set port flowcontrol

To set the receive flow-control value for a particular Gigabit Ethernet switching module port, use the **set port flowcontrol** command in privileged EXEC mode. To reset the receive flow-control value to the default, use the **no** form of this command.

set port flowcontrol {**receive** | **send**} [*module-number* | *port-number*] {**off** | **on** | **desired**}

no set port flowcontrol {**receive** | **send**} [*module-number* | *port-number*] {**off** | **on** | **desired**}

Syntax Description

receive	Indicates whether the port can receive administrative status from a remote device.
send	Indicates whether the local port can send administrative status to a remote device.
module-number	(Optional) Number of the module.
port-number	(Optional) Number of the port on the module.
off	When used with **receive**, it turns off an attached device's ability to send flow-control packets to a local port. When used with **send**, it turns off the local port's ability to send administrative status to a remote device.
on	When used with **receive**, it requires that a local port receive administrative status from a remote device. When used with **send**, the local port sends administrative status to a remote device.
desired	When used with **receive**, it allows a local port to operate with an attached device that is required to send flow-control packets or with an attached device that is not required to, but may send flow-control packets. When used with **send**, the local port sends administrative status to a remote device if the remote device supports it.

Command Default

receive—off
send—desired

Default on multiplexed ports is **on**. The exception to these defaults applies to the 18-port Gigabit Ethernet switching module. For this module, the defaults are shown below:

- Ports 1–2—**send** is **off** and **receive** is **desired**
- Ports 3–18—**send** is **on** and **receive** is **desired**

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(11)T	This command was introduced and implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.

Usage Guidelines

This command is supported only on Gigabit Ethernet switching modules.

Examples

The following examples show how to use the **set port flowcontrol** command set.

The following example show how to set the port 5/1 flow-control receive administration status to **on** (port requires far end to send flow-control packets):

```
Router# set port flowcontrol receive 5/1 on
```

The following example show how to set the port 5/1 flow-control receive administration status to **desired** (port allows far end to send flow-control packets if far end supports it):

```
Router# set port flowcontrol receive 5/1 desired
```

The following example show how to set the port 5/1 flow-control receive administration status to **off** (port does not allow far end to send flow-control packets):

```
Router# set port flowcontrol receive 5/1 off
```

The following example show how to set port 5/1 flow-control send administration status t o **on** (port sends flow-control packets to far end):

```
Router# set port flowcontrol send 5/1 on
```

The following example show how to set port 5/1 flow-control send administration status to **desired** (port sends flow-control packets to far end if far end supports it):

```
Router# set port flowcontrol send 5/1 desired
```

The following example show how to set port 5/1 flow-control send administration status to **off** (port does not send flow-control packets to far end):

```
Router# set port flowcontrol send 5/1 off
```

Related Commands

Command	Description
show port flowcontrol	Displays per-port status information and statistics related to flow control.

set vlan

To group ports into a virtual LAN (VLAN), use the **set vlan** *vlan-number module/port* command in privileged EXEC mode.

set vlan *vlan-number module/port*

To set advanced VLAN options for VLANs, use the advanced keywords.

set vlan *vlan-number* [**name** *name*] [**type** {**ethernet** | **fddi** | **fddinet** | **trcrf** | **trbrf**}] [**state** {**active** | **suspend**}] [**sa-id** *sa-id*] [**mtu** *mtu*] [**ring** *hex-ring-number*] [**decring** *decimal-ring-number*] [**bridge** *bridge-number*] [**parent** *vlan-number*] [**mode** {**srt** | **srb**}] [**stp** {**ieee** | **ibm** | **auto**}] [**translation** *vlan-number*] [**backupcrf** {**off** | **on**}] [**aremaxhop** *hop-count*] [**stemaxhop** *hop-count*]

Syntax Description

vlan-number	Number identifying the VLAN.
module	Number of the module.
port	Number of the port on the module belonging to the VLAN; this argument does not apply to TRBRFs.
name *name*	(Optional) Defines a text string used as the name of the VLAN (1 to 32 characters).
type {**ethernet** | **fddi** | **fddinet** | **trcrf** | **trbrf**}	(Optional) Identifies the VLAN type. The default type is Ethernet.
state {**active** | **suspend**}	(Optional) Specifies whether the state of the VLAN is active or suspended. VLANs in suspended state do not pass packets. The default state is active.
sa-id *sa-id*	(Optional) Specifies the security association identifier. Possible values are 1 to 4294967294. The default is 100001 for VLAN1, 100002 for VLAN 2, 100003 for VLAN 3, and so on. This argument does not apply to Token Ring Concentrator Relay Functions (TRCRFs) or TRBRFs.
mtu *mtu*	(Optional) Specifies the maximum transmission unit (packet size, in bytes) that the VLAN can use. Possible values are 576 to 18190.
ring *hex-ring-number*	(Optional) Specifies the logical ring number for Token Ring VLANs. Possible values are hexadecimal numbers 0x1 to 0xFFF. This argument is valid and required only when you define a TRCRF.
decring *decimal-ring-number*	(Optional) Specifies the logical ring number for Token Ring VLANs. Possible values are decimal numbers 1 to 4095. This argument is valid and required only when you define a TRCRF.
bridge *bridge-number*	(Optional) Specifies the identification number of the bridge. Possible values are hexadecimal numbers 0x1 to 0xF.
parent *vlan-number*	(Optional) Sets a parent VLAN. The range for *vlan-number* is 2 to 1005. This argument identifies the TRBRF to which a TRCRF belongs and is required when you define a TRCRF.
mode {**srt** | **srb**}	(Optional) Specifies the TRCRF bridging mode.
stp {**ieee** | **ibm** | **auto**}	(Optional) Specifies the Spanning Tree Protocol version for a TRBRF to use: source-routing transparent (ieee), source-route bridging (ibm), or automatic source selection (auto).

translation *vlan-number*	(Optional) Specifies a VLAN used to translate FDDIto Ethernet. Valid values are from 1 to 1005. This argument is not valid for defining or configuring Token Ring VLANs.
backupcrf {**off** | **on**}	(Optional) Specifies whether the TRCRF is a backup path for traffic.
aremaxhop *hop-count*	(Optional) Specifies the maximum number of hops for All-Routes Explorer frames. Possible values are 1 to 14. The default is 7. This argument is valid only when you define or configure TRCRFs.
stemaxhop *hop-count*	(Optional) Specifies the maximum number of hops for Spanning-Tree Explorer frames. Possible values are 1 to 14. The default is 7. This argument is valid only when you define or configure TRCRFs.

Command Default

The default configuration has all switched Ethernet ports and Ethernet repeater ports in VLAN 1. Additional defaults are:

- SAID: 100001 for VLAN 1, 100002 for VLAN 2, 100003 for VLAN 3, and so on
- Type: Ethernet
- MTU: 1500 bytes
- State: Active

Defaults for TRBRFs and TRCRFs are:

- TRBRF : 1005
- TRCRF: 1003
- MTU for TRBRFs and TRCRFs : 4472.
- State: Active.
- **aremaxhop**: 7
- **stemaxhop**: 7.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

You cannot use the **set vlan** command until the networking device is in Virtual Trunking Protocol (VTP) transparent mode (**set vtp mode**) or until a VTP domain name has been set (**set vtp**).

Valid MTU values for a Token Ring VLAN are 1500 or 4472. You can enter any value but it defaults to the next lowest valid value.

You cannot set multiple VLANs for Inter-Switch Link (ISL) ports using this command. The VLAN name can be from 1 to 32 characters in length. If you add a new VLAN, the VLAN number must be within the range of 2 to 1001. When you modify a VLAN, the valid range for the VLAN number is 2 to 1005.

On a new Token Ring VLAN, if you do not specify the parent parameter for a TRCRF, the default TRBRF (1005) is used.

Examples

The following example shows how to set VLAN 850 to include ports 4 through 7 on module 3. Because ports 4 through 7 were originally assigned to TRCRF 1003, the message reflects the modification of VLAN 1003.

```
Router# set vlan 850 3/4-7
VLAN 850 modified.
VLAN 1003 modified.
VLAN  Mod/Ports
---- ----------------------
850   3/4-7
```

Related Commands

Command	Description
clear vlan	Deletes an existing VLAN from a management domain.
show vlans	Displays VLAN subinterfaces.

set vlan mapping

To map 802.1Q virtual LANs (VLANs) to Inter-Switch Link (ISL) VLANs, use the **set vlan mapping** command in privileged EXEC mode.

set vlan mapping dot1q *1q-vlan-number* **isl** *isl-vlan-number*

Syntax Description

dot1q	Specifies the 802.1Q VLAN.
1q-vlan-number	Number identifying the 802.1Q VLAN; valid values are 1001 to 4095.
isl	Specifies the ISL VLAN.
isl-vlan-number	Number identifying the ISL VLAN; valid values are 1 to 1000.

Command Default

No 802.1Q-to-ISL mappings are defined.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

IEEE 802.1Q VLAN trunks support VLANs 1 through 4095. ISL VLAN trunks support VLANs 1 through 1000. The switch automatically maps 802.1Q VLANs 1000 and lower to ISL VLANs with the same number.

The native VLAN of the 802.1Q trunk cannot be used in the mapping.

Use this feature to map 802.1Q VLANs above 1000 to ISL VLANs. If you map an 802.1Q VLAN over 1000 to an ISL VLAN, the corresponding 802.1Q VLAN will be blocked. For example, if you map 802.1Q VLAN 2000 to ISL VLAN 200, then 802.1Q VLAN 200 will be blocked.

You can map up to seven VLANs. Only one 802.1Q VLAN can be mapped to an ISL VLAN. For example, if 802.1Q VLAN 800 has been automatically mapped to ISL VLAN 800, do not manually map any other 802.1Q VLANs to ISL VLAN 800.

You cannot overwrite existing 802.1Q VLAN mapping. If the 802.1Q VLAN number is in the mapping table, the command is aborted. You must first clear that mapping.

If *vlan-number* does not exist, then either of the following occurs:

- If the switch is in server or transparent mode, the VLAN is created with all default values.
- If the switch is in client mode, then the command proceeds without creating the VLAN. A warning is given indicating that the VLAN does not exist.

If the table is full, the command is aborted with an error message indicating the table is full.

Examples

The following example shows how to map VLAN 1022 to ISL VLAN 850:

```
Router# set vlan mapping dot1q 1022 isl 850
Vlan 850 configuration successful
Vlan mapping successful
```

The following example shows the display if you enter a VLAN that does not exist:

```
Router# set vlan mapping dot1q 1017 isl 999
Vlan mapping successful
Warning: vlan 999 non-existent
Vlan 999 configuration successful
```

The following example shows the display if you enter an existing mapping:

```
Router# set vlan mapping dot1q 1033 isl 722
722 exists in the mapping table. Please clear the mapping first.
```

The following example shows the display if the mapping table is full:

```
Router# set vlan mapping dot1q 1099 isl 917
Vlan Mapping Table Full.
```

Related Commands

Command	Description
clear vlan mapping	Deletes existing 802.1Q VLAN to ISL VLAN-mapped pairs.
show vlans	Displays VLAN subinterfaces.

show

To verify the Multiple Spanning Tree (MST) configuration, use the **show** command in MST configuration mode.

show [**current** | **pending**]

Syntax Description

current	(Optional) Displays the current configuration that is used to run MST.
pending	(Optional) Displays the edited configuration that will replace the current configuration.

Command Default

This command has no default settings.

Command Modes

MST configuration (config-mst)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The display output from the **show pending** command is the edited configuration that will replace the current configuration if you enter the **exit** command to exit MST configuration mode.

Entering the **show** command with no arguments displays the pending configurations.

Examples

This example shows how to display the edited configuration:

```
Router(config-mst)# show pending

Pending MST configuration
Name      [zorglub]
Version   31415
Instance  Vlans Mapped
--------  ---------------------------------------------------------------------
0         4001-4096
2         1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110
          1120
3         1-1009, 1011-1019, 1021-1029, 1031-1039, 1041-1049, 1051-1059
          1061-1069, 1071-1079, 1081-1089, 1091-1099, 1101-1109, 1111-1119
          1121-4000
-------------------------------------------------------------------------------
Router(config-mst)#
```

This example shows how to display the current configuration:

```
Router(config-mst)# show current

Current MST configuration
Name []
Revision 0
Instance Vlans mapped
-------- ---------------------------------------------------------------------
0 1-4094
--------------------------------------------------------------------------------
```

Related Commands

Command	Description
instance	Maps a VLAN or a set of VLANs to an MST instance.
name (MST configuration submode)	Sets the name of an MST region.
revision	Sets the revision number for the MST configuration.
show spanning-tree mst	Displays the information about the MST protocol.
spanning-tree mst configuration	Enters MST-configuration submode.

show controllers fastethernet

To display information about initialization block, transmit ring, receive ring, Fast Ethernet interface information, applicable MAC destination address and VLAN filtering tables, and errors for the Fast Ethernet controller chip, use the **show controllers fastethernet** command in user EXEC or privileged EXEC mode.

Standard Syntax

show controllers fastethernet *number*

Cisco 7200 Series

show controllers fastethernet *slot*/*port*

Cisco 7500 Series

show controllers fastethernet *slot*/*port-adapter*/*port*

Shared Port Adapter

show controllers fastethernet *slot*/*subslot*/*port* [**detail**]

Syntax Description

number	Port, connector, or interface card number. On a Cisco 4500 or Cisco 4700 router, specifies the network processor module (NPM) number. The numbers are assigned at the factory at the time of installation or when added to a system.
slot	Slot number. Refer to the appropriate hardware manual for slot information.
/*port*	Port number. Refer to the appropriate hardware manual for port information.
/*port-adapter*	Port adapter number. Refer to the appropriate hardware manual for information about port adapter compatibility.
/*subslot*	(Optional) Secondary slot number on a jacket card where a SPA is installed.
detail	Specifies display of additional low-level diagnostic information.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
11.2	This command was introduced.
12.2S	This command was integrated into Cisco IOS Release 12.2S.
12.2(20)S2	This command was implemented on the 4-Port 10/100 Fast Ethernet SPA on the Cisco 7304 router and introduced a new address format and output.

Release	Modification
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The output from this command is generally useful for diagnostic tasks performed by technical support.

Shared Port Adapter Usage Guidelines

The output from the **show controllers fastethernet** command for the 4-Port 10/100 Fast Ethernet SPA provides several different sections of information and statistics that are organized according to the internal hardware devices and the various paths in the flow of data on the SPA. The following sections are provided:

- Interface configuration information—Table 6 on page 182
- Media Access Control (MAC) device counters—Table 7 on page 184
- Field programmable gate array (FPGA) device counters—Table 8 on page 184
- SPA carrier card counters—Table 9 on page 185
- SPA error counters—Table 10 on page 186
- MAC destination address filtering table—Table 11 on page 187
- Virtual LAN (VLAN) filtering table—Table 12 on page 188
- Platform details (including Parallel Express Forwarding [PXF] information)—Table 13 on page 189

Several areas of the output are generally useful for diagnostic tasks performed by Cisco Systems technical support personnel only.

Examples

The following is a sample output from the **show controllers fastethernet** command on a Cisco 4500 series router:

```
Router# show controllers fastethernet 0

DEC21140 Slot 0, Subunit 0
dec21140_ds=0x60001234, registers=0x3c001000, ib=0x42301563, ring entries=256
rxring=0x40235878, rxr shadow=0x64528745, rx_head=0, rx_tail=10
txring=0x43562188, txr shadow=0x65438721, tx_head=17, tx_tail=34, tx_count=17
DEC21140 Registers
CSR0=0x23457667, CSR3=0x12349878, CSR4=0x34528745, CSR5=0x76674565
CSR6=0x76453676, CSR7=0x76456574, CSR8=0x25367648, CSR9=0x87253674
CSR11=0x23456454, CSR12=0x76564787, CSR15=0x98273465
DEC21140 PCI registers
bus_no=0, device_no=0
CFID=0x12341234, CFCS=0x76547654, CFRV=0x87658765, CFLT=0x98769876
CBIO=0x12344321, CBMA=0x23454321, CFIT=0x34567654, CFDA=0x76544567
MII registers
Register 0x00: 0x1234 0x1234 0x2345 0x3456 0x4567 0x5678 0x6789 0x7890
Register 0x08: 0x9876 0x8765 0x7654 0x6543 0x5432 0x4321 0x3210 0x2109
Register 0x10: 0x1234 0x2345 0x3456            0x4567 0x5678 0x6789 0x7890
Register 0x18: 0x9876 0x8765 0x7654 0x6543 0x5432 0x4321
DEC21140 statistics
filtered_in_sw=1000, throttled=10, enabled=10
rx_fifo_overflow=10, rx_no_enp=12, rx_late_collision=18
```

```
rx_watchdog=15, rx_process_stopped=15, rx_buffer_unavailable=1500
tx_jabber_timeout=10, tx_carrier_loss=2, tx_deffered=15
tx_no_carrier=1, tx_late_collision=10, tx_excess_coll=10
tx_process_stopped=1, fata_tx_err=0
```

The following is a sample output from the **show controllers fastethernet** command on a Cisco AS5300 router:

```
Router# show controller fastethernet 0

DEC21140
Setup Frame
 (0 ) 00e0.1e3e.c179
 (1 ) 0100.0ccc.cccc
 (2 ) 0900.2b00.000f
 (3 ) 0900.2b02.0104
 (4 ) 0300.0000.0001
 dec21140_ds=0x60BD33B8, registers=0x3C210000, ib=0x4002F75C, ring entries=32
 rxring=0x4002F844, rxr shadow=0x60F14B58, rx_head=6, rx_tail=6
 txring=0x4002FA6C, txr shadow=0x60F14BF8, tx_head=10, tx_tail=10, tx_count=0
 tx_size=32, rx_size=32
 PHY link up
 DEC21140 Registers:
 CSR0=0xFE024480, CSR3=0x4002F844, CSR4=0x4002FA6C, CSR5=0xFC660000
 CSR6=0x322C2002, CSR7=0xFFFFA241, CSR8=0xE0000000, CSR9=0xFFFDC3FF
 CSR11=0xFFFE0000, CSR12=0xFFFFFF09, CSR15=0xFFFFFEC8
 DEC21140 PCI registers:
  bus_no=2, device_no=0
  CFID=0x00091011, CFCS=0x82800005, CFRV=0x02000021, CFLT=0x0000FF00
  CBIO=0x3C210001, CBMA=0x00000000, CFIT=0x28140100, CFDA=0x00000000

 MII registers:
  Register 0x00:   0000  784D  2000  5C01  0001  0000  0000  0000
  Register 0x08:   0000  0000  0000  0000  0000  0000  0000  0000
  Register 0x10:   0000  0000  0000  0000        0000  0001  8060
  Register 0x18:   8020  0840  0000  3000  A3B9

 throttled=7, enabled=7
 rx_fifo_overflow=0, rx_no_enp=0, late_collision=0
 rx_watchdog=0, rx_process_stopped=0, rx_buffer_unavailable=0
 tx_jabber_timeout=0, tx_carrier_loss=1, tx_deferred=0
 tx_no_carrier=1, tx_late_collision=0, tx_excess_coll=0
 tx_process_stopped=0, fatal_tx_err=0
 overflow_resets=0
0 missed datagrams, 0 overruns
0 transmitter underruns, 0 excessive collisions
0 single collisions, 0 multiple collisions
0 dma memory errors, 0 CRC errors

0 alignment errors, 0 runts, 0 giants
```

The following is a sample output from the **show controllers fastethernet** command on a Cisco 7200 series router:

```
Router# show controllers fastethernet 0/0

Interface Fast Ethernet0/0
Hardware is DEC21140
 dec21140_ds=0x60895888, registers=0x3C018000, ib=0x4B019500
 rx ring entries=128, tx ring entries=128
 rxring=0x4B019640, rxr shadow=0x60895970, rx_head=0, rx_tail=0
 txring=0x4B019EC0, txr shadow=0x60895B98, tx_head=77, tx_tail=77, tx_count=0
 CSR0=0xFFFA4882, CSR3=0x4B019640, CSR4=0x4B019EC0, CSR5=0xFC660000
 CSR6=0xE20CA202, CSR7=0xFFFFA241, CSR8=0xFFFE0000, CSR9=0xFFFDD7FF
```

```
 CSR11=0xFFFE0000, CSR12=0xFFFFFF98, CSR15=0xFFFFFEC8
 DEC21140 PCI registers:
  bus_no=0, device_no=6
  CFID=0x00091011, CFCS=0x02800006, CFRV=0x02000012, CFLT=0x0000FF00
  CBIO=0x7C5AFF81, CBMA=0x48018000, CFIT=0x0000018F, CFDA=0x0000AF00
 MII registers:
  Register 0x00:   2000  780B  2000  5C00  01E1  0000  0000  0000
  Register 0x08:   0000  0000  0000  0000  0000  0000  0000  0000
  Register 0x10:   0000  0000  0000  0000        0000  0000  8040
  Register 0x18:   8000  0000  0000  3800  A3B9
 throttled=0, enabled=0, disabled=0
 rx_fifo_overflow=0, rx_no_enp=0, rx_discard=0
 tx_underrun_err=0, tx_jabber_timeout=0, tx_carrier_loss=1
 tx_no_carrier=1, tx_late_collision=0, tx_excess_coll=0
 tx_collision_cnt=0, tx_deferred=0, fatal_tx_err=0, mult_ovfl=0
HW addr filter: 0x60895FC0, ISL Enabled
  Entry= 0: Addr=0100.0CCC.CCCC
  Entry= 1: Addr=0300.0000.0001
  Entry= 2: Addr=0100.0C00.0000
  Entry= 3: Addr=FFFF.FFFF.FFFF
  Entry= 4: Addr=FFFF.FFFF.FFFF
  Entry= 5: Addr=FFFF.FFFF.FFFF
  Entry= 6: Addr=FFFF.FFFF.FFFF
  Entry= 7: Addr=FFFF.FFFF.FFFF
  Entry= 8: Addr=FFFF.FFFF.FFFF
  Entry= 9: Addr=FFFF.FFFF.FFFF
  Entry=10: Addr=FFFF.FFFF.FFFF
  Entry=11: Addr=FFFF.FFFF.FFFF
  Entry=12: Addr=FFFF.FFFF.FFFF
  Entry=13: Addr=FFFF.FFFF.FFFF
  Entry=14: Addr=FFFF.FFFF.FFFF
  Entry=15: Addr=0060.3E28.6E00
```

Shared Port Adapter Examples

The following is sample output from the **show controllers fastethernet** command for the first interface (port 0) on a 4-Port 10/100 Fast Ethernet SPA that is located in the top subslot (0), of the MSC that is installed in slot 4 on a Cisco 7304 router:

```
Router# show controllers fastethernet 4/0/0

Interface FastEthernet4/0/0
  Hardware is SPA-4FE-7304
  Connection mode is auto-negotiation
  Interface state is up, link is up
  Configuration is Auto Speed, Auto Duplex
  Selected media-type is RJ45
  Promiscuous mode is off, VLAN filtering is enabled
  MDI crossover status: MDI
  Auto-negotiation configuration and status:
    Auto-negotiation is enabled and is completed
    Speed/duplex is resolved to 100 Mbps, full duplex
    Advertised capabilities: 10M/HD 10M/FD 100M/HD 100M/FD Pause capable (Asymmetric)
    Partner capabilities: 10M/HD 10M/FD 100M/HD 100M/FD Pause capable
MAC counters:
  Input: packets = 15, bytes = 1776
         FIFO full/reset removed = 0, error drop = 0
  Output: packets = 18, bytes = 2622
          FIFO full/reset removed = 0, error drop = 0
  Total pause frames: transmitted = 0, received = 0
FPGA counters:
  Input: Total (good & bad) packets: 15, TCAM drops: 4
         Satisfy (host-backpressure) drops: 0, CRC drops: 0
         PL3 RERRs: 0
```

```
  Output: EOP (SPI4) errors: 0
SPA carrier card counters:
  Input: packets = 11, bytes = 1476, drops = 0
  Output: packets = 18, bytes = 2550, drops = 0
  Egress flow control status: XON
  Per bay counters:
  General errors: input = 0, output = 0
  SPI4 errors: ingress dip4 = 0, egress dip2 = 0
SPA Error counters:
  SPI4 TX out of frame error = 2 (00:02:31 ago)
  SPI4 TX Train valid error = 1 (00:02:11 ago)
  SPI4 TX DIP4 error = 1 (00:01:30 ago)
  SPI4 RX out of frame error = 1 (00:00:36 ago)
  SPI4 RX DIP2 error = 1 (00:00:13 ago)
MAC destination address filtering table:
  Table entries: Total = 512, Used = 4, Available = 508
  Index MAC destination address       Mask
  ----- ----------------------  --------------
  1     0007.0ed3.ba80          ffff.ffff.ffff
  2     ffff.ffff.ffff          ffff.ffff.ffff
  3     0100.0000.0000          0100.0000.0000
  4     0100.0ccc.cccc          ffff.ffff.ffff
VLAN filtering table:
  Number of VLANs configured on this interface = 0
  Table entries: Total = 1024, Used = 2, Available = 1022
  Index  VLAN identifier  Enabled  Tunnel
  -----  ---------------  -------  ------
  1           0             No      No
  2           0             Yes     No
Platform details:
  PXF tif number: 0x10
```

Table 6 describes the fields shown in the interface configuration section of the display. This section is useful for verifying the status of autonegotiation and configured parameters on the link, and the amount of traffic being handled by the interface.

