, use the **no** form of this command.

debug sw-vlan {**badpmcookies** | **events** | **management** | **packets** | **registries**}

no debug sw-vlan {**badpmcookies** | **events** | **management** | **packets** | **registries**}

Syntax Description

badpmcookies	Displays VLAN manager incidents of bad port-manager cookies.
events	Debugs VLAN manager events.
management	Debugs VLAN manager management of internal VLANs.
packets	Debugs packet handling and encapsulation processes.
registries	Debugs VLAN manager registries.

Defaults

This command has no default settings.

Command Modes

Privileged 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 debug software VLAN events:

```
Switch# debug sw-vlan events
vlan manager events debugging is on
Switch#
```

Related Commands

undebug sw-vlan (same as **no debug sw-vlan**)

debug sw-vlan ifs

To enable VLAN manager IOS file system (IFS) error tests, use the **debug sw-vlan ifs** command. To disable debugging output, use the **no** form of this command.

debug sw-vlan ifs {**open** {**read** | **write**} | **read** {**1** | **2** | **3** | **4**} | **write**}

no debug sw-vlan ifs {**open** {**read** | **write**} | **read** {**1** | **2** | **3** | **4**} | **write**}

Syntax Description

open	Enables VLAN manager IFS debugging of errors in an IFS file-open operation.
read	Debugs errors that occurred when the IFS VLAN configuration file was open for reading.
write	Debugs errors that occurred when the IFS VLAN configuration file was open for writing.
{**1** | **2** | **3** | **4**}	Determines the file-read operation. See "Usage Guidelines" for information about operation levels.
write	Debugs errors that occurred during an IFS file-write operation.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

The following are four types of file read operations:

- Operation **1**—Reads the file header, which contains the header verification word and the file version number.
- Operation **2**—Reads the main body of the file, which contains most of the domain and VLAN information.
- Operation **3**—Reads TLV descriptor structures.
- Operation **4**—Reads TLV data.

Examples

This example shows how to debug of TLV data errors during a file-read operation:

```
Switch# debug sw-vlan ifs read 4
vlan manager ifs read # 4 errors debugging is on
Switch#
```

Related Commands

undebug sw-vlan ifs (same as **no debug sw-vlan ifs**)

debug sw-vlan notification

To enable debugging messages that trace the activation and deactivation of ISL VLAN IDs, use the **debug sw-vlan notification** command. To disable debugging output, use the **no** form of this command.

debug sw-vlan notification {**accfwdchange** | **allowedvlancfgchange** | **fwdchange** | **linkchange** | **modechange** | **pruningcfgchange** | **statechange**}

no debug sw-vlan notification {**accfwdchange** | **allowedvlancfgchange** | **fwdchange** | **linkchange** | **modechange** | **pruningcfgchange** | **statechange**}

Syntax Description

accfwdchange	Enables VLAN manager notification of aggregated access interface STP forward changes.
allowedvlancfgchange	Enables VLAN manager notification of changes to allowed VLAN configuration.
fwdchange	Enables VLAN manager notification of STP forwarding changes.
linkchange	Enables VLAN manager notification of interface link state changes.
modechange	Enables VLAN manager notification of interface mode changes.
pruningcfgchange	Enables VLAN manager notification of changes to pruning configuration.
statechange	Enables VLAN manager notification of interface state changes.

Defaults

This command has no default settings.

Command Modes

Privileged 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 debug the software VLAN interface mode change notifications:

```
Switch# debug sw-vlan notification modechange
vlan manager port mode change notification debugging is on
Switch#
```

Related Commands

undebug sw-vlan notification (same as **no debug sw-vlan notification**)

debug sw-vlan vtp

To enable debugging messages to be generated by the VTP protocol code, use the **debug sw-vlan vtp** command. To disable debugging output, use the **no** form of this command.

debug sw-vlan vtp {**events** | **packets** | **pruning** [**packets** | **xmit**] | **xmit**}

no debug sw-vlan vtp {**events** | **packets** | **pruning** [**packets** | **xmit**] | **xmit**}

Syntax Description

events	Displays general-purpose logic flow and detailed VTP debugging messages generated by the VTP_LOG_RUNTIME macro in the VTP code.
packets	Displays the contents of all incoming VTP packets that have been passed into the VTP code from the IOS VTP platform-dependent layer, except for pruning packets.
pruning	Enables debugging message to be generated by the pruning segment of the VTP protocol code.
packets	(Optional) Displays the contents of all incoming VTP pruning packets that have been passed into the VTP code from the IOS VTP platform-dependent layer.
xmit	(Optional) Displays the contents of all outgoing VTP packets that the VTP code will request the IOS VTP platform-dependent layer to send.
xmit	Displays the contents of all outgoing VTP packets that the VTP code will request the IOS VTP platform-dependent layer to send; does not include pruning packets.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

If you do not enter any more parameters after entering **pruning**, the VTP pruning debugging messages are displayed.

