

# 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

<b>receive</b>	Indicates whether the port can receive administrative status from a remote device.
<b>send</b>	Indicates whether the local port can send administrative status to a remote device.
<i>module-number</i>	(Optional) Number of the module.
<i>port-number</i>	(Optional) Number of the port on the module.
<b>off</b>	When used with <b>receive</b> , it turns off an attached device's ability to send flow-control packets to a local port.  When used with <b>send</b> , it turns off the local port's ability to send administrative status to a remote device.
<b>on</b>	When used with <b>receive</b> , it requires that a local port receive administrative status from a remote device.  When used with <b>send</b> , the local port sends administrative status to a remote device.
<b>desired</b>	When used with <b>receive</b> , 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 <b>send</b> , the local port sends administrative status to a remote device if the remote device supports it.

## Defaults

**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 on Gigabit Ethernet switching modules only.

**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 flowcontrol 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 flowcontrol 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 flowcontrol packets):

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

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

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

**Related Commands**

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

# 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.
	<i>1q-vlan-number</i>	Number identifying the 802.1Q VLAN; valid values are 1001 to 4095.
	<b>isl</b>	Specifies the ISL VLAN.
	<i>isl-vlan-number</i>	Number identifying the ISL VLAN; valid values are 1 to 1000.

**Defaults** No 802.1Q-to-ISL mappings are defined.

**Command Modes** Privileged EXEC

**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. Note that if you map a 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 will be 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
<b>clear vlan mapping</b>	Deletes existing 802.1Q VLAN to ISL VLAN-mapped pairs.
<b>show vlans</b>	Displays VLAN subinterfaces.

# set vlan

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

**set vlan** *vlan-number module/port*

**set vlan** *vlan-number* [**name** *name*] [**type** {**ethernet** | **fdi** | **fdinet** | **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	
<i>vlan-number</i>	Number identifying the VLAN.
<i>module</i>	Number of the module. This argument is not valid when defining or configuring Token Ring Bridge Relay Functions (TRBRFs).
<i>port</i>	Number of the port on the module belonging to the VLAN; this argument does not apply to TRBRFs.
<b>name</b> <i>name</i>	(Optional) Defines a text string used as the name of the VLAN (1 to 32 characters).
<b>type</b> { <b>ethernet</b>   <b>fdi</b>   <b>fdinet</b>   <b>trcrf</b>   <b>trbrf</b> }	(Optional) Identifies the VLAN type. The default type is Ethernet.
<b>state</b> { <b>active</b>   <b>suspend</b> }	(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.
<b>sa-id</b> <i>sa-id</i>	(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.
<b>mtu</b> <i>mtu</i>	(Optional) Specifies the maximum transmission unit (packet size, in bytes) that the VLAN can use. Possible values are 576 to 18190. The default is 1500 bytes.
<b>ring</b> <i>hex-ring-number</i>	(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 defining a TRCRF.
<b>decring</b> <i>decimal-ring-number</i>	(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 defining a TRCRF.
<b>bridge</b> <i>bridge-number</i>	(Optional) Specifies the identification number of the bridge. Possible values are hexadecimal numbers 0x1 to 0xF. For Token Ring VLANs, the default is 0F. This argument is not valid for TRCRFs.
<b>parent</b> <i>vlan-number</i>	(Optional) Sets a parent VLAN. The range for <i>vlan-number</i> is 2 to 1005. This argument identifies the TRBRF to which a TRCRF belongs and is required when defining a TRCRF.
<b>mode</b> { <b>srt</b>   <b>srb</b> }	(Optional) Specifies the TRCRF bridging mode.
<b>stp</b> { <b>ieee</b>   <b>ibm</b>   <b>auto</b> }	(Optional) Specifies the Spanning Tree Protocol version for a TRBRF to use: source-routing transparent ( <b>ieee</b> ), source-route bridging ( <b>ibm</b> ), or automatic source selection ( <b>auto</b> ).