Table 6 show controllers Command Field Descriptions—Interface Section

Field	Description
Interface	Name of the interface.
Hardware	Type of hardware.
Connection mode	Indicator of autonegotiation used to establish the connection.
Link	State of the link.
Configuration	Configuration of the speed and duplex operation on the interface.
Selected media-type	Interface port media type. RJ-45 is the only type supported on the 4-Port 10/100 Fast Ethernet SPA.
Promiscuous mode	State of promiscuous mode (on or off). When promiscuous mode is on, the SPA disables MAC destination address and VLAN filtering. When promiscuous mode is off, the SPA enables MAC destination address and VLAN filtering.

Table 6 show controllers Command Field Descriptions—Interface Section (continued)

Field	Description
VLAN filtering	Status of ternary content addressable memory (TCAM) filtering of VLANs (enabled or disabled). By default, the SPA always enables VLAN filtering. The SPA disables VLAN filtering if the TCAM table is full, or if the SPA is operating in promiscuous mode. **Note** VLAN filtering is not enabled or disabled using any command-line interface (CLI) command.
MDI crossover status	State of the media dependent interface (MDI) for the PHY device on the specified interface. The possible values are MDI for straight-through cables or media dependent interface crossover (MDI-X) for crossover cables.
Auto-negotiation	State of autonegotiation (enabled or disabled) on the interface and its current status.
Speed/duplex is resolved to	Results of autonegotiated parameter values (speed and duplex) currently being used on the link.
Advertised capabilities	List of the possible combinations of speed and duplex modes (in *speed/duplex* format) and flow control that the local interface has advertised it supports to the remote device: • For speed—10M is 10 Mbps, and 100M is 100 Mbps. • For duplex—HD is half duplex, and FD is full duplex. • For flow control—"Pause capable (Asymmetric)" means that the SPA advertises support of the PAUSE flow control bit and the ASM_DIR (asymmetric) flow control bit.
Partner capabilities	List of the possible combinations of speed and duplex modes (in *speed/duplex* format) and flow control that the remote device has advertised it supports to the local interface: • For speed—10M is 10 Mbps, and 100M is 100 Mbps. • For duplex—HD is half duplex, and FD is full duplex. • For flow control—"Pause capable" means that the remote device supports implementation of the PAUSE flow control bit; "Pause capable (Asymmetric)" means that the remote device supports implementation of the PAUSE flow control bit and the ASM_DIR (asymmetric) flow control bit.

Table 7 describes the fields shown in the MAC counters section of the display. This section is useful for verifying the status of packets processed by the MAC device for the interface. This information is useful for Cisco Systems technical support personnel.

Table 7 show controllers Command Field Descriptions—MAC Counters Section

Field	Description
Input: packets, bytes	Total number of packets and bytes received by the MAC device for the interface since it was activated or cleared. You can clear these counters using the **clear counters** privileged EXEC command.
Input: FIFO full/reset removed	Total number of packets removed by the MAC device due to a first-in, first-out (FIFO) overflow condition in the input buffer for the interface.
Input: error drop	Total number of input packets with errors that are dropped by the MAC device for the interface.
Output: packets, bytes	Total number of packets and bytes transmitted by the MAC device for the interface since it was activated or cleared. You can clear these counters using the **clear counters** privileged EXEC command.
Output: FIFO full/reset removed	Total number of packets removed by the MAC device due to a first-in, first-out (FIFO) overflow condition in the output buffer for the interface.
Output: error drop	Total number of output packets with errors that are dropped by the MAC device for the interface.
Total pause frames	Total number of Ethernet 802.3x pause frames transmitted and received by the MAC device for flow control on the interface.

Table 8 describes the fields shown in the FPGA counters section of the display. This section is useful for verifying the status of packets processed by the FPGA device for the interface. This information is useful for Cisco Systems technical support personnel.

Table 8 show controllers Command Field Descriptions—FPGA Counters Section

Field	Description
Input: Total (good & bad) packets	Total number of packets received by the FPGA device in the ingress direction for the interface.
Input: TCAM drops	Total number of packets dropped by the FPGA device in the ingress direction for the interface due to a ternary content addressable memory (TCAM) lookup failure. This counter increments when the interface receives a frame with a destination MAC address or VLAN identifier that is not present in the TCAM table.
Input: Satisfy (host-backpressure) drops	Total number of packets dropped by the FPGA device in the ingress direction for the interface due to back-pressure from the MSC.

Table 8 show controllers Command Field Descriptions—FPGA Counters Section (continued)

Field	Description
Input: CRC drops	Total number of packets dropped by the FPGA device in the ingress direction for the interface due to cyclic redundancy check (CRC) errors.
Input: PL3 RERRs	Total number of packets with errors received for the interface by the FPGA device in the ingress direction over the System Packet Interface Level 3 (SPI3) (also called PL3) path from the MAC device to the FPGA device.
Output: EOP (SPI4) errors	Total number of packets with end-of-packet (EOP) errors received by the FPGA device in the egress direction for the interface over the System Packet Interface Level 4 (SPI4) path from the MSC to the FPGA device.

Table 9 describes the fields shown in the SPA carrier card counters section of the display. This section is useful for verifying the status of packets processed by the MSC for the interface. This information is useful for Cisco Systems technical support personnel.

Table 9 show controllers Command Field Descriptions—SPA Carrier Card Counters Section

Field	Description
Input: packets, bytes, drops	Total number of packets, bytes, and packet drops that have occurred on the SPI4 path from the FPGA device to the MSC.
Output: packets, bytes, drops	Total number of packets, bytes, and packet drops that have occurred on the SPI4 path from the MSC to the FPGA device.
Egress flow control status	Status of flow control between the MSC and the Route Processor (RP). The possible values are: • XON—A control frame has been sent by the MSC to the RP to indicate that the MSC is ready to accept data. • XOFF—A control frame has been sent by the MSC to the RP to indicate congestion on the MSC. The MSC cannot accept any more data from the RP during this condition.
General errors	Total number of errors (such as parity) on the MSC in the ingress and egress direction.
SPI4 errors: ingress dip4	Total number of 4-bit Diagonal Interleaved Parity (DIP4) errors in the ingress direction on the SPI4 path from the FPGA device to the MSC. DIP4 is a parity algorithm where a 4-bit odd parity is computed diagonally over control and data words.
SPI4 errors: egress dip2	Total number of 2-bit Diagonal Interleaved Parity (DIP2) errors in the egress direction on the SPI4 path from the FPGA device to the MSC. DIP2 is a parity algorithm where a 2-bit odd parity is computed diagonally over status words.

Table 10 describes the fields shown in the SPA error counters section of the display. This section appears only when one of the SPI4 transmit or receive errors occurs on the interface. This information is useful for Cisco Systems technical support personnel.

Note None of the SPA SPI4 error counters appear in **show controllers fastethernet** command output until at least one of those types of SPI4 errors occurs.

All of the errors in the SPA error counters section are subject to the SPA automatic recovery process when certain thresholds are reached.

Table 10 show controllers Command Field Descriptions—SPA Error Counters Section

Field	Description
SPI4 TX out of frame error = 2 (00:02:31 ago)	Number of SPI4 out-of-frame errors (events) detected in the transmit direction (toward the network), from the MSC to the SPA FPGA device. The time stamp indicates how long ago (in hours:minutes:seconds) from the current system time, that the last error was detected. This error indicates a loss of synchronization between the synchronization block and the data received on the SPI4 path. When synchronization is reacquired, the error no longer occurs.
SPI4 TX Train valid error = 1 (00:02:11 ago)	Number of times that a low-level synchronization problem was detected in the transmit direction (toward the network), from the MSC to the SPA FPGA device. The time stamp indicates how long ago (in hours:minutes:seconds) from the current system time, that the last error was detected.
SPI4 TX DIP4 error = 1 (00:01:30 ago)	Number of 4-bit Diagonal Interleaved Parity (DIP4) errors in the transmit direction (toward the network), from the MSC to the SPA FPGA device. The time stamp indicates how long ago (in hours:minutes:seconds) from the current system time, that the last error was detected. DIP4 is a parity algorithm where a 4-bit odd parity is computed diagonally over control and data words.

Table 10 show controllers Command Field Descriptions—SPA Error Counters Section

Field	Description
SPI4 RX out of frame error = 1 (00:00:36 ago)	Number of SPI4 out-of-frame errors (events) detected in the receive direction (from the network), from the SPA FPGA device to the MSC. The time stamp indicates how long ago (in hours:minutes:seconds) from the current system time, that the last error was detected. This error indicates a loss of synchronization between the synchronization block and the data received on the SPI4 path. When synchronization is reacquired, the error no longer occurs.
SPI4 RX DIP2 error = 1 (00:00:13 ago)	Number of 2-bit Diagonal Interleaved Parity (DIP2) errors in the receive direction (from the network), from the SPA FPGA device to the MSC. The time stamp indicates how long ago (in hours:minutes:seconds) from the current system time, that the last error was detected. DIP2 is a parity algorithm where a 2-bit odd parity is computed diagonally over status words.

Table 11 describes the fields shown in the MAC destination address filtering table section of the display. This section is useful for verifying the multicast destination addresses that are in the TCAM table and permitted by the interface. This information is useful for Cisco Systems technical support personnel.

Table 11 show controllers Command Field Descriptions—MAC Destination Address Filtering Table Section

Field	Description
Table entries: Total, Used, Available	Total number of MAC destination address entries possible in the TCAM table for the interface, the number of table entries currently used by the interface, and the number of table entries that remain available. The 4-Port 10/100 Fast Ethernet SPA supports a 512-entry MAC filtering table for each supported interface (2048 entries total on the card).
Index	Table entry identifier.

Table 11 show controllers Command Field Descriptions—MAC Destination Address Filtering Table Section (continued)

Field	Description
MAC destination address	MAC destination address (multicast) permitted by the interface and used in the TCAM lookup table for packet filtering. The multicast MAC entries typically come from routing protocols [such as Open Shortest Path First (OSPF) and Enhanced IGRP (EIGRP)], and other protocols including the Hot Standby Router Protocol (HSRP). When the router reloads, three addresses appear by default in the MAC filtering table: the unicast address of the local interface, the Ethernet broadcast address, and the Ethernet multicast address.
Mask	Mask for the corresponding destination address. The SPA uses the bits that are set in the mask to look up the address in the TCAM table.

Table 12 describes the fields shown in the VLAN filtering table section of the display. This section is useful for verifying the VLANs that are in the TCAM table and are permitted by the interface. This information is useful for Cisco Systems technical support personnel.

Table 12 show controllers Command Field Descriptions—VLAN Filtering Table Section

Field	Description
Number of VLANs configured on this interface	Number of VLANs that are configured on the interface. If the number of VLANs configured on the interface is 1022 or less, then the VLAN filtering table also shows an index entry for every VLAN ID. The number of VLANs configured on the interface can be 0, while the number of used table entries reports 2, because the SPA always uses two entries to provide valid matching criteria for promiscuous mode and non-VLAN packets.
Table entries: Total, Used, Available	Total number of VLAN entries possible in the TCAM filtering table for the interface, the number of table entries currently used by the interface (two are always in use by default), and the number of table entries that remain available. The 4-Port 10/100 Fast Ethernet SPA supports a 1024-entry VLAN filtering table for each supported interface (4096 entries total on the card).
Index	Table entry identifier.
VLAN identifier	Number of the VLAN. Two VLAN ID 0 entries always appear in the table and represent the local interface port for handling of promiscuous mode and non-VLAN packets. Other VLAN entries appear in this table when VLANs are configured on the interface.

Table 12 show controllers Command Field Descriptions—VLAN Filtering Table Section

Field	Description
Enabled	Status of the VLAN ID for TCAM filtering, with the following possible values: • No—The entry is disabled for filtering. • Yes—The entry is enabled for filtering. The TCAM filter uses the "first-match" rule to filter packets that the SPA receives against entries in the table. The matching assessment begins at the top of the table with the VLAN ID 0 entries. **Note** The SPA always supports two VLAN ID 0 entries. The first VLAN ID 0 entry of the TCAM table is used for promiscuous mode. It has a value of "No," meaning it is disabled, whenever promiscuous mode is disabled for the interface. The second VLAN ID 0 entry is used for filtering of non-VLAN packets.
Tunnel	Status of tunneling for the interface, with the following possible values: • No—Tunneling is disabled and the SPA performs MAC destination address filtering. • Yes—Tunneling is enabled and the SPA does not perform MAC destination address filtering. **Note** If promiscuous mode is enabled, then the first VLAN ID 0 entry shows tunnel = Yes. All other VLAN ID entries show tunnel = No.

Table 13 describes the fields shown in the Platform details section of the display.

Table 13 show controllers Command Field Descriptions—Platform Details Section

Field	Description
PXF tif number	Number of the interface (in hexadecimal format) used for PXF on the network services engine (NSE) or by the Hyper Transport (HT) FPGA device on the network processing engine (NPE).

Related Commands

Command	Description
show interfaces fastethernet	Displays information about the Fast Ethernet interfaces.

show cwan

To display the WAN statistics and information about the hidden VLAN-to-WAN interface, use the **show cwan** command in user EXEC mode.

show cwan {**stats** | **vlans**}

Syntax Description

stats	Displays information about the WAN statistics.
vlans	Displays the hidden VLAN-to-WAN interface mapping.

Command Default

This command has no default settings.

Command Modes

User EXEC (>)

Command History

Release	Modification
12.2(17d)SXB	Support for this command was introduced on the Supervisor Engine 2.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 720.

The **show vlan internal usage** command displays the internal VLANs that are allocated to WAN interfaces as Layer 3 VLANs but does not display the associated subinterfaces. To display the associated subinterfaces, enter the **show cwan vlans** command. The **show cwan vlans** command displays the mapping between the WAN subinterface and the internal VLANs in use.

Examples

This example shows how to display the information about the WAN port statistics:

```
Router# show cwan stats

0 unknown VLANs
0 ATM packets with zero src_ltl or inactive VC
0 unknown enctype
0 output unknown enctype drops
0 particle alloc failures
0 pak alloc failures
Router#
```

This example shows how to display the hidden VLAN-to-WAN interface mappings:

```
Router# show cwan vlans

Hidden VLAN swidb->if_number Interface
-----------------------------------------------
1017 75 ATM2/0/0
1018 90 ATM2/0/0.54
1019 92 ATM2/0/0.56
```

```
1020 93 ATM2/0/0.57
1021 94 ATM2/0/0.100
1022 95 ATM2/0/0.101
1023 96 ATM2/0/0.102
1024 97 ATM2/0/0.103
1025 98 ATM2/0/0.110
1026 99 ATM2/0/0.111
1027 100 ATM2/0/0.112
1028 101 ATM2/0/0.113
1029 102 ATM2/0/0.120
1030 103 ATM2/0/0.200
1031 104 ATM2/0/0.201
1032 105 ATM2/0/0.202
1033 106 ATM2/0/0.203
1067 76 POS4/1
1068 77 POS4/2
1071 79 GE-WAN5/2
1072 80 GE-WAN5/3
1073 81 GE-WAN5/4
Recycled VLAN Interface
-----------------------------
Pending recycle holdtime(ms) Interface
-----------------------------------------
Router#
```

Related Commands

Command	Description
ip access-list hardware permit fragments	Permits all noninitial fragments in the hardware.

show cwan qinq

To display the inner, outer, and trunk VLANs that are used in IEEE 802.1Q-in-802.1Q (QinQ) translation, use the **show cwan qinq** command in privileged EXEC mode.

show cwan qinq [**configured** | **detail** | **list**]

Syntax Description

configured	(Optional) Displays statistics for all configured bridge domains.
detail	(Optional) Displays the details of the inner VLAN configurations for each bridge domains.
list	(Optional) Displays the currently configured assignments.

Command Default

The inner, outer, and trunk VLANs that are used in IEEE 802.1Q-in-802.1Q (QinQ) translation are not displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SXD	Support for this command was introduced on the Supervisor Engine 720.
12.2(18)SXE	This command was changed as follows: • Support was added for QinQ link bundles that use virtual port-channel interfaces. • The **configured**, **detail**, and **list** keywords were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command is supported on the Gigabit Ethernet WAN interfaces on Cisco 7600 series routers that are configured with an Optical Services Module (OSM)-2+4GE-WAN+ OSM module only.

OSMs are not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 32.

The **show cwan qinq** command shows a summary of the QinQ translations being performed. See the other related commands for additional information:

- **show cwan qinq**
- **show cwan qinq bridge-domain**
- **show cwan qinq interface**

Examples

This example shows the typical output from the **show cwan qinq** command:

```
Router# show cwan qinq

Bridge-domain   Interface       Egress-if       Inner-start Total Active
32              GE4/4           GE4/4           32          1     1
  Sub-Interface   Trunk-vlan   Inner-vlan   Service         State
  GE4/4.1         101          32           dot1q           up/down

Bridge-domain   Interface       Egress-if       Inner-start Total Active
888             Po1             GE4/1           32          1     1
  Sub-Interface   Trunk-vlan   Inner-vlan   Service         State
  Po1.1           101          32           dot1q           up/up

Router#
```

Table 14 describes the fields shown in the display.

Table 14 show cwan qinq Field Descriptions

Field	Description
Bridge-domain	VLAN ID for the outer PE VLAN tag that is expected on the original incoming packets.
Interface	Gigabit Ethernet WAN interface or subinterface being used for the QinQ translation.
Egress-if	Output interface being used for packets on this particular subinterface and PE VLAN ID.
Inner-start	Start of the 32-count block of inner CE VLAN IDs that are being used for the outer PE VLAN tag. The base number is always evenly divisible by 32. Any CE VLAN IDs that do not fall within this block of 32 IDs are considered to be out of range.
Total	Total number of CE VLAN subinterfaces that are configured for this PE VLAN ID (bridge domain).
Active	Total number of VLAN translations that are currently active for this bridge domain.
Sub-interface	Subinterface on a Gigabit Ethernet WAN interface or port-channel interface for this particular VLAN translation.
Trunk-vlan	VLAN ID for the trunk VLAN tag that is added to the outgoing translated packet as the outer (or only) VLAN tag.
Inner-vlan	VLAN ID for the inner CE VLAN tag that is expected on the original incoming packets.

Table 14 show cwan qinq Field Descriptions (continued)

Field	Description
Service	Type of QinQ configuration being used on the subinterface: • **dot1q-drop**—Invalid configuration or all packets are being dropped. • **dot1q**—Subinterface is configured for QinQ translate mode (two-tags to one-tag translation: **bridge-domain dot1q**). • **dot1q-tunnel**—Subinterface is configured for QinQ tunnel mode (two-tags to two-tags transparent tunneling: **bridge-domain dot1q-tunnel**). • **dot1q-tunnel out-range**—Subinterface is configured for out-of-range packets for this particular PE VLAN (**bridge-domain dot1q-tunnel out-range**).
State	Current

Related Commands

Command	Description
class-map	Accesses the QoS class map configuration mode to configure QoS class maps.
mode dot1q-in-dot1q access-gateway	Enables a Gigabit Ethernet WAN interface to act as a gateway for QinQ VLAN translation.
policy-map	Accesses QoS policy-map configuration mode to configure the QoS policy map.
service-policy	Attaches a policy map to an interface.
set cos cos-inner (policy-map configuration)	Sets the 802.1Q prioritization bits in the trunk VLAN tag of a QinQ-translated outgoing packet with the priority value from the inner customer-edge VLAN tag.
show policy-map	Displays information about the policy map.
show policy-map interface	Displays the statistics and the configurations of the input and output policies that are attached to an interface.

show cwan qinq bridge-domain

To display the provider-edge VLAN IDs that are used on a Gigabit Ethernet WAN interface for 802.1Q in 802.1Q (QinQ) translation or to show the customer-edge VLANs that are used for a specific provider-edge VLAN, use the **show cwan qinq bridge-domain** command in privileged EXEC mode.

show cwan qinq bridge-domain [*pe-vlan-id*]

Syntax Description

pe-vlan-id	(Optional) Information for the specified provider-edge VLAN ID; valid values are from 1 to 4094.

Command Default

If you do not specify a *vlan-id*, the provider-edge VLANs that are configured for each Gigabit Ethernet WAN interface displays.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SXD	Support for this command was introduced as **show cwan qinq bridge-vlan** on the Supervisor Engine 720.
12.2(18)SXE	This command was renamed **show cwan qinq bridge-domain**. Support was also added for QinQ link bundles using port-channel virtual interfaces.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on the GE-WAN interfaces on Cisco 7600 series routers that are configured with an Optical Services Module (OSM)-2+4GE-WAN+ OSM module only.

OSMs are not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 32.

Examples

This example shows typical output from the **show cwan qinq bridge-domain** command. This output displays the provider-edge VLANs (bridge VLANs) for all GE-WAN interfaces on the Catalyst 6500 series switch:

```
Router# show cwan qinq bridge-domain

GE-WAN5/1, group 1, total_rate 2
 2, 4062
GE-WAN5/2, group 1, total_rate 1
 150
GE-WAN5/3, group 1, total_rate 2
 100, 1000
GE-WAN5/4, group 1, total_rate 16
 3-5, 7-10,12-15,18-20,22, 4094
Port-channel1, group 1, total_rate 21

Router#
```

This example shows typical output for a specific provider-edge VLAN:

```
Router# show cwan qinq bridge-domain 4094

Bridge-domain   Interface       Egress-if       Inner-start Service Count
4093            GE5/4             GE2/3           192         31
  Sub-Interface   Trunk-vlan   Inner-vlan   Service
  GE5/4.4000      4000         default      dot1q-tunnel out-ran
  GE5/4.4062      4062         1            dot1q-tunnel
  GE5/4.4064      4064         3            dot1q-tunnel
  GE5/4.4067      4067         6            dot1q-tunnel
  GE5/4.4068      4068         7            dot1q-tunnel

.
.
.
```

Table 15 describes the fields shown in the display.