Examples

This example shows how to debug software VLAN outgoing VTP packets:

```
Switch# debug sw-vlan vtp xmit
vtp xmit debugging is on
Switch#
```

Related Commands

undebug sw-vlan vtp (same as **no debug sw-vlan vtp**)

debug udld

To enable debugging of UDLD activity, use the **debug udld** command. To disable debugging output, use the **no** form of this command.

debug udld {**events** | **packets** | **registries**}

no debug udld {**events** | **packets** | **registries**}

Syntax Description

events	Enables debugging of UDLD process events as they occur.
packets	Enables debugging of the UDLD process as it receives packets from the packet queue and attempts to transmit packets at the request of the UDLD protocol code.
registries	Enables debugging of the UDLD process as it processes registry upcalls from the UDLD process-dependent module and other feature modules.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

This command is supported by the supervisor engine only and can be entered only from the Catalyst 4500 series switch console.

Examples

This example shows how to enable debugging of UDLD events:

```
Switch# debug udld events
UDLD events debugging is on
Switch#
```

This example shows how to enable debugging of UDLD packets:

```
Switch# debug udld packets
UDLD packets debugging is on
Switch#
```

This example shows how to enable debugging of UDLD registry events:

```
Switch# debug udld registries
UDLD registries debugging is on
Switch#
```

Related Commands

undebug udld (same as **no debug udld**)

debug vqpc

To debug VLAN Query Protocol (VQP), use the **debug vqpc** command. To disable debugging output, use the **no** form of this command.

debug vqpc [**all** | **cli** | **events** | **learn** | **packet**]

no debug vqpc [**all** | **cli** | **events** | **learn** | **packet**]

Syntax Description

all	(Optional) Debugs all VQP events.
cli	(Optional) Debugs VQP command line interface.
events	(Optional) Debugs VQP events.
learn	(Optional) Debugs VQP address learning.
packet	(Optional) Debugs VQP packets.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Examples

This example shows how to enable all PM debugging:

```
Switch# debug vqpc all
Switch#
```

Related Commands

vmps reconfirm (privileged EXEC)

define interface-range

To create a macro of interfaces, use the **define interface-range** command.

define interface-range *macro-name interface-range*

Syntax Description

macro-name	Name of the interface range macro; up to 32 characters.
interface-range	List of valid ranges when specifying interfaces; see "Usage Guidelines."

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

The macro name is a character string of up to 32 characters.

A macro can contain up to five ranges. An interface range cannot span modules.

When entering the *interface-range*, use these formats:

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

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

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

Examples

This example shows how to create a multiple-interface macro:

```
Switch(config)# define interface-range macro1 gigabitethernet 4/1-6, fastethernet 2/1-5
Switch(config)#
```

Related Commands

interface range

deny

To deny an ARP packet based on matches against the DHCP bindings, use the **deny** command. Use the **no** form of the command to remove specified ACEs from the access list.

deny {[**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 deny {[**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 *sender-ip*	Specifies that only a specific sender IP address will be accepted.
sender-ip sender-ip-mask	Specifies that a specific range of sender IP addresses will be accepted.
mac	Specifies the sender MAC address.
host *sender-mac*	Specifies that only a specific sender MAC address will be accepted.
sender-mac sender-mac-mask	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 *target-ip*	(Optional) Specifies that only a specific target IP address will be accepted.
target-ip target-ip-mask	(Optional) Specifies that a specific range of target IP addresses will be accepted.
mac	Specifies the MAC address values for the ARP responses.
host *target-mac*	(Optional) Specifies that only a specific target MAC address will be accepted.
target-mac target-mac-mask	(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

At the end of the ARP access list, there is an implicit **deny ip any mac any** command.

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

Deny clauses can be added to forward or drop ARP packets based on some matching criteria.

Examples

A host with a MAC address of 0000.0000.abcd has an IP address of 1.1.1.1. To deny both requests and responses from this host, define an access list as follows:

```
Switch(config)# arp access-list static-hosts
Switch(config-arp-nacl)# deny 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
    deny ip host 1.1.1.1 mac host 0000.0000.abcd
Switch#
```

Related Commands

arp access-list
ip arp inspection filter vlan
permit

diagnostic monitor action

To direct the action of the switch when it detects a packet memory failure, use the **diagnostic monitor action** command.

diagnostic monitor action [**conservative** | **normal** | **aggressive**]

Syntax Description

conservative	(Optional) The bootup SRAM diagnostics log all failures and remove all affected buffers from the hardware operation. The ongoing SRAM diagnostics will log events, but will take no other action.
normal	(Optional) The SRAM diagnostics operate as in conservative mode, except that an ongoing failure resets the supervisor engine. This action allows for the bootup tests to map out the affected memory.
aggressive	(Optional) The SRAM diagnostics operate as in normal mode, except that a bootup failure only logs failures and does not allow the supervisor engine to come online. This action allows for either a redundant supervisor engine or network-level redundancy to take over.