<b>translation</b> <i>vlan-number</i>	(Optional) Specifies a translational VLAN used to translate FDDI to Ethernet. Valid values are from 1 to 1005. This argument is not valid for defining or configuring Token Ring VLANs.
<b>backuperf</b> {off   on}	(Optional) Specifies whether the TRCRF is a backup path for traffic.
<b>aremaxhop</b> <i>hop-count</i>	(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 only valid when defining or configuring TRCRFs.
<b>stemaxhop</b> <i>hop-count</i>	(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 only valid when defining or configuring TRCRFs.

**Defaults**

The default configuration has all switched Ethernet ports and Ethernet repeater ports in VLAN 1. The default SAID is 100001 for VLAN 1, 100002 for VLAN 2, 100003 for VLAN 3, and so on. The default type is Ethernet. The default MTU is 1500 bytes. The default state is active.

The default TRBRF is 1005, the default TRCRF is 1003, and the default MTU for TRBRFs and TRCRFs is 4472. The default state is active. The default **aremaxhop** is 7; the default **stemaxhop** is 7.

**Command Modes**

Privileged EXEC

**Usage Guidelines**

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

Valid MTU values for Token Ring VLAN are 1500 or 4472. While you can enter any value for the MTU value, the value you enter 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 adding a new VLAN, the VLAN number must be within the range 2 to 1001. When modifying 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
<b>clear vlan</b>	Deletes an existing VLAN from a management domain.
<b>show vlans</b>	Displays VLAN subinterfaces.



# 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*] [[**begin** | **exclude** | **include**] *expression*]

Syntax Description	Vlan <i>vlan</i>	(Optional) Specifies a VLAN; valid values are from 1 to 1005.
	<b>begin</b>	(Optional) Specifies that the output display begin with the line that matches the <i>expression</i> .
	<b>exclude</b>	(Optional) Specifies that the output display excludes lines that match the <i>expression</i> .
	<b>include</b>	(Optional) Specifies that the output display includes lines that match the specified <i>expression</i> .
	<i>expression</i>	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 family 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.

**Examples** The following example shows how to display the current configured aging time for all VLANs:

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 show how to display the current configured aging time for a specific VLAN:

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

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

#### Related Commands

Command	Description
<b>show mac-address-table address</b>	Displays MAC address table information for a specific MAC address.
<b>show mac-address-table count</b>	Displays the number of entries currently in the MAC address table.
<b>show mac-address-table detail</b>	Displays detailed MAC address table information.
<b>show mac-address-table dynamic</b>	Displays dynamic MAC address table entries only.
<b>show mac-address-table interface</b>	Displays the MAC address table information for a specific interface.
<b>show mac-address-table multicast</b>	Displays multicast MAC address table information.
<b>show mac-address-table protocol</b>	Displays MAC address table information based on protocol.
<b>show mac-address-table static</b>	Displays static MAC address table entries only.
<b>show mac-address-table vlan</b>	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 | vlan vlan] [[begin | exclude | include] expression]
```

Syntax Description	
<b>address</b> <i>mac-address</i>	(Optional) Specifies a 48-bit MAC address; valid format is H.H.H.
<b>detail</b>	(Optional) Specifies a detailed display of MAC address table information.
<b>interface</b> <i>type number</i>	(Optional) Specifies an interface to match; valid type values are FastEthernet and GigabitEthernet, valid number values are from 1 to 9.
<b>interface</b> <i>type</i>	(Optional) Specifies an interface to match; valid type values are FastEthernet and GigabitEthernet.
<i>slot</i>	(Optional) Adds dynamic addresses to module in slot 1 or 2.
<i>port</i>	(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
<b>protocol</b> <i>protocol</i>	(Optional) Specifies a protocol. See the “Usage Guidelines” section for keyword definitions.
<b>vlan</b> <i>vlan</i>	(Optional) Displays entries for a specific VLAN; valid values are from 1 to 1005.
<b>begin</b>	(Optional) Specifies that the output display begin with the line that matches the expression.
<b>exclude</b>	(Optional) Specifies that the output display exclude lines that match the expression.
<b>include</b>	(Optional) Specifies that the output display include lines that match the specified expression.
<i>expression</i>	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 family 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.

**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 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.

**Examples**

The following examples shows how to display all dynamic MAC address entries:

**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 show 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#
```