Table 15 show cwan qinq bridge-domain Field Descriptions

Field	Description
Bridge-domain	Outer provider-edge VLAN IDs that are configured on the subinterfaces for this interface. These IDs are shown as a range, where possible, or as individual IDs.
interface	Gigabit Ethernet WAN interface or subinterface that is used.
Egress-if	Output interface being used for packets on this particular subinterface and VLAN.
Inner-start	Start of the 32-count block of inner customer-edge VLAN IDs that are used for the outer provider-edge VLAN tag. The base number is always evenly divisible by 32. Any customer-edge VLAN IDs that do not fall within this block of 32 IDs are out of range.
Service Count	Number of service translations that are currently configured and in use.
Tr-vlan	VLAN ID for the trunk VLAN tag that is added to the outgoing translated packet as the outer (or only) VLAN tag.
Inner-vlan	VLAN ID for the inner customer-edge VLAN tag that is expected on the original packets received on this subinterface. If this field shows “default,” it indicates that the subinterface matches all out-of-range packets (packets with a customer-edge VLAN ID that are not within the configured 32-count block of customer-edge VLAN IDs).
Service	Type of QinQ configuration that is used on the subinterface: • **dot1q-drop**—Invalid configuration or all packets are being dropped. • **dot1q**—Subinterface is configured for QinQ translate mode (two-tags to one-tag translation: **bridge-vlan dot1q**). • **dot1q-tunnel**—Subinterface is configured for QinQ tunnel mode (two-tags to two-tags transparent tunneling: **bridge-vlan dot1q-tunnel**). • **dot1q-tunnel out-ran**—Subinterface is configured for out-of-range packets for this particular provider-edge VLAN (**bridge-vlan dot1q-tunnel out-range**).

Related Commands

Command	Description
class-map	Accesses the QoS class map configuration mode to configure QoS class maps.
mode dot1q-in-dot1q access-gateway	Enables a Gigabit Ethernet WAN interface to act as a gateway for QinQ VLAN translation.
policy-map	Accesses QoS policy-map configuration mode to configure the QoS policy map.
service-policy	Attaches a policy map to an interface.
set cos cos-inner (policy-map configuration)	Sets the 802.1Q prioritization bits in the trunk VLAN tag of a QinQ-translated outgoing packet with the priority value from the inner customer-edge VLAN tag.
show cwan qinq	Displays the inner, outer, and trunk VLANs that are used in QinQ translation.
show cwan qinq interface	Displays interface statistics for IEEE 802.1Q-in-802.1Q (QinQ) translation on one or all Gigabit Ethernet WAN interfaces and port-channel interfaces.

show cwan qinq interface

To display interface statistics for IEEE 802.1Q-in-802.1Q (QinQ) translation on one or all Gigabit Ethernet WAN interfaces and port-channel interfaces, use the **show cwan qinq interface** command in privileged EXEC mode.

show cwan qinq interface [**gigabitethernet** [*slot*/*port*[**.***subint*]] | **port-channel** *channel-number* [**.***subint*]]

Syntax Description

gigabitethernet *slot*/*port*	(Optional) Specifies the Gigabit Ethernet WAN interface to be displayed.
port-channel *channel-number*	(Optional) Specifies a port-channel virtual interface to be displayed; valid values are from 1 to 282.
.*subint*	(Optional) Subinterface number to be displayed. The period (**.**) is required.

Command Default

If you enter this command without any arguments, it displays information for all the Gigabit Ethernet WAN interfaces in the Catalyst 6500 series switch.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SXD	Support for this command was introduced on the Supervisor Engine 720.
12.2(18)SXE	This command was changed to add the **port-channel** keyword to support QinQ link bundles that use port-channel virtual interfaces.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on the Gigabit Ethernet WAN interfaces on Cisco 7600 series routers that are configured with an Optical Services Module (OSM)-2+4GE-WAN+ OSM module only.

OSMs are not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 32.

The valid range for user-created port-channel numbers is from 1 to 256. Channel numbers 257 to 282 are system-created channels that are used internally, and their statistics are typically useful only for help in troubleshooting and debugging.

The **show cwan qinq interface** command displays the same interface counters that are shown by the **show interfaces** command but displays them by subinterface with the associated QinQ provider-edge and customer-edge VLANs.

Examples

This example shows the output from the **show cwan qinq interface** command:

```
Router# show cwan qinq interface

Interface        Status    Egress op PE   CE   TRNK Input packets/       Output packets/
                                                    Input bytes          Output bytes
---------------- --------- ------ -- ---- ---- ---- -------------------- ----------------
GE1/2.500        up        GE3/3  1  50   3200 500  0                    0
                                                    0                    0
GE1/2.501        up        GE3/3  1  50   3201 501  3586                 3498
                                                    466294               412323
GE1/2.502        up        GE3/3  1  50   3202 502  3577                 3481
                                                    464844               410704
.
.
.
Router#
```

This example shows the output for a specific interface:

```
Router# show cwan qinq interface GE-WAN 1/2

Interface        Status    Egress op PE   CE   TRNK Input packets/       Output packets/
                                                    Input bytes          Output bytes
---------------- --------- ------ -- ---- ---- ---- -------------------- ----------------
GE1/2.500        up        GE7/0  1  50   3200 500  626485               63571
                                                    492579036            508305780
GE1/2.501        up        GE7/0  1  50   3201 501  626483               63571
                                                    492579644            508305780
GE1/2.502        up        GE7/0  1  50   3202 502  626485               63571
                                                    492701011            508305780
.
.
.
Router#
```

This example shows the output for a specific subinterface:

```
Router# show cwan qinq interface GE-WAN 5/1.1000

Interface        Status    Egress op PE   CE   TRNK Input packets/       Output packets/
                                                    Input bytes          Output bytes
---------------- --------- ------ -- ---- ---- ---- -------------------- ----------------
GE5/1.1000       up        GE3/1  1  2    2496 1000 476790463            12108753
                                                    47168162431          1110048768
Router#
```

This example shows an excerpt from the typical output for a specific subinterface:

```
Router# show cwan qinq interface GE-WAN 5/1.1000

Interface        Status    Egress op PE   CE   TRNK Input packets/       Output packets/
                                                    Input bytes          Output bytes
---------------- --------- ------ -- ---- ---- ---- -------------------- ----------------
GE5/1.1000       up        GE3/1  1  2    2496 1000 476790463            12108753
                                                    47168162431          1110048768

Router#
```

This example shows an excerpt from the typical output for a specific port-channel virtual interface:

```
Router# show cwan qinq interface port 3

Interface        Status    Egress op PE   CE   TRNK Input packets/       Output packets/
                                                    Input bytes          Output bytes
---------------- --------- ------ -- ---- ---- ---- -------------------- ----------------
Po3.101          up/up     GE2/3  1  150  223  323  59759000             23971
                                                    3824576384           819613
Po3.102          up/up     GE2/3  1  150  222  324  59758987             23914
                                                    3824575552           818231
.
.
.
Router#
```

Table 16 describes the fields shown in the displays.

Table 16 show cwan qinq interface Field Descriptions

Field	Description
Interface	Gigabit Ethernet WAN or port-channel interface or subinterface being used.
Status	Current status of this interface: up or down.
Egress	Output interface being used for packets on this particular subinterface and VLAN.
op	Operational status code and QinQ configuration of this subinterface: • 0—Invalid configuration or all packets are being dropped. • 1—Subinterface is configured for QinQ translate mode (two-tags to one-tag translation: **bridge-domain dot1q**). • 2—Subinterface is configured for QinQ tunnel mode (two-tags to two-tags transparent tunneling: **bridge-domain dot1q-tunnel**). • 3—Not used. • 4—Subinterface is configured for out-of-range packets for this particular PE VLAN (**bridge-domain dot1q-tunnel out-range**).
PE	Outer provider edge (PE) VLAN IDs that have been configured on the subinterfaces for this interface.
CE	VLAN ID for the inner customer edge (CE) VLAN tag that is expected on the original packets being received on this subinterface.
Trnk	VLAN ID for the trunk VLAN tag that is added to the outgoing translated packet as the outer (or only) VLAN tag.
Input packets	Number of packets received on this subinterface.
Input bytes	Number of bytes received on this subinterface.
Output packets	Number of translated packets that were transmitted out this subinterface.
Output bytes	Number of translated bytes that were transmitted out this subinterface.

Related Commands

Command	Description
bridge-domain (subinterface configuration)	Binds a PVC to the specified VLAN ID.
class-map	Accesses the QoS class map configuration mode to configure QoS class maps.
mode dot1q-in-dot1q access-gateway	Enables a Gigabit Ethernet WAN interface to act as a gateway for QinQ VLAN translation.
policy-map	Accesses QoS policy-map configuration mode to configure the QoS policy map.
service-policy	Attaches a policy map to an interface.
set cos cos-inner (policy-map configuration)	Sets the 802.1Q prioritization bits in the trunk VLAN tag of a QinQ-translated outgoing packet with the priority value from the inner customer-edge VLAN tag.
show cwtlc qinq	Displays the information that is related to QinQ translation and is contained in the XCM on board the supervisor engine.
show policy-map	Displays information about the policy map.
show policy-map interface	Displays the statistics and the configurations of the input and output policies that are attached to an interface.

show cwan qinq load-balance

To display load-balancing statistics for IEEE 802.1Q-in-802.1Q (QinQ) translation on one or all Gigabit Ethernet WAN interfaces and port-channel interfaces, use the **show cwan qinq load-balance** command in privileged EXEC mode.

show cwan qinq load-balance [*channel-number* | **configured** | **detail** | **list**]

Syntax Description

channel-number	(Optional) Statistics for a specific channel group; valid values are from 1 to 256.
configured	(Optional) Displays statistics for all configured port channels.
detail	(Optional) Displays the details of the inner VLAN configurations for each port channel.
list	(Optional) Displays the currently configured assignments.

Command Default

If you enter this command without any options, it displays information for all Gigabit Ethernet WAN and port-channel interfaces in the router.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SXE	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows an excerpt from the typical output from the default form of the **show cwan qinq load-balance** command:

```
Router# show cwan qinq load-balance

Port-channel10 total 505 bridge-domain vlan(s) active
  Po10 - GE-WAN3/1 has 167 bridge-domain vlan(s) active
  Po10 - GE-WAN3/2 has 169 bridge-domain vlan(s) active
  Po10 - GE-WAN9/1 has 169 bridge-domain vlan(s) active

  Port-channel20 total 4 bridge-domain vlan(s) active
  Po20 - GE-WAN3/3 has 1 bridge-domain vlan(s) active
  Po20 - GE-WAN3/4 has 1 bridge-domain vlan(s) active
  Po20 - GE-WAN9/2 has 1 bridge-domain vlan(s) active
  Po20 - GE-WAN9/3 has 1 bridge-domain vlan(s) active

Router#
```

This example shows typical output when using the **configured** keyword:

```
Router# show cwan qinq load-balance configured

 Port-channel1 total 1 bridge-domain vlan(s) active
   Po1 - GE-WAN4/1 has 1 bridge-domain vlan(s) active
         GE-WAN4/1 has 1 bridge-domain vlan(s) configured: 888
```

```
   Po1 - GE-WAN8/1 has 0 bridge-domain vlan(s) active
         GE-WAN8/1 has 1 bridge-domain vlan(s) configured: 889

Router#
```

This example shows typical output when using the **list** keyword:

```
Router# show cwan qinq load-balance list

 Port-channel1 total 1 bridge-domain vlan(s) active
   Po1 - GE-WAN4/1 has 1 bridge-domain vlan(s) active
   Po1 - GE-WAN4/1 active vlan(s): 888

   Po1 - GE-WAN8/1 has 0 bridge-domain vlan(s) active
   Po1 - GE-WAN8/1 active vlan(s): 889

Router#
```

This example shows typical output when using the **detail** keyword:

```
Router# show cwan qinq load-balance detail

 Port-channel1 total 1 bridge-domain vlan(s) active
   Po1 - GE-WAN4/1 has 1 bridge-domain vlan(s) active
     Bridge-domain Inner  Configured Active
     ------------- ------ ---------- ------
     888           active 3          2
   Po1 - GE-WAN8/1 has 0 bridge-domain vlan(s) active
     Bridge-domain Inner  Configured Active
     ------------- ------ ---------- ------
     889           -      1          0

Router#
```

Table 17 describes the fields shown in this display.

Table 17 show cwan qinq load-balance detail Field Descriptions

Field	Description
Bridge-domain	PE VLANs being used on this interface.
Inner	Number of inner VLANs configured for this bridge domain.
Configured	Number of bridge domains that are configured on this interface.
Active	Number of bridge domains that are configured and active on this interface.

Related Commands

Command	Description
class-map	Accesses the QoS class map configuration mode to configure QoS class maps.
mode dot1q-in-dot1q access-gateway	Enables a Gigabit Ethernet WAN interface to act as a gateway for QinQ VLAN translation.
policy-map	Accesses QoS policy-map configuration mode to configure the QoS policy map.
service-policy	Attaches a policy map to an interface.
set cos cos-inner (policy-map configuration)	Sets the 802.1Q prioritization bits in the trunk VLAN tag of a QinQ-translated outgoing packet with the priority value from the inner customer-edge VLAN tag.

Command	Description
show cwan qinq	Displays the inner, outer, and trunk VLANs that are used in QinQ translation.
show cwan qinq interface	Displays interface statistics for IEEE QinQ translation on one or all Gigabit Ethernet WAN interfaces and port-channel interfaces.

show cwan qinq port-channel

To display IEEE 802.1Q-in-802.1Q (QinQ) statistics for one or all configured QinQ link bundles (port channels), use the **show cwan qinq port-channel** command in privileged EXEC mode.

show cwan qinq port-channel [**detail** *channel-number*]

Syntax Description

detail *channel-number*	(Optional) Displays statistics for a specific port-channel group; valid values are from 1 to 256.

Command Default

If you use this command without the **detail** keyword, it displays statistics for all configured QinQ link bundles.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SXE	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command displays the QinQ-related information for one or all port-channel groups that are being used for QinQ link bundles.

Note To display interface statistics, use the **show cwan qinq interface** command.

Examples

This example shows an excerpt from the typical output from the default form of the **show cwan qinq port-channel** command:

```
Router# show cwan qinq port-channel

Group    : WAN          if_num idb      pagp         if_num idb      port
---------  ------------ d----- x------- ------------ d----- x------- d--
Group 1  : GE-WAN9/1    67     43CABB20 GE-WAN 9/1   88     4529B710 5

Router#
```

Table 18 describes the fields shown in the display.

Table 18 show cwan qinq port-channel Field Descriptions

Field	Description
Group	Channel group to which this interface belongs.
WAN	Interface being displayed.

Table 18 show cwan qinq port-channel Field Descriptions (continued)

Field	Description
if_num	Internal number for this interface.
idb	Memory value (in hexadecimal) for this interface in the interface database.
pagp	Interface providing the port aggregation protocol (PAGP) support.
if_num	Internal number for the PAGP interface.
idb	Memory value (in hexadecimal) for the PAGP interface in the interface database.
port	Port number.

show cwtlc qinq

To display the information that is related to IEEE 802.1Q-in-802.1Q (QinQ) translation and is contained in the XCM onboard the supervisor engine, use the **show cwtlc qinq** command in privileged EXEC mode.

show cwtlc qinq *port* [**outer-vlan** *vlan-id* [*inner-vlan-id*] | **trunk-vlan** *vlan-id*]

show cwtlc qinq qos

Syntax Description

port	Port number for the information to be displayed; valid values are from 0 to 3.
outer-vlan *vlan-id*	(Optional) Displays the XCM tables for a specific outer provider-edge VLAN ID; valid values are from 1 to 4094.
inner-vlan-id	(Optional) XCM tables for a specific inner customer-edge VLAN ID; valid values are from 1 to 4094.
trunk-vlan *vlan-id*	(Optional) Displays the XCM tables for a specific trunk VLAN ID that is put on translated packets as the new outer VLAN tag; valid values are from 1 to 4094.
qos	Displays the source of the 802.1P bits that are being inserted into the outer trunk VLAN tag of translated packets.

Command Default

If you do not specify a specific VLAN ID, the command displays information for all VLANs.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SXD	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on the Gigabit Ethernet WAN interfaces on Cisco 7600 series routers that are configured with an Optical Services Module (OSM)-2+4GE-WAN+ OSM module only.

OSMs are not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 32.

Examples

This example shows the output for a specific combination of provider-edge and customer-edge VLAN IDs:

```
Router# show cwtlc qinq 0 outer-vlan 20 21

TX VLAN FUNC TABLE
func 4, ce vlan base 0, value 4

TX VLAN TABLE
tx vlan status 1
```

```
TX ADJ TABLE
ce_vlan_offset trunk_vlan op_code src_ltl def_fn  pbit intfid
15             2          1       120     2       1    2

Router#
```

This example shows the output for the **trunk-vlan** keyword:

```
Router# show cwtlc qinq 0 trunk-vlan 2

RX VLAN FUNC TABLE
rx_vlan_func 2

RX TVC TABLE
rx_tvc_func src_ltl pe_vlan ce_vlan Q intfid
1           E0      1       20      0 2

Router#
```

Table 19 describes the fields shown in the display.

Table 19 show cwtlc qinq Command Field Descriptions

Field	Description
TX VLAN FUNC TABLE	
ce vlan base	Start of the 32-count block of inner customer-edge VLAN IDs that are used for the outer provider-edge VLAN tag. The base number is always evenly divisible by 32. Any customer-edge VLAN IDs that do not fall within this block of 32 IDs are out of range.
TX VLAN TABLE	
tx vlan status	Transmit VLAN Status: • 0—QINQ_TX_DEF_DROP: Packet dropped. • 1—QINQ_TX_DEF_TRANSPARENT: Transparent tunneling.
TX ADJ TABLE	
trunk_vlan	VLAN ID for the trunk VLAN tag that is added to the outgoing translated packet as the outer (or only) VLAN tag.
op_code	Operational status and QinQ configuration of this subinterface: • 0—Invalid configuration or all packets are being dropped. • 1—Subinterface is configured for QinQ translate mode (two-tags to one-tag translation: **bridge-vlan dot1q**). • 2—Subinterface is configured for QinQ tunnel mode (two-tags to two-tags transparent tunneling: **bridge-vlan dot1q-tunnel**). • 3—Not used. • 4—Subinterface is configured for out-of-range packets for this particular provider-edge VLAN (**bridge-vlan dot1q-tunnel out-range**).
src_ltl	Source local target logic (LTL) address for this entry.

Table 19 show cwtlc qinq Command Field Descriptions (continued)

Field	Description
use_ce_pbit	Status of whether the outgoing translated packet is using the 802.1P bits (P bits) that are copied from the original packet's outer provider-edge VLAN tag or from the original packet's inner customer-edge VLAN tag: • 0 = P bits are copied from the outer provider-edge VLAN tag. • 1 = P bits are copied from the inner customer-edge VLAN tag. See the **set cos cos-inner (policy-map configuration)** command.
intfid	Interface ID for the Gigabit Ethernet WAN interface that is used for the QinQ translation.
RX VLAN FUNC TABLE	
rx_vlan_func	Last performed function: • 0—RXVLAN_DROP: Packet was dropped • 1—RXVLAN_NORMAL: Normal Ethernet packet • 2—RXVLAN_GATEWAY: Received packet from QinQ access gateway • 3—RXVLAN_L2_LISTEN • 4—RXVLAN_L2_LEARN • 5—RXVLAN_QINQ_FORWARD • 6—RXVLAN_WAN_TRUNK—Trunk VLAN
RX TVC TABLE	
rx_tvc_func	Last performed function: • 0—DROP: Packet was dropped • 1—GATEWAY_TRANSLATE: QinQ translation (double-tag to single-tag translation) • 2—GATEWAY_TRANSPARENT: QinQ transparent tunneling (double-tag to double-tag translation) • 3—WANTRUNK_XCONNECT: WAN port cross-connect • 4—WANTRUNK_SWITCH: WAN port switching
src_ltl	Source local target logic (LTL) address for this entry.
pe_vlan	Provider-edge VLAN ID.
ce_vlan	Customer-edge VLAN ID.
intfid	Interface ID for the Gigabit Ethernet WAN interface that is used for the QinQ translation.

Related Commands

Command	Description
bridge-vlan	Maps a subinterface to specific inner customer-edge and outer provider-edge VLAN tags using QinQ translation.
class-map	Accesses the QoS class map configuration mode to configure QoS class maps.
mode dot1q-in-dot1q access-gateway	Enables a Gigabit Ethernet WAN interface to act as a gateway for QinQ VLAN translation.
policy-map	Accesses QoS policy-map configuration mode to configure the QoS policy map.
service-policy	Attaches a policy map to an interface.
set cos cos-inner (policy-map configuration)	Sets the 802.1Q prioritization bits in the trunk VLAN tag of a QinQ-translated outgoing packet with the priority value from the inner customer-edge VLAN tag.
show cwtlc qinq	Displays the information that is related to QinQ translation and is contained in the XCM on board the supervisor engine.
show policy-map	Displays information about the policy map.
show policy-map interface	Displays the statistics and the configurations of the input and output policies that are attached to an interface.

show dot1q-tunnel

To display a list of 802.1Q tunnel-enabled ports, use the **show dot1q-tunnel** command in user EXEC mode.

show dot1q-tunnel [**interface** *interface interface-number*]

Syntax Description

interface *interface*	(Optional) Specifies the interface type; possible valid values are **ethernet**, **fastethernet**, **gigabitethernet**, **tengigabitethernet**, **port-channel**, and **ge-wan**.
interface-number	(Optional) Interface number; see the "Usage Guidelines" section for valid values.

Command Modes

User EXEC (>)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you do not enter any keywords, the 802.1Q tunnel ports for all interfaces are displayed.

The **ge-wan** keyword is not supported in Cisco 7600 series routers that are configured with a Supervisor Engine 720.

The *interface-number* argument designates the module and port number for the **ethernet**, **fastethernet**, **gigabitethernet**, **tengigabitethernet**, and **ge-wan** keywords. Valid values depend on the chassis and module that are used. For example, if you have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the slot number are from 1 to 13 and valid values for the port number are from 1 to 48.

The *interface-number* argument designates the port-channel number for the **port-channel** keyword; valid values are from 1 to 282. The values from 257 to 282 are supported on the Content Switching Module (CSM) and the Firewall Services Module (FWSM) only.

Examples

This example indicates that the port is up and has one 802.1Q tunnel that is configured on it. The fields shown in the display are self-explanatory.

```
Router# show dot1q-tunnel interface port-channel 10

Interface
---------
Po10
```

Related Commands

Command	Description
switchport mode	Sets the interface type.
vlan dot1q tag native	Enables dot1q tagging for all VLANs in a trunk.

show errdisable flap-values

To display conditions that cause a flap error to be recognized as a result of a specific cause, use the **show errdisable flap-values** command in user EXEC or privileged EXEC mode.

show errdisable flap-values

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
15.0(1)	This command was introduced in a release earlier than Cisco IOS Release 15.0(1) on the Cisco 3845 series routers.

Usage Guidelines

The Flaps column in the display shows how many changes to the state within the specified time interval will cause an error to be detected and a port to be disabled. For example, the display in the "Examples" section shows that an error will be assumed and the port shut down if three Dynamic Trunking Protocol (DTP)-state (port mode access/trunk) or Port Aggregation Protocol (PAgP) flap changes occur during a 30-second interval, or if 5 link-state (link up/down) changes occur during a 10-second interval.

Examples

The following is sample output from the **show errdisable flap-values** command:

```
Router# show errdisable flap-values

ErrDisable Reason    Flaps    Time (sec)
-----------------    ------   ----------
pagp-flap              3       30
dtp-flap               3       30
link-flap              20      10
```

Table 20 describes the significant fields shown in the display.

Table 20 show errdisable flap-values Field Descriptions

Field	Description
ErrDisable Reason	Reason for error disable.
Flaps	Total number of flaps.
Time (sec)	Time set for the recovery timer, in seconds.
pagp-flap	PAgP flap error disable.
dtp-flap	DTP flap error disable.
link-flap	Link flap error disable.

Related Commands

Command	Description
errdisable detect cause	Enables the error-disabled detection for a specific cause or all causes.
errdisable recovery	Configures the recovery mechanism variables.

show gvrp interface

To display Generic VLAN Registration (GVRP) interface states, use the **show gvrp interface** command in privileged EXEC mode.

show gvrp interface

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

Use this command to obtain GVRP interface detals of the administrative and operational GVRP states of all or one particular .1Q trunk port in the device.