Defaults

normal mode

Command Modes

Global configuration mode

Command History

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

Usage Guidelines

Use the **conservative** keyword when you do not want the switch to reboot so that the problem can be fixed.

Use the **aggressive** keyword when you have redundant supervisor engines, or when network-level redundancy has been provided.

Examples

This example shows how to configure the switch to initiate an RPR switchover when an ongoing failure occurs:

```
Switch# configure terminal
Switch (config)# diagnostic monitor action normal
```

Related Commands

show diagnostic result module test 2
show diagnostic result module test 3

dot1x guest-vlan

To enable guest VLAN on a per-port basis use the **dot1x guest-vlan** command. To return to the default setting, use the **no** form of this command.

dot1x guest-vlan *vlan-id*

no dot1x guest-vlan *vlan-id*

Syntax Description

vlan-id	Specifies a VLAN in the range of 1 to 4094.

Defaults

The default value for the guest VLAN is 0.

Command Modes

Interface configuration

Command History

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

Usage Guidelines

Guest VLAN can be configured only on switch ports that are statically configured as an access port. Guest VLAN has the same restrictions as a dot1x port that has no trunk port, dynamic port, EtherChannel port, or SPAN destination port.

Examples

This example shows how to enable guest VLAN on Fast Ethernet interface 4/3:

```
Switch# config terminal
Switch(config)# interface fastethernet4/3
Switch(config-if)# dot1x port-control auto
Switch(config-if)# dot1x guest-vlan 26
Switch(config-if)# end
Switch(config)# end
Switch#
```

Related Commands

dot1x max-reauth-req
show dot1x

dot1x initialize

To unauthorize an interface before reinitializing 802.1x, use the **dot1x initialize** command.

dot1x initialize *interface*

Syntax Description

interface	The number of the interface.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

Use this command to initialize state machines and to set up the environment for fresh authentication.

Examples

This example shows how to initialize the 802.1x state machines on an interface:

```
Switch# dot1x initialize
Switch#
```

Related Commands

dot1x initialize
show dot1x

dot1x max-reauth-req

To set the maximum number of times the switch will retransmit an EAP-Request/Identity frame to the client before restarting the authentication process, use the **dot1x max-reauth-req** command. To return to the default setting, use the **no** form of this command.

dot1x max-reauth-req *count*

no dot1x max-reauth-req

Syntax Description

count	Number of times that the switch retransmits EAP-Request/Identity frames before restarting the authentication process; valid values are from 1 to 10.

Defaults

The switch sends a maximum of two retransmissions.

Command Modes

Interface configuration.

Command History

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

Usage Guidelines

You should change the default value of this command only to adjust for unusual circumstances such as unreliable links or specific behavioral problems with certain clients and authentication servers. This setting impacts the wait before a non-dot1x-capable client is admitted to the guest VLAN, if one is configured.

You can verify your settings by entering the **show dot1x** privileged EXEC command.

Examples

This example shows how to set 5 as the number of times that the switch retransmits an EAP-Request/Identity frame before restarting the authentication process:

```
Switch(config-if)# dot1x max-reauth-req 5
Switch(config-if)#
```

Related Commands

show dot1x

dot1x max-req

To set the maximum number of times the switch retransmits an Extensible Authentication Protocol (EAP)-Request frame of types other than EAP-Request/Identity to the client before restarting the authentication process, use the **dot1x max-req** command. To return to the default setting, use the **no** form of this command.

dot1x max-req *count*

no dot1x max-req

Syntax Description

count	Number of times that the switch retransmits EAP-Request frames of types other than EAP-Request/Identity before restarting the authentication process; valid values are from 1 to 10.

Defaults

The switch sends a maximum of two retransmissions.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(12c)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(19)EW	This command was modified to control on EAP-Request/Identity retransmission limits.

Usage Guidelines

You should change the default value of this command only to adjust for unusual circumstances such as unreliable links or specific behavioral problems with certain clients and authentication servers.

You can verify your settings by entering the **show dot1x** privileged EXEC command.