**Related Commands**

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

# 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] [[begin | exclude | include] expression]
```

Syntax	Description
<b>address</b> <i>mac-address</i>	(Optional) Specifies a 48-bit MAC address to match; valid format is H.H.H.
<b>detail</b>	(Optional) Specifies a detailed display of MAC address table information.
<b>interface</b> <i>type number</i>	(Optional) Specifies an interface to match; valid type values are Ethernet, FastEthernet, and Gigabit Ethernet and valid number values are from 1 to 9.
<b>interface</b> <i>type</i>	(Optional) Specifies an interface to match; valid type values are FastEthernet and Gigabit Ethernet.
<i>slot</i>	(Optional) Adds dynamic addresses to module in slot 1 or 2.
<i>port</i>	(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
<b>protocol</b> <i>protocol</i>	(Optional) Specifies a protocol. See the “Usage Guidelines” section for keyword definitions.
<b>vlan</b> <i>vlan</i>	(Optional) Displays entries for a specific VLAN; valid values are from 1 to 1005.
<b>begin</b>	(Optional) Specifies that the output display begin with the line that matches the expression.
<b>exclude</b>	(Optional) Specifies that the output display exclude lines that match the expression.
<b>include</b>	(Optional) Specifies that the output display include lines that match the specified expression.
<i>expression</i>	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 family switches.
	12.2(2)XT	This command was implemented on Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.

Release	Modification
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.

**Usage Guidelines**

**Catalyst Switches**

The keyword definitions for the protocol argument are:

- **ip**—Specifies IP protocol.
- **ipx**—Specifies IPX protocols.
- **assigned**—Specifies assigned protocol entries.
- **other**—Specifies other protocol entries.

**Examples**

The following example shows how to display all static MAC address entries:

**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
.
.
.

```

#### Related Commands

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

# show mac-address-table

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

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

```
show mac-address-table [static | dynamic | secure | self | aging-time | count] [address
  hardware-address] [interface type] [fa | gi slot/port] [vlan vlan-id]
```

Catalyst Switches

```
show mac-address-table [static | dynamic | secure | self | aging-time | count] [address
  hardware-address] [interface interface] [atm slot/port] [vlan vlan-id]
```

## Syntax Description

<b>static</b>	(Optional) Displays only the static addresses.
<b>dynamic</b>	(Optional) Displays only the dynamic addresses.
<b>secure</b>	(Optional) Displays only the secure addresses.
<b>self</b>	(Optional) Displays only addresses added by the switch itself.
<b>aging-time</b>	(Optional) Displays aging-time for dynamic addresses for all VLANs.
<b>count</b>	(Optional) Displays a count for different kinds of MAC addresses.
<b>address hardware-address</b>	(Optional) Displays information for a specific hardware address.
<b>interface type</b>	(Optional) Displays addresses for a specific port.
<b>interface interface</b>	(Optional) Displays addresses for a specific port.
<b>fa</b>	(Optional) Specifies FastEthernet.
<b>gi</b>	(Optional) Specifies GigabitEthernet.
<i>slot/port</i>	(Optional) Adds dynamic addresses to module in slot 1 or 2.
<b>atm slot/port</b>	(Optional) Adds dynamic addresses to ATM module <i>slot/port</i> . Use 1 or 2 for the slot number. Use 0 as the port number.
<b>vlan vlan-id</b>	(Optional) Displays addresses for a specific VLAN. Valid IDs are from 1 to 1005; do not enter leading zeroes.