Examples

The following example shows sample summary output:

```
Router# show gvrp interface

Port      Status    Mode            Registrar State
Fa3/1     on        slow compact    normal
Gi6/13    on        fast compact    normal
Gi6/14    on        fast compact    normal

Port      Transmit Timeout   Leave Timeout   Leaveall Timeout
Fa3/1     200                600             10000
Gi6/13    200                600             10000
Gi6/14    200                600             10000

Port      Vlans Declared
Fa3/1     1,1200,4000,4094
Gi6/13    2-40,100,200,1200,4000,4094
Gi6/14    1200,4000,4094

Port      Vlans Registered
Fa3/1     1-40,100,200
Gi6/13    1,10
Gi6/14    1-40,100,200

Port      Vlans Registered and in Spanning Tree Forwarding State
Fa3/1     1
Gi6/13    10
Gi6/14    none
```

Related Commands

Command	Description
show gvrp summary	Displays the GVRP configuration at the device leve.

show gvrp summary

To display the Generic VLAN Registration Protocol (GVRP) configuration, use the **show gvrp summary** command in privileged EXEC mode.

show gvrp summary

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

Use this command to obtain GVRP VLAN configuration details.

Examples

The following example shows sample summary output. The fields shown in the display are self-explanatory.

```
Router# show gvrp summary

GVRP global state           : enabled
GVRP VLAN creation          : disabled
VLANs created via GVRP      : 41-99, 1201-4094
```

Related Commands

Command	Description
show gvrp interface	Displays details of the adminstrative and operational GVRP states of all or one particular .1Q trunk port in the device.

show mac-address-table

To display the MAC address table, use the **show mac-address-table** command in privileged EXEC mode.

Cisco 2600, 3600, and 3700 Series Routers

show mac-address-table [**secure** | **self** | **count**] [**address** *mac-addr*] [**interface** *type/number*] [**fa** | **gi** *slot/port*] [**atm** *slot/port*] [**vlan** *vlan-id*]

Catalyst 4500 Series Switches

show mac-address-table {**assigned** | **ip** | **ipx** | **other**}

Catalyst 6000/6500 Series Switches and 7600 Series Routers

show mac-address-table [**address** *mac-addr* [**all** | **interface** *type/number* | **module** *number* | **vlan** *vlan-id*] | [**count** [**module** *number* | **vlan** *vlan-id*]] | [**duplicate** [**module** *number* | **only**]] | [**interface** *type/number*] | [**limit** [**vlan** *vlan-id* | **module** *number* | **interface** *interface-type*]] | [**module** *number*] | [**multicast** [**count** | {**igmp-snooping** | **mld-snooping** [**count**] | **user** [**count**] | **vlan** *vlan-id*}]] | [**notification** {**mac-move** [**counter** [*vlan*] | **threshold** | **change**} [**interface** [*interface-number*]]] | [**synchronize statistics**] | [**unicast-flood**] | **vlan** *vlan-id* [**all** | **module** *number*]]

Syntax Description

secure	(Optional) Displays only the secure addresses.
self	(Optional) Displays only addresses added by the switch itself.
count	(Optional) Displays the number of entries that are currently in the MAC address table.
address *mac-addr*	(Optional) Displays information about the MAC address table for a specific MAC address. See the "Usage Guidelines" section for formatting information.
interface *type/number*	(Optional) Displays addresses for a specific interface. For the Catalyst 6500 and 6000 series switches, valid values are **atm**, **fastethernet**, **gigabitethernet**, and **port-channel**. For the Cisco 7600 series, valid values are **atm**, **ethernet**, **fastethernet**, **ge-wan**, **gigabitethernet**, **tengigabitethernet**, and **pos**.
fa	(Optional) Specifies Fast Ethernet.
gi	(Optional) Specifies Gigabit Ethernet.
slot/port	(Optional) Adds dynamic addresses to the module in slot 1 or 2. The **/** is required.
atm *slot/port*	(Optional) Adds dynamic addresses to ATM module *slot/port*. Use 1 or 2 for the slot number. Use 0 as the port number. The **/** is required.
vlan *vlan-id*	(Optional) Displays addresses for a specific VLAN. For the Cisco 2600, 3600, and 3700 series, valid values are from 1 to 1005; do not enter leading zeroes. Beginning with Cisco IOS Release 12.4(15)T, the valid VLAN ID range is from 1 to 4094. For the Catalyst 6500 and 6000 series switches and 7600 series, valid values are from 1 to 4094.

assigned	Specifies the assigned protocol entries.
ip	Specifies the IP protocol entries.
ipx	Specifies the IPX protocol entries.
other	Specifies the other protocol entries.
all	(Optional) Displays every instance of the specified MAC address in the forwarding table.
type/number	(Optional) Module and interface number.
duplicate	(Optional) Specifies the duplicate MAC entries for a particular DFC module number.
module *number*	(Optional) Displays information about the MAC address table for a specific Distributed Forwarding Card (DFC) module, valid values are from 1 to 6.
limit	Displays MAC-usage information.
multicast	Displays information about the multicast MAC address table entries only.
igmp-snooping	Displays the addresses learned by Internet Group Management Protocol (IGMP) snooping.
mld-snooping	Displays the addresses learned by Multicast Listener Discover version 2 (MLDv2) snooping.
user	Displays the manually entered (static) addresses.
notification mac-move	Displays the MAC-move notification status.
notification mac-move counter	(Optional) Displays the number of times a MAC has moved and the number of these instances that have occurred in the system.
vlan	(Optional) Specifies a VLAN to display. For the Catalyst 6500 and 6000 series switches and 7600 series, valid values are from 1 to 4094.
notification threshold	Displays the Counter-Addressable Memory (CAM) table utilization notification status.
notification change	Displays the MAC notification parameters and history table.
synchronize statistics	Displays information about the statistics collected on the switch processor or DFC.
unicast-flood	Displays unicast-flood information.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.2(8)SA	This command was introduced.
11.2(8)SA3	The **self**, **aging-time**, **count**, and **vlan** *vlan-id* keywords and arguments were added.
11.2(8)SA5	The **atm** *slot/port* keyword and arguments were added.
12.2(2)XT	This command was implemented on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.1(8a)EW	This command was implemented on Catalyst 4500 series switches.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.

Release	Modification
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T.
12.2(14)SX	This command was implemented on the Supervisor Engine 720.
12.2(17a)SX	For the Catalyst 6500 and 6000 series switches and 7600 series, this command was changed to support the following optional keywords and arguments: • **unicast-flood** • **count module** *number* • **limit** [**vlan** *vlan-id* | **port** *number* | **interface** *interface-type*] • **notification threshold**
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB.
12.2(18)SXE	For the Catalyst 6500 and 6000 series switches and 7600 series, this command was changed to support the **mld-snooping** keyword on the Supervisor Engine 720 only.
12.2(18)SXF	For the Catalyst 6500 and 6000 series switches and 7600 series, this command was changed to support the **synchronize statistics** keywords on the Supervisor Engine 720 only.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(15)T	This command was modified to extend the range of valid VLAN IDs to 1 to 4094 for specified platforms.
12.2(33)SXH	The **change** keyword was added.
12.2(33)SXI	This command was changed to add the **counter** keyword.

Usage Guidelines

Cisco 2600, 3600, and 3700 Series Routers

This command displays the MAC address table for the switch. Specific views can be defined by using the optional keywords and arguments. If more than one optional keyword is used, then all the conditions must be true for that entry to be displayed.

Catalyst 4500 Series Switches

For the MAC address table entries that are used by the routed ports, the routed port name, rather than the internal VLAN number, is displayed in the “vlan” column.

Catalyst 6500 and 6000 Series Switches and 7600 Series Routers

If you do not specify a module number, the output of the **show mac-address-table** command displays information about the supervisor engine. To display information about the MAC address table of the DFCs, you must enter the module number or the **all** keyword.

The *mac-addr* value is a 48-bit MAC address. The valid format is H.H.H.

The *interface-number* argument designates the module and port number. Valid values depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 1 to 13 and valid values for the port number are from 1 to 48.

The optional **module** *number* keyword and argument are supported only on DFC modules. The **module** *number* keyword and argument designate the module number.

Valid values for the *mac-group-address* argument are from 1 to 9.

The optional **count** keyword displays the number of multicast entries.

The optional **multicast** keyword displays the multicast MAC addresses (groups) in a VLAN or displays all statically installed or IGMP snooping-learned entries in the Layer 2 table.

The information that is displayed in the **show mac-address-table unicast-flood** command output is as follows:

- Up to 50 flood entries, shared across all the VLANs that are not configured to use the filter mode, can be recorded.
- The output field displays are defined as follows:
  - ALERT—Information is updated approximately every 3 seconds.
  - SHUTDOWN—Information is updated approximately every 3 seconds.

Note The information displayed on the destination MAC addresses is deleted as soon as the floods stop after the port shuts down.

  - Information is updated each time that you install the filter. The information lasts until you remove the filter.

The dynamic entries that are displayed in the Learn field are always set to Yes.

The **show mac-address-table limit** command output displays the following information:

- The current number of MAC addresses.
- The maximum number of MAC entries that are allowed.
- The percentage of usage.

The **show mac-address-table synchronize statistics** command output displays the following information:

- Number of messages processed at each time interval.
- Number of active entries sent for synchronization.
- Number of entries updated, created, ignored, or failed.

Examples

Cisco 2600, 3600, and 3700 Series Routers

The following is sample output from the **show mac-address-table** command:

```
Router# show mac-address-table

Dynamic Addresses Count:                9
Secure Addresses (User-defined) Count: 0
Static Addresses (User-defined) Count: 0
```

```
System Self Addresses Count:           41
Total MAC addresses:                   50
Non-static Address Table:
Destination Address  Address Type  VLAN  Destination Port
-------------------  ------------  ----  --------------------
0010.0de0.e289       Dynamic          1  FastEthernet0/1
0010.7b00.1540       Dynamic          2  FastEthernet0/5
0010.7b00.1545       Dynamic          2  FastEthernet0/5
0060.5cf4.0076       Dynamic          1  FastEthernet0/1
0060.5cf4.0077       Dynamic          1  FastEthernet0/1
0060.5cf4.1315       Dynamic          1  FastEthernet0/1
0060.70cb.f301       Dynamic          1  FastEthernet0/1
00e0.1e42.9978       Dynamic          1  FastEthernet0/1
00e0.1e9f.3900       Dynamic          1  FastEthernet0/1
```

Catalyst 4500 Series Switches

This example shows how to display the MAC address table entries that have a specific protocol type (in this case, “assigned”):

```
Switch# show mac-address-table protocol assigned

vlan   mac address     type    protocol  qos             ports
-----+---------------+--------+---------+---+--------------------------------
 200  0050.3e8d.6400  static   assigned  --  Switch
 100  0050.3e8d.6400  static   assigned  --  Switch
   5  0050.3e8d.6400  static   assigned  --  Switch
4092  0000.0000.0000  dynamic  assigned  --  Switch
   1  0050.3e8d.6400  static   assigned  --  Switch
   4  0050.3e8d.6400  static   assigned  --  Switch
4092  0050.f0ac.3058  static   assigned  --  Switch
4092  0050.f0ac.3059  dynamic  assigned  --  Switch
   1  0010.7b3b.0978  dynamic  assigned  --  Fa5/9
Switch#
```

This example shows the “other” output for the previous example:

```
Switch# show mac-address-table protocol other

Unicast Entries
 vlan   mac address     type        protocols               port
-------+---------------+--------+---------------------+--------------------
   1    0000.0000.0201   dynamic other                  FastEthernet6/15
   1    0000.0000.0202   dynamic other                  FastEthernet6/15
   1    0000.0000.0203   dynamic other                  FastEthernet6/15
   1    0000.0000.0204   dynamic other                  FastEthernet6/15
   1    0030.94fc.0dff    static ip,ipx,assigned,other  Switch
   2    0000.0000.0101   dynamic other                  FastEthernet6/16
   2    0000.0000.0102   dynamic other                  FastEthernet6/16
   2    0000.0000.0103   dynamic other                  FastEthernet6/16
   2    0000.0000.0104   dynamic other                  FastEthernet6/16
Fa6/1   0030.94fc.0dff    static ip,ipx,assigned,other  Switch
Fa6/2   0030.94fc.0dff    static ip,ipx,assigned,other  Switch
Multicast Entries
 vlan    mac address     type    ports
-------+---------------+-------+-----------------------------------------
   1    ffff.ffff.ffff   system Switch,Fa6/15
   2    ffff.ffff.ffff   system Fa6/16
1002    ffff.ffff.ffff   system
1003    ffff.ffff.ffff   system
1004    ffff.ffff.ffff   system
1005    ffff.ffff.ffff   system
Fa6/1   ffff.ffff.ffff   system Switch,Fa6/1
Fa6/2   ffff.ffff.ffff   system Switch,Fa6/2
```

```
Switch#
```

Catalyst 6500 and 6000 Series Switches and Cisco 7600 Series Routers

The following is sample output from the **show mac-address-table** command:

```
Switch# show mac-address-table

Dynamic Addresses Count:                 9
Secure Addresses (User-defined) Count: 0
Static Addresses (User-defined) Count: 0
System Self Addresses Count:             41
Total MAC addresses:                     50
Non-static Address Table:
Destination Address  Address Type  VLAN  Destination Port
-------------------  ------------  ----  --------------------
0010.0de0.e289       Dynamic          1  FastEthernet0/1
0010.7b00.1540       Dynamic          2  FastEthernet0/5
0010.7b00.1545       Dynamic          2  FastEthernet0/5
0060.5cf4.0076       Dynamic          1  FastEthernet0/1
0060.5cf4.0077       Dynamic          1  FastEthernet0/1
0060.5cf4.1315       Dynamic          1  FastEthernet0/1
0060.70cb.f301       Dynamic          1  FastEthernet0/1
00e0.1e42.9978       Dynamic          1  FastEthernet0/1
00e0.1e9f.3900       Dynamic          1  FastEthernet0/1
```

Note In a distributed Encoded Address Recognition Logic (EARL) switch, the asterisk (*) indicates a MAC address that is learned on a port that is associated with this EARL.

This example shows how to display the information about the MAC address table for a specific MAC address with a Supervisor Engine 720:

```
Router# show mac-address-table address 001.6441.60ca

Codes: * - primary entry

  vlan   mac address     type    learn qos            ports
------+----------------+--------+-----+---+--------------------------
Supervisor:
*  ---  0001.6441.60ca    static  No    --  Router
```

This example shows how to display MAC address table information for a specific MAC address with a Supervisor Engine 720:

```
Router# show mac-address-table address 0100.5e00.0128

Legend: * - primary entry
        age - seconds since last seen
        n/a - not available

  vlan   mac address     type    learn     age              ports
------+----------------+--------+-----+----------+--------------------------
Supervisor:
*   44  0100.5e00.0128    static  Yes          -   Fa6/44,Router
*    1  0100.5e00.0128    static  Yes          -   Router
Module 9:
*   44  0100.5e00.0128    static  Yes          -   Fa6/44,Router
*    1  0100.5e00.0128    static  Yes          -   Router
```

This example shows how to display the currently configured aging time for all VLANs:

```
Router# show mac-address-table aging-time

Vlan    Aging Time
----    ----------
*100     300
200     1000
```

This example shows how to display the entry count for a specific slot:

```
Router# show mac-address-table count module 1

MAC Entries on slot 1 :
Dynamic Address Count:                4
Static Address (User-defined) Count:  25
Total MAC Addresses In Use:           29
Total MAC Addresses Available:        131072
```

This example shows how to display the information about the MAC address table for a specific interface with a Supervisor Engine 720:

```
Router# show mac-address-table interface fastethernet 6/45

Legend: * - primary entry
        age - seconds since last seen
        n/a - not available

  vlan   mac address     type    learn     age              ports
------+----------------+--------+-----+----------+--------------------------
*   45  00e0.f74c.842d   dynamic  Yes          5   Fa6/45
```

Note A leading asterisk (*) indicates entries from a MAC address that was learned from a packet coming from an outside device to a specific module.

This example shows how to display the limit information for a specific slot:

```
Router# show mac-address-table limit vlan 1 module 1

vlan    switch   module    action      maximum  Total entries  flooding
-------+--------+---------+-----------+--------+--------------+------------
1          1        7       warning      500      0             enabled
1          1        11      warning      500      0             enabled
1          1        12      warning      500      0             enabled

Router#show mac-address-table limit vlan 1 module 2

vlan    switch   module    action      maximum  Total entries  flooding
-------+--------+---------+-----------+--------+--------------+------------
1          2         7      warning      500      0             enabled
1          2         9      warning      500      0             enabled
```

The following example shows how to display the MAC-move notification status:

```
Router# show mac-address-table notification mac-move

MAC Move Notification: Enabled
Router#
```

The following example shows how to display the MAC move statistics:

```
Router> show mac-address-table notification mac-move counter
```

```
-------------------------------------------------------------------------------
Vlan Mac Address From Mod/Port To Mod/Port Count
---- ---------------- ---------------------- ---------------------- ------------
1 00-01-02-03-04-01 2/3 3/1 10
20 00-01-05-03-02-01 5/3 5/1 20
```

This example shows how to display the CAM-table utilization-notification status:

```
Router# show mac-address-table notification threshold

Status limit Interval
-------------+-----------+-------------
enabled 1 120
```

This example shows how to display the MAC notification parameters and history table:

```
Router# show mac-address-table notification change

MAC Notification Feature is Disabled on the switch
MAC Notification Flags For All Ethernet Interfaces :
--------------------------------------------------
Interface                   MAC Added Trap MAC Removed Trap
--------------------        -------------- ----------------
```

This example shows how to display the MAC notification parameters and history table for a specific interface:

```
Router# show mac-address-table notification change interface gigabitethernet5/2

MAC Notification Feature is Disabled on the switch
Interface                   MAC Added Trap MAC Removed Trap
--------------------        -------------- ----------------
GigabitEthernet5/2          Disabled       Disabled
```

This example shows how to display unicast-flood information:

```
Router# show mac-address-table unicast-flood

> > Unicast Flood Protection status: enabled
> >
> > Configuration:
> > vlan Kfps action timeout
> > ------+----------+-----------------+----------
> > 2 2 alert none
> >
> > Mac filters:
> > No. vlan source mac addr. installed
> > on time left (mm:ss)
> >
> >-----+------+----------------+-----------------------------+------------------
> >
> > Flood details:
> > Vlan source mac addr. destination mac addr.
> >
> >------+---------------+-------------------------------------------------
> > 2 0000.0000.cafe 0000.0000.bad0, 0000.0000.babe,
> > 0000.0000.bac0
> > 0000.0000.bac2, 0000.0000.bac4,
> > 0000.0000.bac6
> > 0000.0000.bac8
```

```
> > 2 0000.0000.caff 0000.0000.bad1, 0000.0000.babf,
> > 0000.0000.bac1
> > 0000.0000.bac3, 0000.0000.bac5,
> > 0000.0000.bac7
> > 0000.0000.bac9
```

This example shows how to display the information about the MAC-address table for a specific VLAN:

```
Router# show mac-address-table vlan 100

vlan   mac address     type    protocol  qos             ports
-----+---------------+--------+---------+---+--------------------------------
 100  0050.3e8d.6400  static   assigned  --  Router
 100  0050.7312.0cff  dynamic        ip  --  Fa5/9
 100  0080.1c93.8040  dynamic        ip  --  Fa5/9
 100  0050.3e8d.6400  static        ipx  --  Router
 100  0050.3e8d.6400  static      other  --  Router
 100  0100.0cdd.dddd  static      other  --  Fa5/9,Router,Switch
 100  00d0.5870.a4ff  dynamic        ip  --  Fa5/9
 100  00e0.4fac.b400  dynamic        ip  --  Fa5/9
 100  0100.5e00.0001  static         ip  --  Fa5/9,Switch
 100  0050.3e8d.6400  static         ip  --  Router
```

This example shows how to display the information about the MAC address table for MLDv2 snooping:

```
Router# show mac-address-table multicast mld-snooping

vlan mac address type learn qos ports
-----+---------------+--------+-----+---+--------------------------------
--- 3333.0000.0001 static Yes - Switch,Stby-Switch
--- 3333.0000.000d static Yes - Fa2/1,Fa4/1,Router,Switch
--- 3333.0000.0016 static Yes - Switch,Stby-Switch
```

Related Commands

Command	Description
clear mac-address-table	Deletes entries from the MAC address table.
mac-address-table aging-time	Configures the aging time for entries in the Layer 2 table.
mac-address-table limit	Enables MAC limiting.
mac-address-table notification mac-move	Enables MAC-move notification.
mac-address-table static	Adds static entries to the MAC address table or configures a static MAC address with IGMP snooping disabled for that address.
mac-address-table synchronize	Synchronizes the Layer 2 MAC address table entries across the PFC and all the DFCs.
show mac-address-table static	Displays static MAC address table entries only.

show mac-address-table aging-time

To display the MAC address aging time, use the **show mac-address-table aging-time** command in privileged EXEC mode.

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

show mac-address-table aging-time

Catalyst Switches

show mac-address-table aging-time [**vlan** *vlan-id*] [[**begin** | **exclude** | **include**] *expression*]

Syntax Description

vlan *vlan-id*	(Optional) Specifies a VLAN; valid values are from 1 to 1005.
begin	(Optional) Specifies that the output display begin with the line that matches the *expression*.
exclude	(Optional) Specifies that the output display exclude lines that match the *expression*.
include	(Optional) Specifies that the output display include lines that match the specified *expression*.
expression	Expression in the output to use as a reference point.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(7)XE	This command was introduced on Catalyst 6000 series switches.
12.2(2)XT	This command was implemented on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following example shows how to display the current configured aging time for all VLANs. The fields shown in the display are self-explanatory.

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

```
Router# show mac-address-table aging-time

    Mac address aging time 300
```

Catalyst Switches

```
Router# show mac-address-table aging-time

Vlan    Aging Time
----    ----------
100     300
200     1000
```

The following example shows how to display the current configured aging time for a specific VLAN. The fields shown in the display are self-explanatory.

```
Router# show mac-address-table aging-time vlan 100

Vlan    Aging Time
----    ----------
 100    300
```

Related Commands

Command	Description
show mac-address-table address	Displays MAC address table information for a specific MAC address.
show mac-address-table count	Displays the number of entries currently in the MAC address table.
show mac-address-table detail	Displays detailed MAC address table information.
show mac-address-table dynamic	Displays dynamic MAC address table entries only.
show mac-address-table interface	Displays the MAC address table information for a specific interface.
show mac-address-table multicast	Displays multicast MAC address table information.
show mac-address-table protocol	Displays MAC address table information based on protocol.
show mac-address-table static	Displays static MAC address table entries only.
show mac-address-table vlan	Displays the MAC address table information for a specific VLAN.

show mac-address-table dynamic

To display dynamic MAC address table entries only, use the **show mac-address-table dynamic** command in privileged EXEC mode.

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

show mac-address-table dynamic [**address** *mac-address* | **interface** *type slot/port* | **vlan** *vlan*]

Catalyst Switches

show mac-address-table dynamic [**address** *mac-address* | **detail** | **interface** *type number* | **protocol** *protocol* | | **module** *number* | **vlan** *vlan*] [[**begin** |**exclude** | **include**] *expression*]

Catalyst 6500 Series Switches

show mac-address-table dynamic [{**address** *mac-addr*} | {**interface** *interface interface-number* [**all** | **module** *number*]} | {**module** *num*} | {**vlan** *vlan-id* [**all** | **module** *number*]}]

Syntax Description

address *mac-address*	(Optional) Specifies a 48-bit MAC address; valid format is H.H.H.
detail	(Optional) Specifies a detailed display of MAC address table information.
interface *type number*	(Optional) Specifies an interface to match; valid type values are FastEthernet and GigabitEthernet, valid number values are from 1 to 9.
interface *type*	(Optional) Specifies an interface to match; valid type values are FastEthernet and GigabitEthernet.
slot	(Optional) Adds dynamic addresses to module in slot 1 or 2.
port	(Optional) Port interface number ranges based on type of Ethernet switch network module used: • 0 to 15 for NM-16ESW • 0 to 35 for NM-36ESW • 0 to 1 for GigabitEthernet
protocol *protocol*	(Optional) Specifies a protocol. See the "Usage Guidelines" section for keyword definitions.
module *number*	(Optional) Displays information about the MAC address table for a specific Distributed Forwarding Card (DFC) module.
vlan *vlan*	(Optional) Displays entries for a specific VLAN; valid values are from 1 to 1005.
begin	(Optional) Specifies that the output display begin with the line that matches the expression.
exclude	(Optional) Specifies that the output display exclude lines that match the expression.
include	(Optional) Specifies that the output display include lines that match the specified expression.

expression	Expression in the output to use as a reference point.
all	(Optional) Specifies that the output display all dynamic MAC-address table entries.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(7)XE	This command was introduced on Catalyst 6000 series switches.
12.2(2)XT	This command was implemented on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(14)SX	Support for this command was introduced on the Catalyst 6500 series switch.
12.2(33)SXH	This command was changed to support the **all** keyword on the Catalyst 6500 series switch.