Examples

This example shows how to set 5 as the number of times that the switch retransmits an EAP-Request frame before restarting the authentication process:

```
Switch(config-if)# dot1x max-req 5
Switch(config-if)#
```

Related Commands

dot1x initialize
dot1x max-reauth-req
show dot1x

dot1x multiple-hosts

To allow multiple hosts (clients) on an 802.1x-authorized port that has the **dot1x port-control** interface configuration command set to **auto**, use the **dot1x multiple-hosts** command. To return to the default setting, use the **no** form of this command.

dot1x multiple-hosts

no dot1x multiple-hosts

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

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

This command enables you to attach multiple clients to a single 802.1x-enabled port. In this mode, only one of the attached hosts must be successfully authorized for all hosts to be granted network access. If the port becomes unauthorized (re-authentication fails, or an Extensible Authentication Protocol over LAN [EAPOL]-logoff message is received), all attached clients are denied access to the network.

Examples

This example shows how to enable 802.1x on Gigabit Ethernet 1/1 and to allow multiple hosts:

```
Switch(config)# interface gigabitethernet1/1
Switch(config-if)# dot1x port-control auto
Switch(config-if)# dot1x multiple-hosts
```

You can verify your settings by entering the **show dot1x** [**interface** *interface-id*] privileged EXEC command.

Related Commands

show dot1x

dot1x port-control

To enable manual control of the authorization state on a port, use the **dot1x port-control** command. To return to the default setting, use the **no** form of this command.

dot1x port-control {**auto** | **force-authorized** | **force-unauthorized**}

no dot1x port-control {**auto** | **force-authorized** | **force-unauthorized**}

Syntax Description

auto	Enables 802.1x authentication on the interface and causes the port to transition to the authorized or unauthorized state based on the 802.1x authentication exchange between the switch and the client.
force-authorized	Disables 802.1x authentication on the interface and causes the port to transition to the authorized state without any authentication exchange required. The port transmits and receives normal traffic without 802.1x-based authentication of the client.
force-unauthorized	Denies all access through the specified interface by forcing the port to transition to the unauthorized state, ignoring all attempts by the client to authenticate. The switch cannot provide authentication services to the client through the interface.

Defaults

The port 802.1x authorization 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

The 802.1x protocol is supported on both Layer 2 static-access ports and Layer 3-routed ports.

You can use the **auto** keyword only if the port is not configured as one of these:

- Trunk port—If you try to enable 802.1x on a trunk port, an error message appears, and 802.1x is not enabled. If you try to change the mode of an 802.1x-enabled port to trunk, the port mode is not changed.
- Dynamic ports—A port in dynamic mode can negotiate with its neighbor to become a trunk port. If you try to enable 802.1x on a dynamic port, an error message appears, and 802.1x is not enabled. If you try to change the mode of an 802.1x-enabled port to dynamic, the port mode is not changed.
- EtherChannel port—Before enabling 802.1x on the port, you must first remove it from the EtherChannel. If you try to enable 802.1x on an EtherChannel or on an active port in an EtherChannel, an error message appears, and 802.1x is not enabled. If you enable 802.1x on an inactive port of an EtherChannel, the port does not join the EtherChannel.

- Switch Port Analyzer (SPAN) destination port—You can enable 802.1x on a port that is a SPAN destination port; however, 802.1x is disabled until the port is removed as a SPAN destination. You can enable 802.1x on a SPAN source port.

To globally disable 802.1x on the switch, you must disable it on each port. There is no global configuration command for this task.

Examples

This example shows how to enable 802.1x on Gigabit Ethernet 1/1:

```
Switch(config)# interface gigabitethernet1/1
Switch(config-if)# dot1x port-control auto
Switch#
```

You can verify your settings by using **show dot1x all** or **show dot1x interface** *int* to show the port-control status. An enabled status indicates that the port-control value is set either to **auto** or to **force-unauthorized**.

Related Commands

show dot1x

dot1x re-authenticate

To manually initiate a reauthentication of all 802.1x-enabled ports or the specified 802.1x-enabled port, use the **dot1x re-authenticate** command.

dot1x re-authenticate [**interface** *interface-id*]

Syntax Description

interface *interface-id*	(Optional) Slot and port number of the interface.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

You can use this command to reauthenticate a client without waiting for the configured number of seconds between reauthentication attempts (re-authperiod) and automatic reauthentication.

Examples

This example shows how to manually reauthenticate the device connected to Gigabit Ethernet interface 1/1:

```
Switch# dot1x re-authenticate interface gigabitethernet1/1
Starting reauthentication on gigabitethernet1/1
Switch#
```

dot1x re-authentication

To enable periodic reauthentication of the client, use the **dot1x re-authentication** command. To return to the default setting, use the **no** form of this command.

dot1x re-authentication

no dot1x re-authentication

Syntax Description

This command has no arguments or keywords.

Defaults

The periodic reauthentication 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

You configure the amount of time between periodic reauthentication attempts by using the **dot1x timeout re-authperiod** global configuration command.