## Command Modes

Privileged EXEC

## Command History

Release	Modification
11.2(8)SA	This command was first introduced.
11.2(8)SA3	The <b>self</b> , <b>aging-time</b> , <b>count</b> , and <b>vlan vlan-id</b> keywords were added.
11.2(8)SA5	The <b>atm slot/port</b> keywords were added.
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.



**Usage Guidelines**

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

**Examples****Cisco 2600 Series, Cisco 3600 Series, and Cisco 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 Switches**

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
```

**Related Commands**

Command	Description
<b>clear mac-address-table</b>	Deletes entries from the MAC address table.

# 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

<b>qos</b>	(Optional) Displays details of ACPs used for QoS ACLs.
<b>security</b>	(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.

## 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.

```
Router# show mls masks
```

```
Mask1
```

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

Interfaces: Fa0/1, Fa0/5, Fa0/13

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

# show mls qos interface

To display Multilayer Switching (MLS) quality of service (QoS) information at the interface level, use the **show mls qos interface** command in privileged EXEC mode.

**show mls qos interface** [*interface-id*] [**policers**]

Syntax Description	Parameter	Description
	<i>interface-id</i>	(Optional) Specifies the interface for which QoS information is to be displayed.
	<b>policers</b>	(Optional) Displays all the policers configured on the interface, their settings, and the number of policers unassigned.

**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.

**Usage Guidelines** Use the **show mls qos interface** command without keywords to display parameters for all interfaces. Use the **show mls qos interface** *interface-id* command to display the parameters for a specific interface.

**Examples** The following is sample output from the **show mls qos interface fastethernet0/1** command:

```
Router# show mls qos interface fastethernet0/1

FastEthernet0/1
trust state: trust cos
COS override: dis
default COS: 0
```

Related Commands	Command	Description
	<b>mls qos cos</b>	Defines the default MLS CoS value of a port or assigns the default CoS value to all incoming packets on the port.
	<b>mls qos map</b>	Defines the MLS CoS-to-DSCP map and DSCP-to-CoS map.
	<b>mls qos trust</b>	Configures the MLS port trust state and classifies traffic by an examination of the CoS or DSCP value.

# show mls qos maps

To display Multilayer Switching (MLS) quality of service (QoS) mapping information, use the **show mls qos maps** command in privileged EXEC mode.

**show mls qos maps [cos-dscp | dscp-cos]**

Syntax Description	Parameter	Description
	<b>cos-dscp</b>	(Optional) Displays the class of service (CoS)-to-Differentiated Services Code Point (DSCP) map.
	<b>dscp-cos</b>	(Optional) Displays the DSCP-to-CoS map.

**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.

**Usage Guidelines** Maps are used to generate an internal DSCP value, which represents the priority of the traffic. Use the **show mls qos maps** command without keywords to display all maps.

Use this command with the **cos-dscp** keyword to display the CoS-to-DSCP map.

Use this command with the **dscp-cos** keyword to display the DSCP-to-CoS map.

## Examples

The following is sample output from the **show mls qos maps cos-dscp** command:

```
Router# show mls qos maps cos-dscp

Cos-dscp map:
  cos:  0  1  2  3  4  5  6  7
-----
  dscp:  8  8  8  8 24 32 56 56
```

The following is sample output from the **show mls qos maps dscp-cos** command:

```
Router# show mls qos maps dscp-cos

Dscp-cos map:
  dscp:  0  8 10 16 18 24 26 32 34 40 46 48 56
-----
  cos:  0  1  1  1  2  2  3  3  4  4  5  6  7
```

The following is sample output from the **show mls qos maps** command:

```
Router# show mls qos maps
```

```
Dscp-cos map:  
  dscp:  0  8 10 16 18 24 26 32 34 40 46 48 56  
-----  
   cos:  0  1  1  2  2  3  7  4  4  5  5  7  7  
  
Cos-dscp map:  
   cos:  0  1  2  3  4  5  6  7  
-----  
  dscp:  0  8 16 24 32 40 48 56
```

**Related Commands**

Command	Description
<b>mls qos map</b>	Defines the CoS-to-DSCP map and DSCP-to-CoS map.

# show mls rp interface

To display 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 or privileged EXEC mode.

**show mls rp interface** *type number*

Syntax Description	<i>type</i>	Interface type.
	<i>number</i>	Interface number.

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

Command History	Release	Modification
	12.0(5)T	This command was introduced.

**Examples** The following displays sample output from the **show mls rp interface** command. The interface type is VLAN, and its number is 10.