Usage Guidelines

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

The **show mac-address-table dynamic** command output for an EtherChannel interface changes the port-number designation (for example, 5/7) to a port-group number.

Catalyst Switches

The keyword definitions for the protocol argument are:

- **ip**—Specifies IP protocol
- **ipx**—Specifies Internetwork Packet Exchange (IPX) protocols
- **assigned**—Specifies assigned protocol entries
- **other**—Specifies other protocol entries

The **show mac-address-table dynamic** command output for an EtherChannel interface changes the port-number designation (for example, 5/7) to a port-group number.

Catalyst 6500 Series Switches

The *mac-address* is a 48-bit MAC address and the valid format is H.H.H.

The optional **module** *num* keyword and argument are supported only on DFC modules. The **module** *num* keyword and argument designate the module number.

Examples

The following examples show how to display all dynamic MAC address entries. The fields shown in the various displays are self-explanatory.

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

```
Router# show mac-address-table dynamic

Non-static Address Table:
Destination Address  Address Type  VLAN  Destination Port
-------------------  ------------  ----  --------------------
000a.000a.000a          Dynamic       1     FastEthernet4/0
002a.2021.4567          Dynamic       2     FastEthernet4/0
```

Catalyst Switches

```
Router# show mac-address-table dynamic

vlan   mac address     type    protocol  qos             ports
-----+---------------+--------+---------+---+--------------------------------
 200  0010.0d40.37ff  dynamic        ip  --  5/8
   1  0060.704c.73ff  dynamic        ip  --  5/9
4095  0000.0000.0000  dynamic        ip  --  15/1
   1  0060.704c.73fb  dynamic     other  --  5/9
   1  0080.1c93.8040  dynamic        ip  --  5/9
4092  0050.f0ac.3058  dynamic        ip  --  15/1
   1  00e0.4fac.b3ff  dynamic     other  --  5/9
```

The following example shows how to display dynamic MAC address entries with a specific protocol type (in this case, assigned).

```
Router# show mac-address-table dynamic protocol assigned

vlan   mac address     type    protocol  qos             ports
-----+---------------+--------+---------+---+--------------------------------
4092  0000.0000.0000  dynamic  assigned  --  Router
4092  0050.f0ac.3059  dynamic  assigned  --  Router
   1  0010.7b3b.0978  dynamic  assigned  --  Fa5/9

Router#
```

The following example shows the detailed output for the previous example.

```
Router# show mac-address-table dynamic protocol assigned detail

MAC Table shown in details
=======================================
 Type   Always Learn Trap Modified Notify Capture Protocol Flood
-------+------------+----+--------+------+-------+--------+-----+
     QoS bit      L3 Spare   Mac Address  Age Byte Pvlan Xtag SWbits Index
-----------------+--------+--------------+--------+-----+----+------+-----
DYNAMIC     NO        NO     YES     NO     NO    assigned   NO
   Bit Not On        0     0000.0000.0000  255      4092   0     0     0x3

DYNAMIC     NO        NO     YES     NO     NO    assigned   NO
   Bit Not On        0     0050.f0ac.3059  254      4092   0     0     0x3

DYNAMIC     NO        NO     YES     NO     NO    assigned   NO
   Bit Not On        0     0010.7b3b.0978  254      1      0     0     0x108

Router#
```

Catalyst 6500 Series Switches

This example shows how to display all the dynamic MAC-address entries for a specific VLAN.

```
Router# show mac-address-table dynamic vlan 200 all

Legend: * - primary entry
        age - seconds since last seen
        n/a - not aevailable
vlan     mac address      type   learn    age               ports
------+----------------+--------+-----+----------+--------------------------
 200  0010.0d40.37ff   dynamic    NO      23        Gi5/8
Router#
```

This example shows how to display all the dynamic MAC-address entries.

```
Router# show mac-address-table dynamic

Legend: * - primary entry
age - seconds since last seen
n/a - not applicable
vlan     mac address      type   learn    age               ports
------+----------------+--------+-----+----------+--------------------------
* 10   0010.0000.0000   dynamic  Yes   n/a        Gi4/1
* 3    0010.0000.0000   dynamic  Yes   0          Gi4/2
* 1    0002.fcbc.ac64   dynamic  Yes   265        Gi8/1
* 1    0009.12e9.adc0   static   No    -          Router
Router#
```

Related Commands

Command	Description
show mac-address-table address	Displays MAC address table information for a specific MAC address.
show mac-address-table aging-time	Displays the MAC address aging time.
show mac-address-table count	Displays the number of entries currently in the MAC address table.
show mac-address-table detail	Displays detailed MAC address table information.
show mac-address-table interface	Displays the MAC address table information for a specific interface.
show mac-address-table multicast	Displays multicast MAC address table information.
show mac-address-table protocol	Displays MAC address table information based on protocol.
show mac-address-table static	Displays static MAC address table entries only.
show mac-address-table vlan	Displays the MAC address table information for a specific VLAN.

show mac-address-table learning

To display the MAC-address learning state, use the **show mac-address-table learning** command in user EXEC mode.

show mac-address-table learning [**vlan** *vlan-id* | **interface** *interface slot/port*] [**module** *num*]

Syntax Description

vlan *vlan-id*	(Optional) Displays information about the MAC-address learning state for the specified switch port VLAN; valid values are from 1 to 4094.
interface *interface slot/port*	(Optional) Displays information about the MAC-address learning state for the specified routed interface type, the slot number, and the port number.
module *num*	(Optional) Displays information about the MAC-address learning state for the specified module number.

Defaults

This command has no default settings.

Command Modes

User EXEC (>)

Command History

Release	Modification
12.2(18)SXE	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **module** *num* keyword and argument can be used to specify supervisor engines or Distributed Forwarding Cards (DFCs) only.

The **interface** *interface slot/port* keyword and arguments can be used on routed interfaces only. The **interface** *interface slot/port* keyword and arguments cannot be used to configure learning on switch-port interfaces.

If you specify the **vlan** *vlan-id*, the state of the MAC-address learning of the specified VLAN, including router interfaces, on all modules, is displayed.

If you specify the **vlan** *vlan-id* and the **module** *num*, the state of the MAC-address learning of a specified VLAN on a specified module is displayed.

If you specify the **interface** *interface slot/port* keyword and arguments, the state of the MAC-address learning of the specified interface on all modules is displayed.

If you specify the **interface** *interface slot/port* keyword and arguments, the state of the MAC-address learning of the specified interface on the specified module is displayed.

If you enter the **show mac-address-table learning** command with no arguments or keywords, the status of MAC learning on all the existing VLANs on all the supervisor engines or DFCs configured on a Catalyst 6500 series switch is displayed.

Examples

This example shows how to display the MAC-address learning status on all the existing VLANs on all the supervisor engines or DFCs configured on a Catalyst 6500 series switch:

```
Router# show mac-address-table learning

VLAN/Interface          Mod1   Mod4   Mod7
--------------------    ---------------------
1                       yes    yes    yes
100                     yes    yes    yes
150                     yes    yes    yes
200                     yes    yes    yes
250                     yes    yes    yes
1006                     no     no     no
1007                     no     no     no
1008                     no     no     no
1009                     no     no     no
1010                     no     no     no
1011                     no     no     no
1012                     no     no     no
1013                     no     no     no
1014                     no     no     no
GigabitEthernet6/1       no     no     no
GigabitEthernet6/2       no     no     no
GigabitEthernet6/4       no     no     no
FastEthernet3/4          no     no     no
FastEthernet3/5          no     no     no
GigabitEthernet4/1       no     no     no
GigabitEthernet4/2       no     no     no
GigabitEthernet7/1       no     no     no
GigabitEthernet7/2       no     no     no

Router#
```

Table 21 describes the fields that are shown in the example.

Table 21 show mac-address-table learning Field Descriptions

Field	Description
VLAN/Interface[1]	VLAN ID or interface type, module, and port number.
Mod#	Module number of a supervisor engine or DFC.
yes	MAC-address learning is enabled.
no	MAC-address learning is disabled.

1. The interfaces displayed are routed interfaces that have internal VLANs assigned to them.

This example shows how to display the status of MAC-address learning on all the existing VLANs on a single supervisor engine or a DFC:

```
Router# show mac-address-table learning module 4

VLAN/Interface          Mod4
--------------------    -----
1                       yes
100                     yes
150                     yes
200                     yes
250                     yes
1006                     no
1007                     no
1008                     no
```

```
1009                    no
1010                    no
1011                    no
1012                    no
1013                    no
1014                    no
GigabitEthernet6/1      no
GigabitEthernet6/2      no
GigabitEthernet6/4      no
FastEthernet3/4         no
FastEthernet3/5         no
GigabitEthernet4/1      no
GigabitEthernet4/2      no
GigabitEthernet7/1      no
GigabitEthernet7/2      no

Router#
```

This example shows how to display the status of MAC-address learning for a specific VLAN on all the supervisor engines and DFCs:

```
Router# show mac-address-table learning vlan 100

VLAN    Mod1   Mod4   Mod7
----    ---------------------
100      no     no     yes
Router
```

This example shows how to display the status of MAC-address learning for a specific VLAN on a specific supervisor engine or DFC:

```
Router# show mac-address-table learning vlan 100 module 7

VLAN    Mod7
----    -----
100     yes
Router
```

This example shows how to display the status of MAC-address learning for a specific supervisor engine or DFC:

```
Router# show mac-address-table learning interface FastEthernet 3/4

Interface       Mod1   Mod4   Mod7
---------       ---------------------
Fa3/4            no     yes    no
Router
```

This example shows how to display the status of MAC-address learning for a specific interface on a specific supervisor engine or DFC:

```
Router# show mac-address-table learning interface FastEthernet 3/4 module 1

Interface       Mod1
---------       -----
Fa3/4            no
Router
```

Related Commands

Command	Description
mac-address-table learning	Enables MAC-address learning.

show mac-address-table static

To display static MAC address table entries only, use the **show mac-address-table static** command in privileged EXEC mode.

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

show mac-address-table static [**address** *mac-address* | **interface** *type slot/port* | **vlan** *vlan*]

Catalyst Switches

show mac-address-table static [**address** *mac-address* | **detail** | **interface** *type number* | **protocol** *protocol* | **vlan** *vlan-id*] [[**begin** | **exclude** | **include**] *expression*]

Syntax Description

address *mac-address*	(Optional) Specifies a 48-bit MAC address to match; valid format is H.H.H.
detail	(Optional) Specifies a detailed display of MAC address table information.
interface *type number*	(Optional) Specifies an interface to match; valid type values are Ethernet, FastEthernet, and Gigabit Ethernet and valid number values are from 1 to 9.
interface *type*	(Optional) Specifies an interface to match; valid type values are FastEthernet and Gigabit Ethernet.
slot	(Optional) Adds dynamic addresses to module in slot 1 or 2.
port	(Optional) Port interface number ranges based on type of Ethernet switch network module used: • 0 to 15 for NM-16ESW • 0 to 35 for NM-36ESW • 0 to 1 for Gigabit Ethernet
protocol *protocol*	(Optional) Specifies a protocol. See the "Usage Guidelines" section for keyword definitions.
vlan *vlan*	(Optional) Displays entries for a specific VLAN; valid values are from 1 to 1005.
begin	(Optional) Specifies that the output display begin with the line that matches the expression.
exclude	(Optional) Specifies that the output display exclude lines that match the expression.
include	(Optional) Specifies that the output display include lines that match the expression.
expression	Expression in the output to use as a reference point.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(7)XE	This command was introduced on Catalyst 6000 series switches.
12.2(2)XT	This command was implemented on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Catalyst Switches

The keyword definitions for the protocol argument are:

- **ip**—Specifies IP protocol
- **ipx**—Specifies Internetwork Packet Exchange (IPX) protocols
- **assigned**—Specifies assigned protocol entries
- **other**—Specifies other protocol entries

Examples

The following examples show how to display all static MAC address entries. The fields shown in the various displays are self-explanatory.

Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers

```
Router# show mac-address-table static

Static Address Table:
Destination Address  Address Type  VLAN  Destination Port
-------------------  ------------  ----  --------------------
2323.3214.5432          Static        4     FastEthernet4/1
2323.3214.5431          Static        5     FastEthernet4/1
2323.3214.5432          Static        6     FastEthernet4/1
2323.3214.5434          Static        7     FastEthernet4/1
2323.3214.5435          Static        8     FastEthernet4/1
```

Catalyst Switches

```
Router# show mac-address-table static

*Oct 22 12:15:35: %SYS-5-CONFIG_I: Configured from console by console
vlan   mac address     type    protocol  qos             ports
-----+---------------+--------+---------+---+--------------------------------
 200  0050.3e8d.6400  static   assigned  --  Router
 100  0050.3e8d.6400  static   assigned  --  Router
4092  0050.f0ac.3058  static      other  --  Router
 917  0100.0cdd.dddd  static      other  --  Fa5/9,Router,Switch
   5  0050.3e8d.6400  static   assigned  --  Router
 303  0100.0cdd.dddd  static      other  --  Fa5/9,Router,Switch
 850  0100.0cdd.dddd  static      other  --  Fa5/9,Router,Switch
1002  0100.0cdd.dddd  static      other  --  Fa5/9,Router,Switch
 802  0100.0cdd.dddd  static      other  --  Fa5/9,Router,Switch
```

```
   2  0100.0cdd.dddd  static      other  --  Fa5/9,Router,Switch
 304  0100.5e00.0001  static         ip  --  Fa5/9,Switch
.
.
.
```

The following example shows how to display static MAC address entries with a specific protocol type (in this case, assigned).

```
Router# show mac-address-table static protocol assigned

vlan   mac address     type    protocol  qos             ports
-----+---------------+--------+---------+---+--------------------------------
 200  0050.3e8d.6400  static   assigned  --  Router
 100  0050.3e8d.6400  static   assigned  --  Router
   5  0050.3e8d.6400  static   assigned  --  Router
```

The following example shows the detailed output for the previous example.

```
Router# show mac-address-table static protocol assigned detail

       MAC Table shown in details
=======================================
 Type   Always Learn Trap Modified Notify Capture Protocol Flood
-------+------------+----+--------+------+-------+--------+-----+
     QoS bit      L3 Spare   Mac Address  Age Byte Pvlan Xtag SWbits Index
-----------------+--------+--------------+--------+-----+----+------+-----
STATIC      NO        NO     NO      NO     NO    assigned   NO
   Bit Not On        0     0050.3e8d.6400  254      200    1     0     0x3

STATIC      NO        NO     NO      NO     NO    assigned   NO
   Bit Not On        0     0050.3e8d.6400  254      100    1     0     0x3

STATIC      NO        NO     NO      NO     NO    assigned   NO
   Bit Not On        0     0050.3e8d.6400  254      5      1     0     0x3

S   Bit Not On        0     0050.f0ac.3058  254      4092   1     0     0x3
.
.
.
```

Cisco 7600 Series Routers

This example shows how to display all the static MAC address entries; this Catalyst 6500 series switch is configured with a Supervisor Engine 720.

```
Router# show mac-address-table static

Codes: * - primary entry

  vlan   mac address     type    learn qos            ports
------+---------------+--------+-----+---+--------------------------
*  ---  0001.6441.60ca    static  No    --  Router
```

Related Commands

Command	Description
show mac-address-table address	Displays MAC address table information for a specific MAC address.
show mac-address-table aging-time	Displays the MAC address aging time.
show mac-address-table count	Displays the number of entries currently in the MAC address table.
show mac-address-table detail	Displays detailed MAC address table information.
show mac-address-table dynamic	Displays dynamic MAC address table entries only.
show mac-address-table interface	Displays the MAC address table information for a specific interface.
show mac-address-table multicast	Displays multicast MAC address table information.
show mac-address-table protocol	Displays MAC address table information based on protocol.
show mac-address-table vlan	Displays the MAC address table information for a specific VLAN.

show mls df-table

To display information about the multilayer switching (MLS) Don't Fragment (DF) table, use the **show mls df-table** command in privileged EXEC mode.

show mls df-table *start-vlan end-vlan*

Syntax Description

start-vlan	Start of a range of VLAN IDs; valid values are from 1 to 4094.
end-vlan	End of a range of VLAN IDs; valid values are from 1 to 4094.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

You must identify the active Supervisor Engine by using the **show module** command; and start a command-line interface sesssion with the active Supervisor Engine by using the **attach** command in privileged EXEC mode, before you can use the **show mls df-table** command.

In the output display, the following applies:

- 1 indicates that DF is enabled.
- 0 indicates that DF is disabled.

Examples

This example shows how to display the DF-table contents on the Supervisor Engine for a range of VLANs. The fields shown in the display are self-explanatory.

```
Router# remote login switch

Trying Switch ...
Entering CONSOLE for Switch
Type "^C^C^C" to end this session


Router-sp#

Router-sp# show mls df-table 201 212

TYCHO FIB DF Table

vlan   df_index
       3 2 1 0
-----+----------
 201   0 0 0 0
 202   0 0 0 0
```

```
 203    0 0 0 0
 204    0 0 0 0
 205    0 0 0 0
 206    0 0 0 0
 207    0 0 0 0
 208    0 0 0 0
 209    0 0 0 0
 210    0 0 0 0
 211    0 0 0 0
 212    0 0 0 0
Router-sp#
```

Related Commands

Command	Description
show mls asic	Displays the ASIC version.
show mls ip	Displays the MLS IP information.
show mls ipx	Displays the MLS IPX information.
show mls qos	Displays MLS QoS information.
show mls statistics	Displays the MLS statistics for the IP.

show mls masks

To display the details of the access control parameters (ACPs) that are used for multilayer switching (MLS) quality of service (QoS) and security access control lists (ACLs), use the **show mls masks** command in privileged EXEC mode.

show mls masks [**qos** | **security**]

Syntax Description

qos	(Optional) Displays details of ACPs used for QoS ACLs.
security	(Optional) Displays details of ACPs used for security ACLs.

Note ACPs are called masks in the command-line interface (CLI) commands and output.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.1(6)EA2	This command was introduced.
12.2(15)ZJ	This command was implemented on the following platforms: Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T on the following platforms: Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **show mls mask** command without keywords to display all ACPs configured on the switch.

Use this command with the **qos** keyword to display the ACPs used for QoS ACLs.

Use this command with the **security** keyword to display the ACPs used for security ACLs.

Note You can configure up to four ACPs (QoS and security) on a switch.

Examples

The following is sample output from the **show mls masks** command. In this example, Mask 1 is a QoS ACP consisting of an IP source address (with wildcard bits 0.0.0.255), an IP destination address, and Layer 4 destination port fields. This ACP is used by the QoS policy maps pmap1 and pmap2.

The fields shown in the display are self-explanatory.

```
Router# show mls masks

Mask1
        Type : qos
        Fields : ip-sa(0.0.0.255), ip-da(host), dest-port
        Policymap: pmap1
            Interfaces: Fa0/9, Gi0/1
        Policymap: pmap2
            Interfaces: Fa0/1, Fa0/5, Fa0/13
```

Related Commands

Command	Description
ip access-group	Applies an IP ACL to an interface.
policy-map	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.

show mls rp

To display multilayer switching (MLS) details, including specifics for the Multilayer Switching Protocol (MLSP), use the **show mls rp** command in user EXEC mode or privileged EXEC mode.

show mls rp [*interface*]

Syntax Description

interface	(Optional) Displays information for one interface. Without this argument, detailed views of all interfaces are displayed.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
11.3(3)WA4(4)	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show mls rp** command. The fields shown in the display are self-explanatory.

```
Router# show mls rp

multilayer switching is globally enabled
mls id is 00e0.fefc.6000
mls ip address 10.20.26.64
mls flow mask is ip-flow
vlan domain name: WBU
   current flow mask: ip-flow
   current sequence number: 80709115
   current/maximum retry count: 0/10
   current domain state: no-change
   current/next global purge: false/false
   current/next purge count: 0/0
   domain uptime: 13:03:19
   keepalive timer expires in 9 seconds
   retry timer not running
   change timer not running
   fcp subblock count = 7

   1 management interface(s) currently defined:
      vlan 1 on Vlan1

   7 mac-vlan(s) configured for multi-layer switching:

      mac 00e0.fefc.6000
         vlan id(s)
         1    10   91   92   93   95   100
```

```
   router currently aware of following 1 switch(es):
      switch id 0010.1192.b5ff
```

The following is sample output from the **show mls rp** command for a specific interface:

```
Router# show mls rp int vlan 10

mls active on Vlan10, domain WBU
```

Related Commands

Command	Description
mls rp ip	Enables MLSP.
mls rp management-interface	Designates an interface as the management interface for MLSP packets.
mls rp nde-address	Specifies a NetFlow Data Export address.
mls rp vlan-id	Assigns a VLAN ID.
mls rp vtp-domain	Selects the router interface to be Layer 3 switched and then adds that interface to a VTP domain.
show mls rp vtp-domain	Displays MLS interfaces for a specific VTP domain.

show mls rp interface

To display Internetwork Packet Exchange (IPX) multilayer switching (MLS) details for the route processor (RP), including specific information about the Multilayer Switching Protocol (MLSP), use the **show mls rp interface** command in user EXEC mode or privileged EXEC mode.

show mls rp interface *type number*

Syntax Description

type	Interface type.
number	Interface number.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following displays sample output from the **show mls rp interface** command. The interface type is VLAN, and its number is 10. The fields shown in the display are self-explanatory.

```
Router# show mls rp interface vlan 10

    IPX MLS active on Vlan 10, domain WBU
```

Related Commands

Command	Description
mls rp ipx (global)	Enables the router as an IPX MLS RP.
mls rp locate ipx	Displays information about all switches currently shortcutting for the specified IPX flows.
mls rp vtp-domain	Assigns an MLS interface to a specific VTP domain on the MLS RP.
mls rp management-interface	Designates an interface as the management interface for MLSP packets.
mls rp vlan-id	Assigns a VLAN identification number to an IPX MLS interface.
show mls rp ipx	Displays details for all IPX MLS interfaces on the IPX MLS router.
show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the route processor.

show mls rp ip multicast

To display hardware-switched multicast flow information about IP multicast multilayer switching (MLS), use the **show mls rp ip multicast** command in user EXEC mode or privileged EXEC mode.

show mls rp ip multicast [**locate**] [*group* [*source*] [*vlan-id*]] [**statistics**] [**summary**]

Syntax Description

locate	(Optional) Displays flow information associated with the switch. This keyword applies only to a single router and multiple switches.
group	(Optional) Address of the IP multicast group about which to display information.
source	(Optional) IP multicast source sending to the specified multicast group about which to display information.
vlan-id	(Optional) Source VLAN about which to display information.
statistics	(Optional) Displays MLS statistics.
summary	(Optional) Displays MLS summary.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output of the **show mls rp ip multicast** command using the **locate** keyword:

```
Router# show mls rp ip multicast locate

Source           Group            Vlan  SwitchIP         SwitchMAC
------           -----            ----  --------         ---------
192.168.10.6     239.255.158.197  10    192.168.10.199   0010.a60b.b4ff
```