Examples

This example shows how to disable periodic reauthentication of the client:

```
Switch(config-if)# no dot1x re-authentication
Switch(config-if)#
```

This example shows how to enable periodic reauthentication and set the number of seconds between reauthentication attempts to 4000 seconds:

```
Switch(config-if)# dot1x re-authentication
Switch(config-if)# dot1x timeout re-authperiod 4000
Switch#
```

You can verify your settings by entering the **show dot1x** privileged EXEC command.

Related Commands

dot1x timeout
show dot1x

dot1x system-auth-control

To enable 802.1x authentication on the switch, use the **dot1x system-auth-control** command. To disable 802.1x authentication on the system, use the **no** form of this command.

dot1x system-auth-control

no dot1x system-auth-control

Syntax Description

This command has no arguments or keywords.

Defaults

The 802.1x authentication 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 **dot1x system-auth-control** if you want to use 802.1x access controls on any port on the switch. You can then use the **dot1x port-control auto** command on each specific port on which you want 802.1x access controls to be used.

Examples

This example shows how to enable 802.1x authentication:

```
Switch(config)# dot1x system-auth-control
Switch(config)#
```

Related Commands

dot1x initialize
show dot1x

dot1x timeout

To set the reauthentication timer, use the **dot1x timeout** command. To return to the default setting, use the **no** form of this command.

dot1x timeout {**reauth-period** *seconds* | **quiet-period** *seconds* | **tx-period** *seconds* | **supp-timeout** *seconds* | **server-timeout** *seconds*}

no dot1x timeout {**reauth-period** | **quiet-period** | **tx-period** | **supp-timeout** | **server-timeout**}

Syntax Description

reauth-period *seconds*	Number of seconds between reauthentication attempts; valid values are from 1 to 65535. See "Usage Guidelines" for more information.
quiet-period *seconds*	Number of seconds the switch remains in the quiet state following a failed authentication exchange with the client; valid values are from 0 to 65535 seconds.
tx-period *seconds*	Number of seconds the switch waits for a response to an EAP-request/identity frame from the client before retransmitting the request; valid values are from 15 to 65535 seconds.
supp-timeout *seconds*	Number of seconds the switch waits for the retransmission of EAP-Request packets; valid values are from 30 to 65535 seconds.
server-timeout *seconds*	Number of seconds the switch waits for the retransmission of packets by the backend authenticator to the authentication server; valid values are from 30 to 65535 seconds.

Defaults

The default settings are as follows:

- Reauthentication period is 3600 seconds.
- Quiet period is 60 seconds.
- Transmission period is 30 seconds.
- Supplicant timeout is 30 seconds.
- Server timeout is 30 seconds.

Command Modes

Interface configuration

Command History

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

Usage Guidelines

Periodic reauthentication must be enabled before entering the **dot1x timeout re-authperiod** command. Enter the **dot1x re-authentication** command to enable periodic reauthentication.

This example shows how to set 60 as the number of seconds that the switch waits for a response to an EAP-request/identity frame from the client before retransmitting the request:

```
Switch(config-if)# dot1x timeout tx-period 60
Switch(config-if)#
```

You can verify your settings by entering the **show dot1x** privileged EXEC command.

Related Commands

dot1x initialize
show dot1x

duplex

To configure the duplex operation on an interface, use the **duplex** command. To return to the default setting, use the **no** form of this command.

duplex {**auto** | **full** | **half**}

no duplex

Syntax Description

auto	Specifies autonegotiation operation.
full	Specifies full-duplex operation.
half	Specifies half-duplex operation.

Defaults

Half-duplex operation

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

Table 2-2 lists the supported command options by interface.

Table 2-2 Supported duplex Command Options

Interface Type	Supported Syntax	Default Setting	Guidelines
10/100-Mbps module	**duplex** [**half** | **full**]	**half**	If the speed is set to **auto**, you will not be able to set the **duplex** mode. If the speed is set to **10** or **100**, and you do not configure the duplex setting, the duplex mode is set to **half** duplex.
100-Mbps fiber modules	**duplex** [**half** | **full**]	**half**	
Gigabit Ethernet Interface	Not supported.	Not supported.	Gigabit Ethernet interfaces are set to **full** duplex.
10/100/1000	**duplex** [**half** | **full**]		If the speed is set to **auto** or **1000**, you will not be able to set **duplex**. If the speed is set to **10** or **100**, and you do not configure the duplex setting, the duplex mode is set to **half** duplex.

If the transmission speed on a 16-port RJ-45 Gigabit Ethernet port is set to **1000**, duplex mode is set to **full**. If the transmission speed is changed to **10** or **100**, the duplex mode stays at **full**. You must configure the correct duplex mode on the switch when the transmission speed changes to **10** or **100** from 1000 Mbps.