The following is sample output of the **show mls rp ip multicast** command for a specific IP multicast group:

```
Router# show mls rp ip multicast 224.1.1.1

Multicast hardware switched flows:
(10.1.13.1, 224.1.1.1) Incoming interface: Vlan13, Packets switched: 61590
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan13

(10.1.9.3, 224.1.1.1) Incoming interface: Vlan9, Packets switched: 0
Hardware switched outgoing interfaces: Vlan20
MFD installed: Vlan9
```

```
(10.1.12.1, 224.1.1.1) Incoming interface: Vlan12, Packets switched: 62010
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan12

(10.1.12.3, 224.1.1.1) Incoming interface: Vlan12, Packets switched: 61980
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan12

(10.1.11.1, 224.1.1.1) Incoming interface: Vlan11, Packets switched: 62430
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan11

(10.1.11.3, 224.1.1.1) Incoming interface: Vlan11, Packets switched: 62430
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan11

Total shortcut installed: 6
```

The following is sample output of the **show mls rp ip multicast** command using the **statistics** keyword:

```
Router# show mls rp ip multicast statistics

MLS Multicast Operation Status:
MLS Multicast configuration and state:
    Router Mac: 0010.298f.0009
    Switch Mac: 0010.0d70.a3ff      Switch IP: 10.2.10.195
    MLS Multicast Operating state: ACTIVE
    Active management vlan: Vlan1, 192.1.4.1
    User configured management vlan: None, 0.0.0.0
    Include-List: IP1 = 192.168.28.2, IP2 = 10.0.0.0
    Router IP used in MLS Multicast messages: 192.168.28.2

MLS Multicast statistics:
    Keepalive sent: 90
    Keepalive ACK received: 90
    Open request sent: 3
    Open request ACK received: 3
    Delete notifications received: 3
    Flow statistics messages received: 181
    Flow message sent: 14
    Flow message Ack received: 14
    Flow message Nack received: 0

    Flow install Ack: 2
    Flow install Nack: 0
    Flow update Ack: 7
    Flow update Nack: 0
    Flow delete Ack: 0
    Complete flow install Ack: 3
    Complete flow install Nack: 0
    Complete flow delete Ack: 1
    Input vlan delete Ack: 0
    Output vlan delete Ack: 0
    Global delete sent: 1

    L2 entry not found error: 0
    LTL entry not found error: 0
    MET entry not found error: 0
    L3 entry not found error: 0
    L3 entry exists error : 0
    Hash collision error : 0
```

```
    Sequence number error : 0
    None-supported error : 0
    Generic error : 0
```

The following is sample output of the **show mls rp ip multicast** command using the **summary** keyword:

```
Router# show mls rp ip multicast summary

Switch IP:10.0.0.0  Switch MAC:0000.0000.0000
Number of complete flows: 0
Total hardware-switched flows: 0

Switch IP:10.2.10.199  Switch MAC:0010.a60b.b4ff
Number of complete flows: 1
Total hardware-switched flows: 1
```

Related Commands

Command	Description
mls rp ip multicast	Enables IP multicast MLS (hardware switching) on an external or internal router in conjunction with Layer 3 switching hardware for the Catalyst 5000 switch.

show mls rp ipx

To display details for all Internetwork Packet Exchange (IPX) multilayer switching (MLS) interfaces on the IPX MLS router, use the **show mls rp ipx** command in privileged EXEC mode.

show mls rp ipx

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command gives you details about the following:

- MLS status (enabled or disabled) for switch interfaces and subinterfaces
- Flow mask required when creating Layer 3 switching entries for the router
- Current settings for the keepalive timer, retry timer, and retry count
- MLS identifier used in Multilayer Switching Protocol (MLSP) messages
- List of all interfaces in all Virtual Trunking Protocol (VTP) domains enabled for MLS

Examples

The following example shows sample output from the **show mls rp ipx** command for all IPX MLS interfaces on an MLS route processor (RP). The fields shown in the display are self-explanatory.

```
Router# show mls rp ipx

    ipx multilayer switching is globally enabled
    ipx mls inbound acl override is globally disabled
    mls id is 0050.73ff.b580
    mls ip address 5.5.5.155
    IPX MLS flow mask is source-destination
    number of domains configured for mls 1

    vlan domain name:Engineering
           current ipx flow mask:source-destination
           ipx current/next global purge:false/false
           ipx current/next purge count:0/0
           current sequence number:4086390283
           current/maximum retry count:0/10
           current domain state:no-change
           domain uptime:03:13:09
           keepalive timer expires in 3 seconds
```

```
    retry timer not running
    change timer not running

1 management interface(s) currently defined:
       vlan 21 on Vlan21

2 mac-vlan(s) enabled for ipx multi-layer switching:

       mac 0010.0738.2917
          vlan id(s)
          22

       mac 0050.73ff.b5b8
          vlan id(s)
          21

router currently aware of following 1 switch(es):
       switch id 00e0.fe4a.aeff
```

Related Commands

Command	Description
mls rp ipx (global)	Enables the router as an IPX MLS RP.
mls rp locate ipx	Displays information about all switches currently shortcutting for the specified IPX flows.
mls rp management-interface	Designates an interface as the management interface for MLSP packets.
mls rp vlan-id	Assigns a VLAN identification number to an IPX MLS interface.
show mls rp interface	Displays IPX MLS details for the RP, including specific information about the MLSP.
show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the RP.

show mls rp vtp-domain

To display Internetwork Packet Exchange (IPX) multilayer switching (MLS) interfaces for a specific Virtual Trunking Protocol (VTP) domain on a Route Processor (RP), use the **show mls rp vtp-domain** command in privileged EXEC mode.

show mls rp vtp-domain *domain-name*

Syntax Description

domain-name	The name of the VTP domain whose MLS interfaces will be displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.3(3)WA4(4)	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

This example shows details about IPX MLS interfaces in a VTP domain named WBU. The fields shown in the display are self-explanatory.

```
Router# show mls rp vtp-domain WBU

    vlan domain name: WBU
    current ipx flow mask: destination
           ipx current/next global purge: false/false
           ipx current/next purge count: 0/0
           current ipx flow mask: destination
           ipx current/next global purge: false/false
           ipx current/next purge count: 0/0
           current sequence number: 590678296
           current/maximum retry count: 0/10
           current domain state: no-change
           domain uptime: 1d14h
           keepalive timer expires in 3 seconds
           retry timer not running
           change timer not running
           fcp subblock count = 20

       1 management interface(s) currently defined:
              vlan 2 on Vlan2

       20 mac-vlan(s) configured for multi-layer switching

       17 mac-vlan(s) enabled for ipx multi-layer switching:

              mac 0010.0738.2917
                 vlan id(s)
         2    3    4    5    6    7    8    9    10   12   13
         14   15   88   99
```

```
       mac 0090.6dfc.5800
          vlan id(s)
          20   21

18 mac-vlan(s) enabled for ipx multi-layer switching:

       mac 0010.0738.2917
          vlan id(s)
          2    3    4    5    6    7    8    9    10   11   12
          13   14   15   66   77   88   99

router currently aware of following 1 switch(es):
       switch id 0010.141f.6fff
```

Related Commands

Command	Description
mls rp ipx (global)	Enables the router as an IPX MLS RP.
mls rp locate ipx	Displays information about all switches currently shortcutting for the specified IPX flows.
mls rp management-interface	Designates an interface as the management interface for MLSP packets.
mls rp vlan-id	Assigns a VLAN identification number to an IPX MLS interface.
show mls rp interface	Displays IPX MLS details for the RP, including specific information about the MLSP.
show mls rp ipx	Displays details for all IPX MLS interfaces on the IPX MLS router.
show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the RP.

show mmls igmp explicit-tracking

To display information about the host-tracking database, use the **show mmls igmp explicit-tracking** command in privileged EXEC mode.

show mmls igmp explicit-tracking [*vlan-id*]

Syntax Description

vlan-id	(Optional) VLAN ID; valid values are 1 to 4094.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

Examples

This example shows how to display information about the host-tracking database for a specific VLAN. The fields shown in the display are self-explanatory.

```
Switch-sp# show mmls igmp explicit-tracking 27

Source/Group                    Interface    Reporter        Filter_mode
------------------------------------------------------------------------
10.1.1.1/224.1.1.1              Vl27:3/25    10.27.2.3       INCLUDE
10.2.2.2/224.1.1.1              Vl27:3/25    10.27.2.3       INCLUDE
Router#
```

show mmls msc

To display information about Multicast Multilayer Switching (MMLS), use the **show mmls msc** command in privileged EXEC mode.

show mmls msc [**cache** | **entry** | **icroif-cache** | **rpdf-cache** | **statistics** | **vpn**]

Syntax Description

cache	(Optional) Displays information about the multicast shortcuts for the process cache.
entry	(Optional) Displays information about the dump-hardware entries in Layer 3.
icroif-cache	(Optional) Displays information about the dump-ICROIF cache.
rpdf-cache	(Optional) Displays information about the dump-bidirectional (Bidir) RPDF cache.
statistics	(Optional) Displays statistics on the multicast-shortcuts process.
vpn	(Optional) Displays information about Virtual Private Networks (VPNs).

Command Default

MMLS information is not displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

Examples

This example shows how to display information about MMLS. The fields are self-explanatory.

```
Router# remote login switch
Trying Switch ...
Entering CONSOLE for Switch
Type "^C^C^C" to end this session


Router#

Router# show mmls msc

     General Info
     ------------------------------------------------------+------+
     Number shortcuts in software database              1890
     Number of MFD in software database                 1890
     Router MAC                                         0001.64f8.1b00
```

```
     Internal Vlan                                    4093
     Aggregation Vlan                                 0
     Aggregation Indexes                              0
     Current Size of inputQ                           0
     Maximum Size of inputQ                           2
     flow statistics timeout [sec]                    25
     non-rpf MFDs purge timeout [sec]                 20
     non-rpf MFDs aging timeout [sec]                 2.0
Router#
```

This example shows how to display information about the MMLS shortcut-process cache:

```
Router# show mmls msc cache

     -------------macg cache buckets for vpn 0-----------------
     Bucket 90 #g: 1
     Group mac address: 0100.5e01.0105
       $$$ (S,G,C): (10.0.0.4, 224.1.1.5, 100)      mfd_flag: 1  type: Sparse
       $$$ (S,G,C): (0.0.0.0, 224.1.1.5, 1)      mfd_flag: 1  type: Sparse
       ### vlan:  100   sc_count:     0 rpf_count:     1
       ### vlan:    1   sc_count:     0 rpf_count:     1
     Bucket 91 #g: 1
     Group mac address: 0100.5e01.0104
       $$$ (S,G,C): (10.0.0.4, 224.1.1.4, 100)      mfd_flag: 1  type: Sparse
       $$$ (S,G,C): (0.0.0.0, 224.1.1.4, 1)      mfd_flag: 1  type: Sparse
       ### vlan:  100   sc_count:     0 rpf_count:     1
       ### vlan:    1   sc_count:     0 rpf_count:     1
     Bucket 92 #g: 1
     Group mac address: 0100.5e01.0103
       $$$ (S,G,C): (10.0.0.4, 224.1.1.3, 100)      mfd_flag: 1  type: Sparse
       $$$ (S,G,C): (0.0.0.0, 224.1.1.3, 1)      mfd_flag: 1  type: Sparse
       ### vlan:  100   sc_count:     0 rpf_count:     1
       ### vlan:    1   sc_count:     0 rpf_count:     1
     Bucket 93 #g: 1
     Group mac address: 0100.5e01.0102
       $$$ (S,G,C): (10.0.0.4, 224.1.1.2, 100)      mfd_flag: 1  type: Sparse
       $$$ (S,G,C): (0.0.0.0, 224.1.1.2, 1)      mfd_flag: 1  type: Sparse
       ### vlan:  100   sc_count:     0 rpf_count:     1
       ### vlan:    1   sc_count:     0 rpf_count:     1
     Bucket 94 #g: 1
     Group mac address: 0100.5e01.0101
       $$$ (S,G,C): (10.0.0.4, 224.1.1.1, 100)      mfd_flag: 1  type: Sparse
       $$$ (S,G,C): (0.0.0.0, 224.1.1.1, 1)      mfd_flag: 1  type: Sparse
       ### vlan:  100   sc_count:     0 rpf_count:     1
       ### vlan:    1   sc_count:     0 rpf_count:     1
Router#
```

This example shows how to display dump ICROIF-cache information:

```
Router# show mmls msc icroif-cache

     msc_local_icroif_index:  0x493
     msc_global_icroif_index: 0x494

     ICROIF CACHE:
     -------------
     Module mask: 0x8       Icroif_index: 0x495
Router#
```

This example shows how to display a dump list of DF interfaces for the PIM-RPs:

```
Router# show mmls msc rpdf-cache

--------------- RP-CACHE [VPN-0] --------------
```

```
Bucket# :0

        RP-addr: 10.1.0.1, Rpf: 0 Vpn: 0
        DF-index: 0
        DF-list:  201  202  203  204  205  206  207  208  209  210
                  211  212
        Group-list:
                (224.1.0.0/24, H)
        G/m-count: 1, G/32-count: 1

Bucket# :2

        RP-addr: 10.3.0.1, Rpf: 0 Vpn: 0
        DF-index: 2
        DF-list:  201  202  203  204  205  206  207  208  209  210
                  211  212
        Group-list:
                (224.1.2.0/24, H)
        G/m-count: 1, G/32-count: 0

Bucket# :3

        RP-addr: 10.2.0.1, Rpf: 0 Vpn: 0
        DF-index: 1
        DF-list:  201  202  203  204  205  206  207  208  209  210
                  211  212
        Group-list:
                (224.1.1.0/24, H)
        G/m-count: 1, G/32-count: 1

Bucket# :5

        RP-addr: 10.4.0.1, Rpf: 0 Vpn: 0
        DF-index: 3
        DF-list:  201  202  203  204  205  206  207  208  209  210
                  211  212
        Group-list:
                (224.1.3.0/24, H)
        G/m-count: 1, G/32-count: 0
Router#
```

This example shows how to display the statistics for the multicast-shortcut process:

```
Router# show mmls msc statistics

     Communication Statistics
     ------------------------------------------------+------+
     Number MSM PDU Received                           1
     Number MSM PDU Sent                               1
     Unsolicited Feature Notification Sent             1
     Feature Notification Received                     2
     Feature Notification Sent                         2
     Stop retry  Sent                                  0
     Stop download Sent                                0

     Error Statistics
     ------------------------------------------------+------+
     L2 entry not found                                0
     LTL full error                                    0
     MET full error                                    0

     Debug Statistics
     ------------------------------------------------+------+
```

```
HW Met failure                                    0
HW Dist failure                                   0
HW L3 Install failure                             0
HW L3 Update failure                              0

TLV Statistics
-------------------------------------------------+------+
INSTALL TLV Received                              0
SELECTIVE DELETE TLV Received                     0
GROUP DELETE TLV Received                         0
UPDATE TLV Received                               0
INPUT VLAN DELETE TLV Received                    0
OUTPUT VLAN DELETE TLV Received                   0
GLOBAL DELETE TLV Received                        0
MFD INSTALL TLV Received                          0
MFD DELETE TLV Received                           0
MFD GLOBAL DELETE Received                        0
NRPF MFD INSTALL TLV Received                     0
NRPF MFD DELETE TLV Received                      0
SUBNET INSTALL TLV Received                       15
SUBNET DELETE TLV Received                        0
MVPN INSTALL TLV Received                         0
MVPN SELECTIVE DELETE TLV Received                0
MVPN UPDATE TLV Received                          0
MVPN GROUP DELETE TLV Received                    0
MVPN MFD INSTALL TLV Received                     0
MVPN MFD DELETE TLV Received                      0
MVPN BIDIR RPDF UPDATE TLV Received               0
MVPN BIDIR RP UPDATE TLV Received                 0
MVPN BIDIR CLEAR ALL GRP TLV Received             0
MVPN BIDIR CLEAR RP GRP TLV Received              0
MVPN BIDIR CLEAR ALL DF TLV Received              0
MVPN BIDIR CLEAR RP DF TLV Received               0
MVPN BIDIR CLEAR ALL RP TLV Received              0
MVPN BIDIR NONDF INSTALL TLV Received             0

INSTALL TLV Ack Sent                              0
SELECTIVE DELETE TLV Ack Sent                     0
GROUP DELETE TLV Ack Sent                         0
UPDATE TLV Ack Sent                               0
INPUT VLAN DELETE TLV Ack Sent                    0
OUTPUT VLAN DELETE TLV Ack Sent                   0
GLOBAL DELETE TLV Ack Sent                        0
MFD INSTALL TLV Ack Sent                          0
MFD DELETE TLV Ack Sent                           0
MFD GLOBAL DELETE Ack Sent                        0
NRPF MFD INSTALL TLV Ack Sent                     0
NRPF MFD DELETE TLV Ack Sent                      0
SUBNET INSTALL TLV Ack Sent                       15
SUBNET DELETE TLV Ack Sent                        0
MVPN INSTALL TLV Ack Sent                         0
MVPN SELECTIVE DELETE TLV Ack Sent                0
MVPN UPDATE TLV Ack Sent                          0
MVPN GROUP DELETE TLV Ack Sent                    0
MVPN MFD INSTALL TLV Ack Sent                     0
MVPN MFD DELETE TLV Ack Sent                      0
MVPN BIDIR RPDF UPDATE TLV Ack Sent               0
MVPN BIDIR RP UPDATE TLV Ack Sent                 0
MVPN BIDIR CLEAR ALL GRP TLV Ack Sent             1
MVPN BIDIR CLEAR RP GRP TLV Ack Sent              0
MVPN BIDIR CLEAR ALL DF TLV Ack Sent              0
MVPN BIDIR CLEAR RP DF TLV Ack Sent               0
MVPN BIDIR CLEAR ALL RP TLV Ack Sent              0
MVPN BIDIR NONDF INSTALL TLV Ack Sent             0
```

```
     TLV Error Statistics
     ------------------------------------------------+------+
     Generic error                                    0
     L3 entry exist error                             0
     Hash collision error                             0
     L3 entry not found                               0
     MFD exist error                                  0
     MFD not found error                              0
     Invalid subnet error                             0
     Bidir-RP not found error                         0
     Bidir-DF partial fail error                      0
     Bidir-DF Table full error                        0

     TLV Debug Statistics
     ------------------------------------------------+------+
     Non RPF L3 failure                               0
     Bidir DF install                                 0
     Bidir DF failure                                 0
     Bidir NDF install                                0
     Bidir NDF failure                                0
     Bidir DF err-tlv sent                            0
     Bidir GRP err-tlv sent                           0
Router#
```

Related Commands

Command	Description
show mls asic	Displays the ASIC version.
show mls df-table	Displays information about the DF table.
show mls ip	Displays the MLS IP information.
show mls ipx	Displays the MLS IPX information.
show mls qos	Displays MLS QoS information.
show mls statistics	Displays the MLS statistics for the IP.

show mvrp interface

To display Multiple VLAN Registration Protocol (MVRP) interface states, use the **show mvrp interface** command in privileged EXEC mode.

show mvrp interface [*type slot/port*] [**statistics**]

Syntax Description

type slot/port	(Optional) The interface for which information is displayed.
statistics	(Optional) Displays MVRP statistics information for the MVRP port.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXI	This command was introduced.

Usage Guidelines

Use this command to display MVRP interface details of the administrative and operational MVRP states of all or one particular IEEE 802.1q trunk port in the device.

Examples

The following example shows sample output. The fields are self-explanatory.

```
Router# show mvrp interface

Port      Status   Registrar State
Fa3/1     off      normal

Port      Join Timeout   Leave Timeout   Leaveall Timeout
Fa3/1     201 600        700             1000

Port      Vlans Declared
Fa3/1     none

Port      Vlans Registered
Fa3/1     none

Port      Vlans Registered and in Spanning Tree Forwarding State
Fa3/1     none
```

Related Commands

Command	Description
show mvrp summary	Displays the MVRP configuration at the device level.

show mvrp module

To display Multiple VLAN Registration Protocol (MVRP)-related information for a specific module, use the **show mvrp module** command in privileged EXEC mode.

show mvrp module *module-number*

Syntax Description

module-number	Indicates the module for which information is displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXI	This command was introduced.

Usage Guidelines

Use this command to display MVRP module details of the administrative and operational MVRP states of all or one particular IEEE 802.1q trunk port in the device.

Examples

The following example shows sample summary output. The fields are self-explanatory.

```
Router# show mvrp module 3

Port      Status   Registrar State
Fa3/1     off      normal

Port      Join Timeout   Leave Timeout   Leaveall Timeout
Fa3/1     201          700             1000
Fa3/5    201           700             1000

Port      Vlans Declared
Fa3/1     none
Fa3/5      3,100

Port      Vlans Registered
Fa3/1     none
Fa3/5      3,100

Port      Vlans Registered and in Spanning Tree Forwarding State
Fa3/1     none
Fa3/5      3
```

Related Commands

Command	Description
show mvrp summary	Displays the MVRP configuration at the device level.

show mvrp summary

To display the Multiple VLAN Registration Protocol (MVRP) configuration at the device level, use the **show mvrp summary** command in privileged EXEC mode.

show mvrp summary

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXI	This command was introduced.

Usage Guidelines

Use this command to display MVRP configuration details.

Examples

The following example shows sample summary output for a device with MVRP configured. The fields are self-explanatory.

```
Router# show mvrp summary

MVRP global state           : enabled
MVRP VLAN creation          : disabled
VLANs created via MVRP      : 20-45, 3001-3050
Learning disabled on VLANs: none
```

Related Commands

Command	Description
show mvrp interface	Displays details of the administrative and operational MVRP states of all or one particular IEEE 802.1q trunk port in the device.

show platform software status control-processor

To display status information about the control processors, use the **show platform software status control-processor** command in privileged EXEC or diagnostic mode.

show platform software status control-processor [**brief**]

Syntax Description

brief	(Optional) Displays summary status information for the control processors.

Command Modes

Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Aggregation Services Routers.
Cisco IOS XE Release 2.2	This command was modified. The **brief** keyword was added.

Usage Guidelines

Control processors consist of Embedded Services Processors (ESPs), Route Processors (RPs), and SPA Interface Processors (SIPs).

Use the **show platform software status control-processor** command to provide a quick view of the health of the system concerning memory and CPU usage on each processor.

The CPU usage output reflects the relative percentage of CPU usage during the latest two seconds instead of the cumulative percent usage over the entire uptime.

All control processors should show a status of Healthy. Other possible status values are Warning and Critical. Warning indicates that the router is operational but that the operating level should be reviewed. Critical implies that the router is near failure.

If you see a status of Warning or Critical, take the following actions:

- Reduce static and dynamic loads on the system by reducing the number of elements in the configuration or by limiting the capacity for dynamic services.
- Reduce the number of routes and adjacencies, limit the number of ACLs and other rules, reduce the number of VLANs, and so on.

Examples

The following example displays status information about the control processors:

```
Router# show platform software status control-processor

RP0: online, statistics updated 7 seconds ago
Load Average: healthy
  1-Min: 0.16, status: healthy, under 5.00
  5-Min: 0.16, status: healthy, under 5.00
  15-Min: 0.12, status: healthy, under 5.00
```

```
Memory (kb): healthy
  Total: 3733016
  Used: 1320804 (31%)
  Free: 2412212 (58%)
  Committed: 1889524 (45%), status: healthy, under 90%

ESP0: online, statistics updated 7 seconds ago
Load Average: healthy
  1-Min: 0.00, status: healthy, under 5.00
  5-Min: 0.00, status: healthy, under 5.00
  15-Min: 0.00, status: healthy, under 5.00
Memory (kb): healthy
  Total: 984996
  Used: 532492 (50%)
  Free: 452504 (43%)
  Committed: 1724096 (164%), status: healthy, under 300%

SIP0: online, statistics updated 10 seconds ago
Load Average: healthy
  1-Min: 0.00, status: healthy, under 5.00
  5-Min: 0.00, status: healthy, under 5.00
  15-Min: 0.00, status: healthy, under 5.00
Memory (kb): warning
  Total: 479884
  Used: 434476 (82%)
  Free: 45408 (8%)
  Committed: 202508 (38%), status: healthy, under 90%

SIP1: online, statistics updated 10 seconds ago
Load Average: healthy
  1-Min: 0.00, status: healthy, under 5.00
  5-Min: 0.00, status: healthy, under 5.00
  15-Min: 0.00, status: healthy, under 5.00
Memory (kb): warning
  Total: 479884
  Used: 430384 (82%)
  Free: 49500 (9%)
  Committed: 202512 (38%), status: healthy, under 90%
```

The following example displays summary status information about the control processors with **brief** keyword:

```
Router# show platform software status control-processor brief

Load Average
 Slot  Status  1-Min  5-Min 15-Min
  RP0 Healthy   0.25   0.30   0.44
  RP1 Healthy   0.31   0.19   0.12
 ESP0 Healthy   0.01   0.05   0.02
 ESP1 Healthy   0.03   0.05   0.01
 SIP1 Healthy   0.15   0.07   0.01
 SIP2 Healthy   0.03   0.03   0.00

Memory (kB)
 Slot  Status    Total     Used (Pct)     Free (Pct) Committed (Pct)
  RP0 Healthy  3722408  2514836 (60%)  1207572 (29%)   1891176 (45%)
  RP1 Healthy  3722408  2547488 (61%)  1174920 (28%)   1889976 (45%)
 ESP0 Healthy  2025468  1432088 (68%)   593380 (28%)   3136912 (149%)
 ESP1 Healthy  2025468  1377980 (65%)   647488 (30%)   3084412 (147%)
 SIP1 Healthy   480388   293084 (55%)   187304 (35%)    148532 (28%)
 SIP2 Healthy   480388   273992 (52%)   206396 (39%)     93188 (17%)

CPU Utilization
 Slot  CPU   User System   Nice   Idle    IRQ   SIRQ IOwait
```

```
  RP0    0  30.12   1.69   0.00  67.63   0.13   0.41   0.00
  RP1    0  21.98   1.13   0.00  76.54   0.04   0.12   0.16
 ESP0    0  13.37   4.77   0.00  81.58   0.07   0.19   0.00
 ESP1    0   5.76   3.56   0.00  90.58   0.03   0.05   0.00
 SIP1    0   3.79   0.13   0.00  96.04   0.00   0.02   0.00
 SIP2    0   3.50   0.12   0.00  96.34   0.00   0.02   0.00
```

Table 22 describes the significant fields shown in the display.

Table 22 show platform software status control-processor Field Descriptions

Field	Description
processor-name: online	Name of the online control processor to which the statistics that follow apply.
statistics updated *x* seconds ago	Time (in seconds) when the statistics were last updated.
Load Average:	Summary status indicator of the overall control processor load average. This value is derived from the "5-Min" load average.
1-Min: / status:	One-minute load average on the control processor and status indicator.
5-Min: / status:	Five-minute load average on the control processor and status indicator.
15-Min: / status:	Fifteen-minute load average on the control processor and status indicator.
Memory (kb):	Summary status indicator of the overall control processor memory usage. This value signals if any of the individual memory values below are in critical or warning status.
Total:	Total memory (in kilobytes) on the control processor.
Used: *xxxxxxx* (*pp%*)	Total used memory (in kilobytes) on the control processor and the percentage of used memory on the control processor.
Free: *xxxxxxx* (*pp%*)	Total free memory (in kilobytes) on the control processor and the percentage of free memory on the control processor.
Committed: *xxxxxxx* (*pp%*) / status:	Total committed memory (in kilobytes) on the control processor, percentage of committed memory on the control processor, and status indicator.
CPU Utilization:	Percentage of time that the CPU is busy.
CPU:	Allocated processor.
User:	Non-Linux kernel processes.
System:	Linux kernel process.
Nice:	Low priority processes.
Idle:	Percentage of time that the CPU was inactive.
IRQ:	Interrupts.
SIRQ:	System interrupts.
IOwait:	Percentage of time that the CPU was waiting for I/O.

Related Commands

Command	Description
show platform software process list	Displays a list of the processes running in a given slot.

show port flowcontrol

To display per-port status information and statistics related to flow control, use the **show port flowcontrol** command in privileged EXEC mode.

show port flowcontrol [*module-number*[*/port-number*]]

Syntax Description

module-number	(Optional) Number of the module.
/port-number	(Optional) Number of the port on the module. If you do not specify a number, filters configured on all the ports on the module are shown.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(11)T	This command was introduced and implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.

Usage Guidelines

The Catalyst 2948G is a fixed configuration switch. All ports are located on module 2; for this reason, if you enter *module-number*/*port-number* 1/*N*, an error message is displayed.

Examples

The following example shows how to display the flow-control port status and statistics:

```
Router# show port flowcontrol

Port    Send-Flowcontrol   Receive-Flowcntl   RxPause   TxPause
        Admin    Oper      Admin    Oper
-----   ---------------    ---------------    -------   ------
 3/1    on       disagree  on       disagree  0         0
 3/2    off      off       off      off       0         0
 3/3    desired  on        desired  off       10        10
```

Table 23 describes the fields shown in the display.

Table 23 show port flowcontrol Field Descriptions

Field	Description
Port	Module and port number.
Send-Flowcontrol Admin	Flow-control administration. Possible settings: • On indicates the local port sends flow control to the far end. • Off indicates the local port does not send flow control to the far end. • Desired indicates the local end sends flow control to the far end if the far end supports it.

Table 23 show port flowcontrol Field Descriptions (continued)

Field	Description
Send-Flowcontrol Oper	Flow-control operation. Possible settings: • Disagree indicates the two ports could not agree on a link protocol. • Off indicates that the local port cannot send flow control to a remote port.
Receive-Flowcntl Admin	Flow-control administration. Possible settings: • On indicates the local port requires the far end to send flow control. • Off indicates the local port does not allow the far end to send flow control. • Desired indicates the local end allows the far end to send flow control.
Receive-Flowcntl Oper	Flow-control operation. Possible settings: • Disagree indicates the two ports could not agree on a link protocol. • Off indicates that the local port cannot receive flow control from a remote port.
RxPause	Number of pause frames received.
TxPause	Number of pause frames transmitted.

Related Commands

Command	Description
set port flowcontrol	Sets the receive flow-control value for a particular Gigabit Ethernet switching module port.

show rep topology

To display Resilient Ethernet Protocol (REP) topology information for a segment or for all segments, including the primary and secondary edge ports in the segment, use the **show rep topology** command in privileged EXEC mode.

show rep topology [**segment** *segment-id*] [**archive**] [**detail**]

Syntax Description

segment *segment-id*	(Optional) The specific segment for which to display REP topology information. The ID range is from 1 to 1024.
archive	(Optional) Display the previous topology of the segment. This keyword can be useful for troubleshooting a link failure.
detail	(Optional) Display detailed REP topology information.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(40)SE	This command was introduced.
12.2(33)SRC	Support was added for the Resilient Ethernet Protocol (REP) on the Cisco 7600 series router.
Cisco IOS XE Release 2.2	This command was implemented on the Cisco ASR 1000 Series Aggregation Services Router.

Examples

The following is sample output from the **show rep topology segment** command for segment 1. The fields show in the display are self-explanatory.

```
Router# show rep topology segment 1

REP Segment 1
BridgeName       PortName   Edge Role
---------------- ---------- ---- ----
sw1_multseg_3750 Gi1/1/1    Pri  Alt
sw3_multseg_3400 Gi0/13          Open
sw3_multseg_3400 Gi0/14          Alt
sw4_multseg_3400 Gi0/13          Open
sw4_multseg_3400 Gi0/14          Open
sw5_multseg_3400 Gi0/13          Open
sw5_multseg_3400 Gi0/14          Open
sw2_multseg_3750 Gi1/1/2         Open
sw2_multseg_3750 Gi1/1/1         Open
sw1_multseg_3750 Gi1/1/2    Sec  Open
```

This example shows output from the **show rep topology detail** command:

```
Router# show rep topology detail

REP Segment 2
repc_2_24ts, Fa0/2 (Primary Edge)
  Alternate Port, some vlans blocked
  Bridge MAC: 0019.e714.5380
```

```
  Port Number: 004
  Port Priority: 080
  Neighbor Number: 1 / [-10]
repc_3_12cs, Gi0/1 (Intermediate)
  Open Port, all vlans forwarding
  Bridge MAC: 001a.a292.3580
  Port Number: 001
  Port Priority: 000
  Neighbor Number: 2 / [-9]
repc_3_12cs, Po10 (Intermediate)
  Open Port, all vlans forwarding
  Bridge MAC: 001a.a292.3580
  Port Number: 080
  Port Priority: 000
  Neighbor Number: 3 / [-8]
repc_4_12cs, Po10 (Intermediate)
  Open Port, all vlans forwarding
  Bridge MAC: 001a.a19d.7c80
  Port Number: 080
  Port Priority: 000
  Neighbor Number: 4 / [-7]
repc_4_12cs, Gi0/2 (Intermediate)
  Alternate Port, some vlans blocked
  Bridge MAC: 001a.a19d.7c80
  Port Number: 002
  Port Priority: 040
  Neighbor Number: 5 / [-6]

<output truncated>
```

This example shows output from the **show rep topology segment archive** command:

```
Router# show rep topology segment 1 archive

REP Segment 1
BridgeName       PortName   Edge Role
---------------- ---------- ---- ----
sw1_multseg_3750 Gi1/1/1    Pri  Open
sw3_multseg_3400 Gi0/13          Open
sw3_multseg_3400 Gi0/14          Open
sw4_multseg_3400 Gi0/13          Open
sw4_multseg_3400 Gi0/14          Open
sw5_multseg_3400 Gi0/13          Open
sw5_multseg_3400 Gi0/14          Open
sw2_multseg_3750 Gi1/1/2         Alt
sw2_multseg_3750 Gi1/1/1         Open
sw1_multseg_3750 Gi1/1/2    Sec  Open
```

Related Commands

Command	Description
rep segment	Enables REP on an interface and assigns a segment ID.

show spanning-tree

To display spanning-tree information for the specified spanning-tree instances, use the **show spanning-tree** command in privileged EXEC mode.

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show spanning-tree [*bridge-group*] [**active | backbonefast | blockedports | bridge | brief | inconsistentports | interface** *interface-type interface-number*| **root | summary** [**totals**] **| uplinkfast | vlan** *vlan-id*]

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show spanning-tree [*bridge-group* **| active | backbonefast | bridge** [*id*] **| detail | inconsistentports | interface** *interface-type interface-number* [**portfast** [**edge**]] **| mst** [*list* **| configuration** [**digest**]] **| root | summary** [**totals**] **| uplinkfast | vlan** *vlan-id* **| port-channel** *number* **| pathcost** *method*]

Syntax Description

bridge-group	(Optional) Specifies the bridge group number. The range is 1 to 255.
active	(Optional) Displays spanning-tree information on active interfaces only.
backbonefast	(Optional) Displays spanning-tree BackboneFast status.
blockedports	(Optional) Displays blocked port information.
bridge	(Optional) Displays status and configuration of this switch.
brief	(Optional) Specifies a brief summary of interface information.
configuration [**digest**]	(Optional) Displays the multiple spanning-tree current region configuration.
inconsistentports	(Optional) Displays information about inconsistent ports.
interface *interface-type interface-number*	(Optional) Specifies the type and number of the interface. Enter each interface designator, using a space to separate it from the one before and the one after. Ranges are not supported. Valid interfaces include physical ports and virtual LANs (VLANs). See the "Usage Guidelines" for valid values.
list	(Optional) Specifies a multiple spanning-tree instance list.
mst	(Optional) Specifies multiple spanning-tree.
portfast [**edge**]	(Optional) Displays spanning-tree PortFast edge interface operational status. Beginning with Cisco IOS Release 12.2(33)SXI, the **edge** keyword is required. In earlier releases, the **edge** keyword is not used.
root	(Optional) Displays root-switch status and configuration.
summary	(Optional) Specifies a summary of port states.
totals	(Optional) Displays the total lines of the spanning-tree state section.
uplinkfast	(Optional) Displays spanning-tree UplinkFast status.
vlan *vlan-id*	(Optional) Specifies the VLAN ID. The range is 1 to 1005. Beginning with Cisco IOS Release 12.4(15)T, the valid VLAN ID range is from 1 to 4094. If the *vlan-id* value is omitted, the command applies to the spanning-tree instance for all VLANs.

id	(Optional) Identifies the spanning tree bridge.
detail	(Optional) Shows status and configuration details.
port-channel *number*	(Optional) Identifies the Ethernet channel associated with the interfaces.
pathcost *method*	(Optional) Displays the default path-cost calculation method that is used. See the "Usage Guidelines" section for the valid values.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(1)T	This command was introduced.
12.0(5.2)WC(1)	This command was integrated into Cisco IOS Release 12.0(5.2)WC(1).
12.1(6)EA2	This command was integrated into Cisco IOS Release 12.1(6)EA2. The following keywords and arguments were added: *bridge-group*, **active**, **backbonefast**, **blockedports**, **bridge**, **inconsistentports**, **pathcost** *method*, **root**, **totals**, and **uplinkfast**.
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(15)ZJ	The syntax added in Cisco IOS Release 12.1(6)EA2 was implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.3(4)T	The platform support and syntax added in Cisco IOS Release 12.2(15)ZJ was integrated into Cisco IOS Release 12.3(4)T.
12.4(15)T	This command was modified to extend the range of valid VLAN IDs to 1–4094 for specified platforms.
12.2(33)SXI	This command was modified to require the **edge** keyword after **portfast**. The command output was modified to show the status of Bridge Assurance and PVST Simulation.

Usage Guidelines

The keywords and arguments that are available with the **show spanning-tree** command vary depending on the platform you are using and the network modules that are installed and operational.

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The valid values for **interface** *interface-type* are:

- **fastethernet**—Specifies a Fast Ethernet IEEE 802.3 interface.
- **port-channel**—Specifies an Ethernet channel of interfaces.

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The **port-channel** *number* values from 257 to 282 are supported on the Content Switching Module (CSM) and the Firewal Services Module (FWSM) only.

The *interface-number* argument designates the module and port number. Valid values for *interface-number* depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 2 to 13 and valid values for the port number are from 1 to 48.

When checking spanning tree-active states and you have a large number of VLANs, you can enter the **show spanning-tree summary total** command. You can display the total number of VLANs without having to scroll through the list of VLANs.

The valid values for **interface** *interface-type* are:

- **fastethernet**—Specifies a Fast Ethernet IEEE 802.3 interface.
- **port-channel**—Specifies an Ethernet channel of interfaces.
- **atm**—Specifies an Asynchronous Transfer Mode (ATM) interface.
- **gigabitethernet**—Specifies a Gigabit Ethernet IEEE 802.3z interface.
- **multilink**—Specifies a multilink-group interface.
- **serial**—Specifies a serial interface.
- **vlan**—Specifies a catalyst VLAN interface.

The valid values for keyword **pathcoast** *method* are:

- **append**—Appends the redirected output to a URL (supporting the append operation).
- **begin**—Begins with the matching line.
- **exclude**—Excludes matching lines.
- **include**—Includes matching lines.
- **redirect**—Redirects output to a URL.
- **tee**—Copies output to a URL.

When you run the **show spanning-tree** command for a VLAN or an interface the switch router will display the different port states for the VLAN or interface. The valid spanning-tree port states are listening, learning, forwarding, blocking, disabled, and loopback. See Table 24 for definitions of the port states:

Table 24 show spanning-tree vlan Command Port States

Field	Definition
BLK	Blocked is when the port is still sending and listening to BPDU packets but is not forwarding traffic.
DIS	Disabled is when the port is not sending or listening to BPDU packets and is not forwarding traffic.
FWD	Forwarding is when the port is sending and listening to BPDU packets and forwarding traffic.
LBK	Loopback is when the port recieves its own BPDU packet back.
LIS	Listening is when the port spanning tree initially starts to listen for BPDU packets for the root bridge.
LRN	Learning is when the port sets the proposal bit on the BPDU packets it sends out

Examples

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The following example shows that bridge group 1 is running the VLAN Bridge Spanning Tree Protocol:

```
Router# show spanning-tree 1

Bridge group 1 is executing the VLAN Bridge compatible Spanning Tree Protocol
Bridge Identifier has priority 32768, address 0000.0c37.b055
Configured hello time 2, max age 30, forward delay 20
We are the root of the spanning tree
Port Number size is 10 bits
Topology change flag not set, detected flag not set
Times: hold 1, topology change 35, notification 2
      hello 2, max age 30, forward delay 20
Timers: hello 0, topology change 0, notification 0
  bridge aging time 300

Port 8 (Ethernet1) of Bridge group 1 is forwarding
   Port path cost 100, Port priority 128
   Designated root has priority 32768, address 0000.0c37.b055
   Designated bridge has priority 32768, address 0000.0c37.b055
   Designated port is 8, path cost 0
   Timers: message age 0, forward delay 0, hold 0
   BPDU: sent 184, received 0
```

The following is sample output from the **show spanning-tree summary** command:

```
Router# show spanning-tree summary

UplinkFast is disabled

Name                 Blocking Listening Learning Forwarding STP Active
-------------------- -------- --------- -------- ---------- ----------
VLAN1                23       0         0        1          24
-------------------- -------- --------- -------- ---------- ----------
               1 VLAN 23       0         0        1          24
```

Table 25 describes the significant fields shown in the display.

Table 25 show spanning-tree summary Field Descriptions

Field	Description
UplinkFast	Indicates whether the spanning-tree UplinkFast feature is enabled or disabled.
Name	Name of VLAN.
Blocking	Number of ports in the VLAN in a blocking state.
Listening	Number of ports in a listening state.
Learning	Number of ports in a learning state.
Forwarding	Number of ports in a forwarding state.
STP Active	Number of ports using the Spanning-Tree Protocol.

The following is sample output from the **show spanning-tree brief** command:

```
Router# show spanning-tree brief

VLAN1
  Spanning tree enabled protocol IEEE
  ROOT ID     Priority 32768
              Address 0030.7172.66c4
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
VLAN1
  Spanning tree enabled protocol IEEE
  ROOT ID     Priority 32768
              Address 0030.7172.66c4
Port                            Designated
Name     Port ID Prio Cost Sts  Cost  Bridge ID      Port ID
-------- ------- ---- ---- ---  ----  -------------- -------
Fa0/11   128.17  128  100  BLK  38    0404.0400.0001 128.17
Fa0/12   128.18  128  100  BLK  38    0404.0400.0001 128.18
Fa0/13   128.19  128  100  BLK  38    0404.0400.0001 128.19
Fa0/14   128.20  128  100  BLK  38    0404.0400.0001 128.20
Fa0/15   128.21  128  100  BLK  38    0404.0400.0001 128.21
Fa0/16   128.22  128  100  BLK  38    0404.0400.0001 128.22
Fa0/17   128.23  128  100  BLK  38    0404.0400.0001 128.23
Fa0/18   128.24  128  100  BLK  38    0404.0400.0001 128.24
Fa0/19   128.25  128  100  BLK  38    0404.0400.0001 128.25
Fa0/20   128.26  128  100  BLK  38    0404.0400.0001 128.26
Fa0/21   128.27  128  100  BLK  38    0404.0400.0001 128.27

Port                            Designated
Name     Port ID Prio Cost Sts  Cost  Bridge ID      Port ID
-------- ------- ---- ---- ---  ----  -------------- -------
Fa0/22   128.28  128  100  BLK  38    0404.0400.0001 128.28
Fa0/23   128.29  128  100  BLK  38    0404.0400.0001 128.29
Fa0/24   128.30  128  100  BLK  38    0404.0400.0001 128.30 Hello Time   2 sec  Max Age 20
sec  Forward Delay 15 sec
```

Table 26 describes the significant fields shown in the display.

Table 26 show spanning-tree brief Field Descriptions

Field	Description
VLAN1	VLAN for which spanning-tree information is shown.
Spanning tree enabled protocol	Type of spanning tree (IEEE, IBM, CISCO).
ROOT ID	Indicates the root bridge.
Priority	Priority indicator.
Address	MAC address of the port.
Hello Time	Amount of time, in seconds, that the bridge sends bridge protocol data units (BPDUs).
Max Age	Amount of time, in seconds, that a BPDU packet should be considered valid.
Forward Delay	Amount of time, in seconds, that the port spends in listening or learning mode.
Port Name	Interface type and number of the port.
Port ID	Identifier of the named port.
Prio	Priority associated with the port.

Table 26 show spanning-tree brief Field Descriptions (continued)

Field	Description
Cost	Cost associated with the port.
Sts	Status of the port.
Designated Cost	Designated cost for the path.
Designated Bridge ID	Bridge identifier of the bridge assumed to be the designated bridge for the LAN associated with the port.

The following is sample output from the **show spanning-tree vlan 1** command:

```
Router# show spanning-tree vlan 1

Spanning tree 1 is executing the IEEE compatible Spanning Tree protocol
  Bridge Identifier has priority 32768, address 00e0.1eb2.ddc0
  Configured hello time 2, max age 20, forward delay 15
  Current root has priority 32768, address 0010.0b3f.ac80
  Root port is 5, cost of root path is 10
  Topology change flag not set, detected flag not set, changes 1
  Times:  hold 1, topology change 35, notification 2
          hello 2, max age 20, forward delay 15
  Timers: hello 0, topology change 0, notification 0

Interface Fa0/1  in Spanning tree 1 is down
   Port path cost 100, Port priority 128
   Designated root has priority 32768, address 0010.0b3f.ac80
Designated bridge has priority 32768, address 00e0.1eb2.ddc0
   Designated port is 1, path cost 10
   Timers: message age 0, forward delay 0, hold 0
   BPDU: sent 0, received 0
```

Table 27 describes the significant fields shown in the display.

Table 27 show spanning-tree vlan Field Descriptions

Field	Description
Spanning tree	Type of spanning tree (IEEE, IBM, CISCO).
Bridge Identifier	Part of the bridge identifier and taken as the most significant part for bridge ID comparisons.
address	Bridge MAC address.
Root port	Identifier of the root port.
Topology change	Flags and timers associated with topology changes.

The following is sample output from the **show spanning-tree interface fastethernet0/3** command:

```
Router# show spanning-tree interface fastethernet0/3

Interface Fa0/3 (port 3) in Spanning tree 1 is down
   Port path cost 100, Port priority 128
   Designated root has priority 6000, address 0090.2bba.7a40
   Designated bridge has priority 32768, address 00e0.1e9f.4abf
   Designated port is 3, path cost 410
   Timers: message age 0, forward delay 0, hold 0
   BPDU: sent 0, received 0
```

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This example shows how to display a summary of interface information:

```
Router# show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    4097
             Address     0004.9b78.0800
             This bridge is the root
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    4097   (priority 4096 sys-id-ext 1)
             Address     0004.9b78.0800
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time 15

Interface        Port ID                     Designated                 Port ID
Name             Prio.Nbr      Cost Sts      Cost Bridge ID             Prio.Nbr
---------------- -------- --------- --- --------- -------------------- --------
Gi2/1            128.65           4 LIS         0  4097 0004.9b78.0800 128.65
Gi2/2            128.66           4 LIS         0  4097 0004.9b78.0800 128.66
Fa4/3            128.195         19 LIS         0  4097 0004.9b78.0800 128.195
Fa4/4            128.196         19 BLK         0  4097 0004.9b78.0800 128.195

Router#
```

Table 28 describes the fields that are shown in the example.

Table 28 show spanning-tree Command Output Fields

Field	Definition
Port ID Prio.Nbr	Port ID and priority number.
Cost	Port cost.
Sts	Status information.