Note Catalyst 4006 switches cannot automatically negotiate interface speed and duplex mode if either connecting interface is configured to a value other than **auto**.

Caution Changing the interface speed and duplex mode configuration might shut down and reenable the interface during the reconfiguration.

Table 2-3 describes the system performance for different combinations of the duplex and speed modes. The specified **duplex** command configured with the specified **speed** command produces the resulting action shown in the table.

Table 2-3 Relationship Between duplex and speed Commands

duplex Command	speed Command	Resulting System Action
duplex half or **duplex full**	**speed auto**	Autonegotiates both speed and duplex modes
duplex half	**speed 10**	Forces 10 Mbps and half duplex
duplex full	**speed 10**	Forces 10 Mbps and full duplex
duplex half	**speed 100**	Forces 100 Mbps and half duplex
duplex full	**speed 100**	Forces 100 Mbps and full duplex
duplex full	**speed 1000**	Forces 1000 Mbps and full duplex

Examples

This example shows how to configure the interface for full-duplex operation:

```
Switch(config-if)# duplex full
Switch(config-if)#
```

Related Commands

speed
interface (refer to Cisco IOS documentation)
show controllers (refer to Cisco IOS documentation)
show interfaces (refer to Cisco IOS documentation)

errdisable detect

To enable error disable detection, use the **errdisable detect** command. To disable the error disable detection feature, use the **no** form of this command.

errdisable detect cause {**all** | **arp-inspection** | **dhcp-rate-limit** | **dtp-flap** | **gbic-invalid** | **l2ptguard** | **link-flap** | **pagp-flap**}

no errdisable detect cause {**all** | **arp-inspection** | **dhcp-rate-limit** | **dtp-flap** | **gbic-invalid** | **l2ptguard** | **link-flap** | **pagp-flap**}

Syntax Description

cause	Specifies error disable detection to detect from a specific cause.
all	Specifies error disable detection for all error-disable causes.
arp-inspection	Specifies detection for the ARP inspection error-disable cause.
dhcp-rate-limit	Specifies detection for the DHCP rate limit error-disable cause.
dtp-flap	Specifies detection for the DTP flap error-disable cause.
gbic-invalid	Specifies detection for the GBIC invalid error-disable cause.
l2ptguard	Specifies detection for the Layer 2 protocol-tunnel error-disable cause.
link-flap	Specifies detection for the link flap error-disable cause.
pagp-flap	Specifies detection for the PAgP flap error-disable cause.

Defaults

All error disable causes are detected.

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

A cause (dtp-flap, link-flap, pagp-flap) is defined as the reason the error-disabled state occurred. When a cause is detected on an interface, the interface is placed in error-disabled state (an operational state similar to link down state).

You must enter the **shutdown** command and then the **no shutdown** command to recover an interface manually from error disable.

Examples

This example shows how to enable error disable detection for the link-flap error disable cause:

```
Switch(config)# errdisable detect cause link-flap
Switch(config)#
```

To disable error disable detection for DAI, perform the following:

```
Switch(config)# no errdisable detect cause arp-inspection
Switch(config)# end
Switch# show errdisable detect
ErrDisable Reason    Detection status
-----------------    ----------------
udld                 Enabled
bpduguard            Enabled
security-violatio    Enabled
channel-misconfig    Disabled
psecure-violation    Enabled
vmps                 Enabled
pagp-flap            Enabled
dtp-flap             Enabled
link-flap            Enabled
l2ptguard            Enabled
gbic-invalid         Enabled
dhcp-rate-limit      Enabled
unicast-flood        Enabled
storm-control        Enabled
ilpower              Enabled
arp-inspection       Disabled
Switch#
```

Related Commands

show errdisable detect
show interfaces status

errdisable recovery

To configure the recovery mechanism variables, use the **errdisable recovery** command. To return to the default setting, use the **no** form of this command.

errdisable recovery [**cause** {**all** | **arp-inspection** | **bpduguard** | **channel-misconfig** | **dhcp-rate-limit** | **dtp-flap** | **gbic-invalid** | **l2ptguard** | **link-flap** | **pagp-flap** | **pesecure-violation** | **security-violation** | **storm-control** | **udld** | **unicastflood** | **vmps**} [**arp-inspection**] [**interval** {*interval*}]

no errdisable recovery [**cause** {**all** | **arp-inspection** | **bpduguard** | **channel-misconfig** | **dhcp-rate-limit** | **dtp-flap** | **gbic-invalid** | **l2ptguard** | **link-flap** | **pagp-flap** | **pesecure-violation** | **security-violation** | **storm-control** | **udld** | **unicastflood** | **vmps**} [**arp-inspection**] [**interval** {*interval*}]

Syntax Description

cause	(Optional) Enables error disable recovery to recover from a specific cause.
all	(Optional) Enables the recovery timers for all error disable causes.
arp-inspection	(Optional) Enables the recovery timer for the ARP inspection cause.
bpduguard	(Optional) Enables the recovery timer for the BPDU guard error-disable cause.
channel-misconfig	(Optional) Enables the recovery timer for the channel-misconfig error-disable cause.
dhcp-rate-limit	(Optional) Enables the recovery timer for the DHCP rate limit error-disable cause.
dtp-flap	(Optional) Enables the recovery timer for the DTP flap error-disable cause.
gbic-invalid	(Optional) Enables the recovery timer for the GBIC invalid error-disable cause.
l2ptguard	(Optional) Enables the recovery timer for the Layer 2 protocol-tunnel error-disable cause.
link-flap	(Optional) Enables the recovery timer for the link flap error-disable cause.
pagp-flap	(Optional) Enables the recovery timer for the PAgP flap error-disable cause.
pesecure-violation	(Optional) Enables the recovery timer for the pesecure violation error-disable cause.
security-violation	(Optional) Enables automatic recovery of ports disabled due to 802.1x security violations.
storm-control	(Optional) Enables the timer to recover from storm-control error-disable state.
udld	(Optional) Enables the recovery timer for the UDLD error-disable cause.
unicastflood	(Optional) Enables the recovery timer for the Unicast flood error-disable cause.
vmps	(Optional) Enables the recovery timer for the VMPS error-disable cause.
arp-inspection	(Optional) Enables ARP inspection cause and recovery timeout.
interval *interval*	(Optional) Specifies the time to recover from specified error-disable cause; valid values are from 30 to 86400 seconds.

Defaults

Error disable recovery is disabled.

The recovery interval is set to 300 seconds.

Command Modes

Configuration

Command History

Release	Modification
12.1(8a)EW	Support for this command was introduced on the Catalyst 4500 series switch.
12.1(19)EW	Support for the storm-control feature.

Usage Guidelines

A cause (bpduguard, dtp-flap, link-flap, pagp-flap, udld) is defined as the reason the error-disabled state occurred. When a cause is detected on an interface, the interface is placed in error-disabled state (an operational state similar to link-down state). If you do not enable error-disable recovery for the cause, the interface stays in error-disabled state until a shutdown and no shutdown occurs. If you enable recovery for a cause, the interface is brought out of error-disabled state and allowed to retry operation again once all the causes have timed out.

You must enter the **shutdown** command and then the **no shutdown** command to recover an interface manually from error disable.

Examples

This example shows how to enable the recovery timer for the BPDU guard error disable cause:

```
Switch(config)# errdisable recovery cause bpduguard
Switch(config)#
```

This example shows how to set the timer to 300 seconds:

```
Switch(config)# errdisable recovery interval 300
Switch(config)#
```

To enable errdisable recovery for arp-inspection, do the following:

```
Switch(config)# errdisable recovery cause arp-inspection
Switch(config)# end
Switch# show errdisable recovery
ErrDisable Reason    Timer Status
-----------------    --------------
udld                 Disabled
bpduguard            Disabled
security-violatio    Disabled
channel-misconfig    Disabled
vmps                 Disabled
pagp-flap            Disabled
dtp-flap             Disabled
link-flap            Disabled
l2ptguard            Disabled
psecure-violation    Disabled
gbic-invalid         Disabled
dhcp-rate-limit      Disabled
unicast-flood        Disabled
storm-control        Disabled
arp-inspection       Enabled
```

```
Timer interval: 300 seconds

Interfaces that will be enabled at the next timeout:

Switch#
```

Related Commands

show errdisable recovery
show interfaces status

flowcontrol

To configure a Gigabit Ethernet interface to send or receive pause frames, use the **flowcontrol** command. To disable the flow control setting, use the **no** form of this command.

flowcontrol {**receive** | **send**} {**off** | **on** | **desired**}

no flowcontrol {**receive** | **send**} {**off** | **on** | **desired**}

Syntax Description

receive	Specifies that the interface processes pause frames.
send	Specifies that the interface sends pause frames.
off	Prevents a local port from receiving and processing pause frames from remote ports or from sending pause frames to remote ports.
on	Enables a local port to receive and process pause frames from remote ports or send pause frames to remote ports.
desired	Obtains predictable results whether a remote port is set to on, off, or desired.