This example shows how to display information about the spanning tree on active interfaces only:

```
Router# show spanning-tree active

UplinkFast is disabled
BackboneFast is disabled

 VLAN1 is executing the ieee compatible Spanning Tree protocol
  Bridge Identifier has priority 32768, address 0050.3e8d.6401
  Configured hello time 2, max age 20, forward delay 15
  Current root has priority 16384, address 0060.704c.7000
  Root port is 265 (FastEthernet5/9), cost of root path is 38
  Topology change flag not set, detected flag not set
  Number of topology changes 0 last change occurred 18:13:54 ago
  Times:  hold 1, topology change 24, notification 2
          hello 2, max age 14, forward delay 10
  Timers: hello 0, topology change 0, notification 0

Router#
```

This example shows how to display the status of spanning-tree BackboneFast:

```
Router# show spanning-tree backbonefast

BackboneFast is enabled

BackboneFast statistics
-----------------------
Number of transition via backboneFast (all VLANs) : 0
Number of inferior BPDUs received (all VLANs)     : 0
Number of RLQ request PDUs received (all VLANs)   : 0
Number of RLQ response PDUs received (all VLANs)  : 0
Number of RLQ request PDUs sent (all VLANs)       : 0
Number of RLQ response PDUs sent (all VLANs)      : 0
Router#
```

This example shows how to display information about the spanning tree for this bridge only:

```
Router# show spanning-tree bridge

VLAN1
  Bridge ID  Priority    32768
             Address     0050.3e8d.6401
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
.
Router#
```

This example shows how to display detailed information about the interface:

```
Router# show spanning-tree detail

VLAN1 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 4096, address 00d0.00b8.1401
Configured hello time 2, max age 20, forward delay 15
We are the root of the spanning tree
Topology change flag not set, detected flag not set
Number of topology changes 9 last change occurred 02:41:34 ago
from FastEthernet4/21
Times: hold 1, topology change 35, notification 2
hello 2, max age 20, forward delay 15
Timers: hello 1, topology change 0, notification 0, aging 300


Port 213 (FastEthernet4/21) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.213.
Designated root has priority 4096, address 00d0.00b8.1401
Designated bridge has priority 4096, address 00d0.00b8.1401
Designated port id is 128.213, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 4845, received 1
Router#
```

This example shows how to display information about the spanning tree for a specific interface:

```
Router# show spanning-tree interface fastethernet 5/9

Interface Fa0/10 (port 23) in Spanning tree 1 is ROOT-INCONSISTENT
Port path cost 100, Port priority 128
Designated root has priority 8192, address 0090.0c71.a400
Designated bridge has priority 32768, address 00e0.1e9f.8940
```

This example shows how to display information about the spanning tree for a specific bridge group:

```
Router# show spanning-tree 1

UplinkFast is disabled
 BackboneFast is disabled

  Bridge group 1 is executing the ieee compatible Spanning Tree protocol
   Bridge Identifier has priority 32768, address 00d0.d39c.004d
   Configured hello time 2, max age 20, forward delay 15
   Current root has priority 32768, address 00d0.d39b.fddd
   Root port is 7 (FastEthernet2/2), cost of root path is 19
   Topology change flag set, detected flag not set
   Number of topology changes 3 last change occurred 00:00:01 ago
           from FastEthernet2/2
   Times:  hold 1, topology change 35, notification 2
           hello 2, max age 20, forward delay 15
   Timers: hello 0, topology change 0, notification 0  bridge aging time 15

Port 2 (Ethernet0/1/0) of Bridge group 1 is down

    Port path cost 100, Port priority 128
    Designated root has priority 32768, address 0050.0bab.1808
    Designated bridge has priority 32768, address 0050.0bab.1808
    Designated port is 2, path cost 0
    Timers: message age 0, forward delay 0, hold 0
    BPDU: sent 0, received 0
Router#
```

This example shows how to display a summary of port states:

```
Router# show spanning-tree summary

Root bridge for: Bridge group 1, VLAN0001, VLAN0004-VLAN1005
 VLAN1013-VLAN1499, VLAN2001-VLAN4094
EtherChannel misconfiguration guard is enabled
Extended system ID is enabled
Portfast is enabled by default
PortFast BPDU Guard is disabled by default
Portfast BPDU Filter is disabled by default
Loopguard is disabled by default
UplinkFast is disabled
BackboneFast is disabled
Platform PVST Simulation is enabled
Pathcost method used is long
Name                   Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
1 bridge               0        0         0        1          1
3584 vlans 3584 0 0 7168 10752


Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
Total                  3584     0         0        7169       10753
Router#
```

This example shows how to display the total lines of the spanning-tree state section:

```
Router#  show spanning-tree summary total

Root bridge for:Bridge group 10, VLAN1, VLAN6, VLAN1000.
Extended system ID is enabled.
PortFast BPDU Guard is disabled
EtherChannel misconfiguration guard is enabled
```

```
UplinkFast is disabled
BackboneFast is disabled
Default pathcost method used is long

Name                 Blocking Listening Learning Forwarding STP Active
-------------------- -------- --------- -------- ---------- ----------
           105 VLANs 3433     0         0        105        3538

BackboneFast statistics
-----------------------
Number of transition via backboneFast (all VLANs) :0
Number of inferior BPDUs received (all VLANs)     :0
Number of RLQ request PDUs received (all VLANs)   :0
Number of RLQ response PDUs received (all VLANs)  :0
Number of RLQ request PDUs sent (all VLANs)       :0
Number of RLQ response PDUs sent (all VLANs)      :0
Router#
```

This example shows how to display information about the spanning tree for a specific VLAN:

```
Router# show spanning-tree vlan 200

VLAN0200
 Spanning tree enabled protocol ieee
 Root ID Priority 32768
    Address 00d0.00b8.14c8
    This bridge is the root
    Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Bridge ID Priority 32768
    Address 00d0.00b8.14c8
    Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
    Aging Time 300
Interface Role Sts Cost Prio.Nbr Status
---------------- ---- --- --------- -------- --------------------------------
Fa4/4 Desg FWD 200000 128.196 P2p
Fa4/5 Back BLK 200000 128.197 P2p
Router#
```

Table 29 describes the fields that are shown in the example.

Table 29 show spanning-tree vlan Command Output Fields

Field	Definition
Role	Current 802.1w role; valid values are Boun (boundary), Desg (designated), Root, Altn (alternate), and Back (backup).
Sts	Spanning-tree states; valid values are BKN* (broken)[1], BLK (blocking), DWN (down), LTN (listening), LBK (loopback), LRN (learning), and FWD (forwarding).
Cost	Port cost.

Table 29 show spanning-tree vlan Command Output Fields (continued)

Field	Definition
Prio.Nbr	Port ID that consists of the port priority and the port number.
Status	Status information; valid values are as follows: • P2p/Shr—The interface is considered as a point-to-point (resp. shared) interface by the spanning tree. • Edge—PortFast has been configured (either globally using the **default** command or directly on the interface) and no BPDU has been received. • *ROOT_Inc, *LOOP_Inc, *PVID_Inc and *TYPE_Inc—The port is in a broken state (BKN*) for an inconsistency. The port would be (respectively) Root inconsistent, Loopguard inconsistent, PVID inconsistent, or Type inconsistent. • Bound(type)—When in MST mode, identifies the boundary ports and specifies the type of the neighbor (STP, RSTP, or PVST). • Peer(STP)—When in PVRST rapid-pvst mode, identifies the port connected to a previous version of the 802.1D bridge.

1. For information on the *, see the definition for the Status field.

This example shows how to determine if any ports are in the root-inconsistent state:

```
Router#  show spanning-tree inconsistentports

Name                 Interface            Inconsistency
-------------------- -------------------- ------------------
 VLAN1               FastEthernet3/1      Root Inconsistent

Number of inconsistent ports (segments) in the system :1
Router#
```

Related Commands

Command	Description
spanning-tree backbonefast	Enables BackboneFast on all Ethernet VLANs.
spanning-tree cost	Sets the path cost of the interface for STP calculations.
spanning-tree guard	Enables or disables the guard mode.
spanning-tree pathcost method	Sets the default path-cost calculation method.
spanning-tree portfast (interface configuration mode)	Enables PortFast mode.
spanning-tree portfast bpdufilter default	Enables BPDU filtering by default on all PortFast ports.
spanning-tree portfast bpduguard default	Enables BPDU guard by default on all PortFast ports.
spanning-tree port-priority	Sets an interface priority when two bridges vie for position as the root bridge.
spanning-tree uplinkfast	Enables UplinkFast.
spanning-tree vlan	Enables the STP on a VLAN.

show spanning-tree mst

To display the information about the Multiple Spanning Tree (MST) protocol, use the **show spanning-tree mst** command in privileged EXEC mode.

show spanning-tree mst [*instance-id-number* [**detail**] [*interface*] | **configuration** [**digest**] | **detail** | **interface** *interface* [**detail**]]

Syntax Description

instance-id-number	(Optional) Instance identification number; valid values are from 0 to 4094.
configuration	(Optional) Displays information about the region configuration.
digest	(Optional) Displays information about the Message Digest 5 (MD5) algorithm included in the current MST configuration identifier (MSTCI).
detail	(Optional) Displays detailed information about the MST protocol.
interface	(Optional) Displays information about the interface type; possible valid values for type are **ethernet**, **fastethernet**, **gigabitethernet**, **tengigabitethernet**, **pos**, **atm**, **ge-wan**, **port-channel**, and **vlan**.
interface	(Optional) Displays the information about the specific interface number. See the "Usage Guidelines" section for valid number values.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.

Release	Modification
12.2(18)SXF	The changes are as follows: • The range of valid values for the *instance-id-number* changed to 0 to 4094. • The output of the **show spanning-tree mst configuration** command has changed as follows: – Displays the instance identification from 0 to 4094. – Displays the number of the currently configured instances from 0 to 65. – Adds the **digest** keyword to display the MD5 digest of the VLAN-to-instance mapping of the MST configuration. • The output of the **show spanning-tree mst detail** command has changed as follows: – The Regional Root field replaced the IST Master field. – The Internal Path field replaced the Path Cost field. – The Designated Regional Root field replaced the Designated IST Master field. – The txholdcount field was added in the Operational parameter line. • Displays new roles for all MST instances on the common and internal spanning tree (CIST) root port. • Displays the prestandard flag.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The valid values for *interface* depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 2 to 13 and valid values for the port number are from 1 to 48.

The number of valid values for **port-channel** *number* are a maximum of 64 values ranging from 1 to 282. The **port-channel** *number* values from 257 to 282 are supported on the Content Switching Module (CSM) and the Firewall Serices Module (FWSM) only.

The number of valid values for **vlan** are from 1 to 4094.

In the output display of the **show spanning-tree mst configuration** command, a warning message may display. This message appears if you do not map secondary VLANs to the same instance as the associated primary VLAN. The display includes a list of the secondary VLANs that are not mapped to the same instance as the associated primary VLAN. The warning message is as follows:

```
These secondary vlans are not mapped to the same instance as their primary:
-> 3
```

In the output display of the **show spanning-tree mst configuration digest** command, if the output applies to both standard and prestandard bridges at the same time on a per-port basis, two different digests are displayed.

If you configure a port to transmit prestandard PortFast Bridge Protocol Data Units (BPDUs) only, the prestandard flag displays in the **show spanning-tree** commands. The variations of the prestandard flag are as follows:

- Pre-STD (or pre-standard in long format)—This flag displays if the port is configured to transmit prestandard BPDUs and if a prestandard neighbor bridge has been detected on this interface.
- Pre-STD-Cf (or pre-standard (config) in long format)—This flag displays if the port is configured to transmit prestandard BPDUs but a prestandard BPDU has not been received on the port, the autodetection mechanism has failed, or a misconfiguration, if there is no prestandard neighbor, has occurred.
- Pre-STD-Rx (or pre-standard (rcvd) in long format)—This flag displays when a prestandard BPDU has been received on the port but it has not been configured to send prestandard BPDUs. The port will send prestandard BPDUs, but we recommend that you change the port configuration so that the interaction with the prestandard neighbor does not rely only on the autodetection mechanism.

If the configuration is not prestandard compliant, for example, a single MST instance has an ID that is greater than or equal to 16, the prestandard digest is not computed and the following output is displayed:

```
Router# show spanning-tree mst configuration digest

Name      [region1]
Revision  2     Instances configured 3
Digest          0x3C60DBF24B03EBF09C5922F456D18A03
Pre-std Digest  N/A, configuration not pre-standard compatible
Router#
```

MST BPDUs include an MSTCI that consists of the region name, region revision, and an MD5 digest of the VLAN-to-instance mapping of the MST configuration.

See the **show spanning-tree** command for output definitions.

Examples

This example shows how to display information about the region configuration:

```
Router# show spanning-tree mst configuration

Name      [leo]
Revision  2702
Instance  Vlans mapped
--------  ---------------------------------------------------------------------
0         1-9,11-19,21-29,31-39,41-4094
1         10,20,30,40
-------------------------------------------------------------------------------
```

This example shows how to display additional MST-protocol values:

```
Router# show spanning-tree mst 3 detail

###### MST03 vlans mapped: 3,3000-3999
Bridge address 0002.172c.f400 priority 32771 (32768 sysid 3)
Root this switch for MST03

GigabitEthernet1/1 of MST03 is boundary forwarding
Port info port id 128.1 priority 128
cost 20000
Designated root address 0002.172c.f400 priority 32771
cost 0
Designated bridge address 0002.172c.f400 priority 32771 port
id 128.1
Timers: message expires in 0 sec, forward delay 0, forward transitions 1
Bpdus (MRecords) sent 4, received 0
```

```
FastEthernet4/1 of MST03 is designated forwarding
Port info port id 128.193 priority 128 cost
200000
Designated root address 0002.172c.f400 priority 32771
cost 0
Designated bridge address 0002.172c.f400 priority 32771 port id
128.193
Timers: message expires in 0 sec, forward delay 0, forward transitions 1
Bpdus (MRecords) sent 254, received 1

FastEthernet4/2 of MST03 is backup blocking
Port info port id 128.194 priority 128 cost
200000
Designated root address 0002.172c.f400 priority 32771
cost 0
Designated bridge address 0002.172c.f400 priority 32771 port id
128.193
Timers: message expires in 2 sec, forward delay 0, forward transitions 1
Bpdus (MRecords) sent 3, received 252
Router#
```

This example shows how to display MST information for a specific interface:

```
Router# show spanning-tree mst 0 interface fastethernet 4/1 detail

Edge port: no (trunk) port guard : none
(default)
Link type: point-to-point (point-to-point) bpdu filter: disable
(default)
Boundary : internal bpdu guard : disable
(default)
FastEthernet4/1 of MST00 is designated forwarding
Vlans mapped to MST00 1-2,4-2999,4000-4094
Port info port id 128.193 priority 128 cost
200000
Designated root address 0050.3e66.d000 priority 8193
cost 20004
Designated ist master address 0002.172c.f400 priority 49152
cost 0
Designated bridge address 0002.172c.f400 priority 49152 port id
128.193
Timers: message expires in 0 sec, forward delay 0, forward transitions 1
Bpdus sent 492, received 3
Router#
```

This example shows how to display the MD5 digest included in the current MSTCI:

```
Router# show spanning-tree mst configuration digest

Name      [mst-config]
Revision  10    Instances configured 25
Digest          0x40D5ECA178C657835C83BBCB16723192
Pre-std Digest  0x27BF112A75B72781ED928D9EC5BB4251
Router#
```

This example displays the new master role for all MST instances at the boundary of the region on the port that is a CIST root port:

```
Router# show spanning-tree mst interface fastethernet4/9

FastEthernet4/9 of MST00 is root forwarding
Edge port: no             (default)        port guard : none        (default)
Link type: point-to-point (auto)           bpdu filter: disable     (default)
```

```
Boundary : boundary       (RSTP)           bpdu guard : disable     (default)
Bpdus sent 3428, received 6771

Instance Role Sts Cost      Prio.Nbr Vlans mapped
-------- ---- --- --------- -------- --------------------------------
0        Root FWD 200000    128.201  2-7,10,12-99,101-999,2001-3999,4001-4094
8        Mstr FWD 200000    128.201  8,4000
9        Mstr FWD 200000    128.201  1,9,100
11       Mstr FWD 200000    128.201  11,1000-2000
Router#
```

Related Commands

Command	Description
spanning-tree mst	Sets the path cost and port-priority parameters for any MST instance.
spanning-tree mst forward-time	Sets the forward-delay timer for all the instances on the Catalyst 6500 series switch.
spanning-tree mst hello-time	Sets the hello-time delay timer for all the instances on the Catalyst 6500 series switch.
spanning-tree mst max-hops	Specifies the number of possible hops in the region before a BPDU is discarded.
spanning-tree mst root	Designates the primary and secondary root, sets the bridge priority, and sets the timer value for an instance.

show spantree

To display spanning-tree information for a virtual LAN (VLAN) or port, use the **show spantree** command in privileged EXEC mode.

show spantree [*vlan*] [**active**]

show spantree *mod/port*

Syntax Description

vlan	(Optional) Number of the VLAN; valid values are from 1 to 1001 and from 1025 to 4094.
active	(Optional) Displays only the active ports.
mod/port	Number of the module and the port on the module. The slash mark is required.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(7)XE	This command was introduced on the Catalyst 6000 series switches.
12.2(2)XT	This command was implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If you do not specify the VLAN number, VLAN 1 is displayed.

If you are in Multiple Instances of Spanning Tree (MISTP) mode, instance information is not displayed.

The maximum length of the channel port list is 47. The space in the Port(s) column might not be enough to display the entire list in one line. If this is the case, the port list is split into multiple lines. For example, in the following display, ports 6/5-8, 6/13, 6/15, 6/17, 6/19 are channeling:

```
.
.
.
Port(s)                  Vlan Port-State    Cost      Prio Portfast Channel_id
------------------------ ---- ------------- --------- ---- -------- ----------
6/5-8,6/13,6/15,6/17,6/1 1    not-connected 2684354   32   disabled 0

9
.
.
.
```

The Link Aggregation Control Protocol (LACP) for channels does not support half-duplex links. If a port is in active/passive mode and becomes half duplex, the port is suspended (and a syslog message is generated).

The port is shown as "connected" if you use the **show port** command and as "not connected" if you use the **show spantree** command. This discrepancy occurs because the port is physically connected but never joined the active spanning-tree topology. To get the port to join the active spanning- tree topology, either set the duplex to full or set the channel mode to off for that port.

Examples

The following example shows how to display the active spanning tree port configuration for VLAN 1 while in Per VLAN Spanning Tree (PVST+ mode):

```
Router# (enable) show spantree 1 active

VLAN 1
Spanning tree mode          PVST+
Spanning tree type          ieee
Spanning tree enabled

Designated Root             00-60-70-4c-70-00
Designated Root Priority    16384
Designated Root Cost        19
Designated Root Port        2/3
Root Max Age   14 sec   Hello Time 2  sec   Forward Delay 10 sec

Bridge ID MAC ADDR          00-d0-00-4c-18-00
Bridge ID Priority          32768
Bridge Max Age 20 sec   Hello Time 2  sec   Forward Delay 15 sec

Port                     Vlan Port-State    Cost      Prio Portfast Channel_id
------------------------ ---- ------------- --------- ---- -------- ----------
 2/3                     1    forwarding           19   32 disabled 0
 2/12                    1    forwarding           19   32 disabled 0
```

The following example shows how to display the active spanning-tree port configuration for VLAN 1 (while in MISTP mode):

```
Router# (enable) show spantree 1 active

VLAN 1
Spanning tree mode          MISTP
Spanning tree type          ieee
Spanning tree enabled
VLAN mapped to MISTP Instance: 1
Port                     Vlan Port-State    Cost      Prio Portfast Channel_id
------------------------ ---- ------------- --------- ---- -------- ----------
 2/3                     1    forwarding       200000   32 disabled 0
 2/12                    1    forwarding       200000   32 disabled 0
```

Table 30 describes the significant fields shown in the displays.

Table 30 show spantree Field Descriptions

Field	Description
VLAN	VLAN for which the spanning-tree information is shown.
Spanning tree mode	Indicates the current mode that spanning tree is operating in: • PVST—Per VLAN Spanning Tree • MSTP—Multiple Spanning Tree Protocol
Spanning tree type	Indicates the current Spanning Tree Protocol type: • IEEE—IEEE Spanning Tree • DEC—Digital Equipment Corporation Spanning Tree
Spanning tree enabled	Indicates whether Spanning Tree Protocol is enabled or disabled.
Designated Root	MAC address of the designated spanning-tree root bridge.
Designated Root Priority	Priority of the designated root bridge.
Designated Root Cost	Total path cost to reach the root.
Designated Root Port	Port through which the root bridge can be reached. (Shown only on nonroot bridges.)
Root Max Age	Amount of time a bridge packet data unit (BPDU) packet should be considered valid.
Hello Time	Number of times the root bridge sends BPDUs.
Forward Delay	Amount of time the port spends in listening or learning mode.
Port	Port number.
Vlan	VLAN to which the port belongs.
Port-State	Spanning tree port state (disabled, inactive, not-connected, blocking, listening, learning, forwarding, bridging, or type-pvid-inconsistent).
Cost	Cost associated with the port.
Prio	Priority associated with the port.
Portfast	Status of whether the port is configured to use the PortFast feature.
Channel_id	Channel ID number.

Related Commands

Command	Description
show spantree backbonefast	Displays whether the spanning-tree BackboneFast Convergence feature is enabled.
show spantree blockedports	Displays only the blocked ports on a per-VLAN or per-instance basis.
show spantree portvlancost	Shows the path cost for the VLANs or extended-range VLANs.
show spantree statistics	Shows spanning tree statistical information
show spantree summary	Displays a summary of spanning-tree information.
show spantree uplinkfast	Shows the UplinkFast feature settings.

show ssl-proxy module state

To display the spanning-tree state for the specified VLAN, enter the **show ssl-proxy module state** command in user EXEC mode.

show ssl-proxy module *mod* **state**

Syntax Description

mod	Module number.

Command Modes

User EXEC (>)

Command History

Release	Modification
12.2(18)SXD	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on Cisco 7600 series routers that are configured with a Secure Sockets Layer (SSL) Services Module only.

Examples

This example shows how to verify that the VLAN information displayed matches the VLAN configuration. The fields shown in the display are self-explanatory.

```
Router# show ssl-proxy module 6 state

SSL-services module 6 data-port:
 Switchport:Enabled
Administrative Mode:trunk
Operational Mode:trunk
Administrative Trunking Encapsulation:dot1q
Operational Trunking Encapsulation:dot1q
Negotiation of Trunking:Off
Access Mode VLAN:1 (default)
Trunking Native Mode VLAN:1 (default)
Trunking VLANs Enabled:100
Pruning VLANs Enabled:2-1001
Vlans allowed on trunk:100
Vlans allowed and active in management domain:100
Vlans in spanning tree forwarding state and not pruned:
100
Allowed-vlan :100
Router#
```

Related Commands

Command	Description
ssl-proxy module allowed-vlan	Adds the VLANs allowed over the trunk to the SSL Services Module.

show udld

To display the administrative and operational Unidirectional Link Detection Protocol (UDLD) status, use the **show udld** command in user EXEC mode.

show udld [*interface-id* | **neighbors**]

Syntax Description

interface-id	(Optional) Interface name and number.
neighbors	(Optional) Displays neighbor information only.

Command Modes

User EXEC (>)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(18)SXD	This command was changed to include the **neighbors** keyword.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you do not enter an *interface-id* value, the administrative and operational UDLD status for all interfaces are displayed.

Examples

This example shows how to display the UDLD state for a single interface. The fields shown in the display are self-explanatory.

```
Router# show udld gigabitethernet2/2

Interface Gi2/2
---
Port enable administrative configuration setting: Follows device default
Port enable operational state: Enabled
Current bidirectional state: Bidirectional
Current operational state: Advertisement
Message interval: 60
Time out interval: 5
No multiple neighbors detected
    Entry 1
    ---
    Expiration time: 146
    Device ID: 1
    Current neighbor state: Bidirectional
```

```
    Device name: 0050e2826000
    Port ID: 2/1
    Neighbor echo 1 device: SAD03160954
    Neighbor echo 1 port: Gi1/1

    Message interval: 5
    CDP Device name: 066527791
Router#
```

This example shows how to display neighbor information only. The fields shown in the display are self-explanatory.

```
Router# show udld neighbors

Port     Device Name                    Device ID    Port-ID OperState
-------- ------------------------------ ------------ ------- --------------
Gi3/1    SAL0734K5R2                    1            Gi4/1   Bidirectional
Gi4/1    SAL0734K5R2                    1            Gi3/1   Bidirectional
Router#
```

Related Commands

Command	Description
udld	Enables aggressive or normal mode in UDLD and sets the configurable message time.
udld port	Enables UDLD on the interface or enables UDLD in aggressive mode on the interface.