Defaults

The default settings for Gigabit Ethernet interfaces are as follows:

- Sending pause frames is desired—Gigabit Ethernet interfaces.
- Receiving pause frames is off—Gigabit Ethernet interfaces.
- Sending pause frames is on—oversubscribed Gigabit Ethernet interfaces.
- Receiving pause frames is desired—oversubscribed Gigabit Ethernet interfaces

Table 2-4 shows the default settings for modules:

Table 2-4 Default Module Settings

Module	Ports	Send
All modules except WS-X4418-GB, WS-X4412-2GB-TX, and WS-X4416-2GB-TX	All ports except for the oversubscribed ports (1–18)	No
WS-X4418-GB	Uplink ports (1–2)	No
WS-X4418-GB	Oversubscribed ports (3–18)	Yes
WS-X4412-2GB-TX	Uplink ports (13–14)	No
WS-X4412-2GB-TX	Oversubscribed ports (1–12)	Yes
WS-X4416-2GB-TX	Uplink ports (17–18)	No

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

Pause frames are special packets that signal a source to stop sending frames for a specific period of time because the buffers are full.

Table 2-5 describes guidelines for using different configurations of the **send** and **receive** keywords with the **flowcontrol** command.

Table 2-5 Keyword Configurations for send and receive

Configuration	Description
send on	Enables a local port to send pause frames to remote ports. To obtain predictable results, use **send on** only when remote ports are set to **receive on** or **receive desired**.
send off	Prevents a local port from sending pause frames to remote ports. To obtain predictable results, use **send off** only when remote ports are set to **receive off** or **receive desired**.
send desired	Obtains predictable results whether a remote port is set to **receive on**, **receive off**, or **receive desired**.
receive on	Enables a local port to process pause frames that a remote port sends. To obtain predictable results, use **receive on** only when remote ports are set to **send on** or **send desired**.
receive off	Prevents remote ports from sending pause frames to local port. To obtain predictable results, use **send off** only when remote ports are set to **receive off** or **receive desired**.
receive desired	Obtains predictable results whether a remote port is set to **send on**, **send off**, or **send desired**.

Table 2-6 identifies how flow control will be forced or negotiated on Gigabit Ethernet interfaces based on their speed settings.

Note Catalyst 4006 switches support flow control only on gigabit interfaces.

Table 2-6 Send Capability by Switch Type, Module, and Port

Interface Type	Configured Speed	Advertised Flow Control
10/100/1000BASE-TX	Speed 1000	Configured flow control always
1000BASE-T	Negotiation always enabled	Configured flow control always negotiated
1000BASE-X	No speed nonegotiation	Configured flow control negotiated
1000BASE-X	Speed nonegotiation	Configured flow control forced

Examples

This example shows how to enable send flow control:

```
Switch(config-if)# flowcontrol receive on
Switch(config-if)#
```

This example shows how to disable send flow control:

```
Switch(config-if)# flowcontrol send off
Switch(config-if)#
```

This example shows how to set receive flow control to desired:

```
Switch(config-if)# flowcontrol receive desired
Switch(config-if)#
```

Related Commands

interface port-channel
interface range
interface vlan
show flowcontrol
show running-config (refer to Cisco IOS Documentation)
speed

hw-module power

To turn the power off on a slot or line module, use the **no hw-module power** command. To turn the power back on, use the **hw-module power** command.

hw-module [**slot** | **module**] *number* **power**

no hw-module [**slot** | **module**] *number* **power**

Syntax Description

slot	(Optional) Specifies a slot on a chassis.
module	(Optional) Specifies a line module.
number	(Optional) Specifies the slot or module number.

Defaults

After a boot up, the power is on.

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(18)EW	Add slot and module keywords.

Examples

This example shows how to shut off power to a module in slot 5:

```
Switch# no hw-module slot 5 power
Switch#
```

Related Commands

clear hw-module slot password

instance

To map a VLAN or a set of VLANs to an MST instance, use the **instance** command. To return the VLANs to the common instance default, use the **no** form of this command.

instance *instance-id* {**vlans** *vlan-range*}

no instance *instance-id*

Syntax Description

instance-id	MST instance to which the specified VLANs are mapped; valid values are from 0 to 15.
vlans *vlan-range*	Specifies the 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.

Defaults

Mapping is disabled.

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

The mapping is incremental, not absolute. This means that when you enter a range of VLANs, this range is added or removed to the existing ones.

Any unmapped VLAN is mapped to the CIST instance.

Examples

This example shows how to map a range of VLANs to instance 2:

```
Switch(config-mst)# instance 2 vlans 1-100
Switch(config-mst)#
```

This example shows how to map a VLAN to instance 5:

```
Switch(config-mst)# instance 5 vlans 1100
Switch(config-mst)#
```

This example shows how to move a range of VLANs from instance 2 to the CIST instance:

```
Switch(config-mst)# no instance 2 vlans 40-60
Switch(config-mst)#
```

This example shows how to move all the VLANs mapped to instance 2 back to the CIST instance:

```
Switch(config-mst)# no instance 2
Switch(config-mst)#
```

Related Commands

name
revision
show spanning-tree mst
spanning-tree mst configuration