```
Router# show mls rp interface vlan 10

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

Related Commands	Command	Description
	<b>mls rp ipx (global)</b>	Enables the router as an IPX MLS RP.
	<b>mls rp locate ipx</b>	Displays information about all switches currently shortcutting for the specified IPX flow(s).
	<b>mls rp vtp-domain</b>	Assigns an MLS interface to a specific VTP domain on the MLS RP.
	<b>mls rp management-interface</b>	Designates an interface as the management interface for MLSP packets.
	<b>mls rp vlan-id</b>	Assigns a VLAN identification number to an IPX MLS interface.
	<b>show mls rp ipx</b>	Displays details for all IPX MLS interfaces on the IPX MLS router.
	<b>show mls rp vtp-domain</b>	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 or privileged EXEC mode.

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

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

Command Modes	
	User EXEC Privileged EXEC

Command History	Release	Modification
	12.0(5)T	This command was introduced.

**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
-----
192.1.10.6       239.255.158.197  10    1.2.10.199     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:
(1.1.13.1, 224.1.1.1) Incoming interface: Vlan13, Packets switched: 61590
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan13

(1.1.9.3, 224.1.1.1) Incoming interface: Vlan9, Packets switched: 0
Hardware switched outgoing interfaces: Vlan20
MFD installed: Vlan9

(1.1.12.1, 224.1.1.1) Incoming interface: Vlan12, Packets switched: 62010
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan12
```



```
(1.1.12.3, 224.1.1.1) Incoming interface: Vlan12, Packets switched: 61980
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan12
```

```
(1.1.11.1, 224.1.1.1) Incoming interface: Vlan11, Packets switched: 62430
Hardware switched outgoing interfaces: Vlan20 Vlan9
MFD installed: Vlan11
```

```
(1.1.11.3, 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: 1.2.10.195
  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 = 192.1.28.2, IP2 = 0.0.0.0
  Router IP used in MLS Multicast messages: 192.1.28.2
```

```
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:0.0.0.0  Switch MAC:0000.0000.0000  
Number of complete flows: 0  
Total hardware-switched flows: 0
```

```
Switch IP:1.2.10.199  Switch MAC:0010.a60b.b4ff  
Number of complete flows: 1  
Total hardware-switched flows: 1
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>mls rp ip multicast</b>	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 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.

**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 Trunk Protocol (VTP) domains enabled for MLS

**Examples** The following example displays sample output from the **show mls rp ipx** command for all IPX MLS interfaces on an MLS-Route Processor (RP):

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

## show mls rp vtp-domain

To display IPX Multilayer Switching (MLS) interfaces for a specific Virtual Trunk Protocol (VTP) domain on the Route Processor (RP), use the **show mls rp vtp-domain** command in privileged EXEC mode.

**show mls rp vtp-domain** *domain-name*

Syntax Description	<i>domain-name</i>	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.

**Examples** This example shows details about IPX MLS interfaces in a VTP domain named WBU:

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

## 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 or privileged EXEC mode.

**show mls rp** [*interface*]

<b>Syntax Description</b>	<i>interface</i>	(Optional) Displays information for one interface. Without this argument, detailed views of all interfaces are displayed.
---------------------------	------------------	---

<b>Command Modes</b>	User EXEC Privileged EXEC
----------------------	------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.3(3) WA4(4)	This command was introduced.

### Examples

The following is sample output for the **show mls rp** command:

```
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 for the **show mls rp** command for a specific interface:

```
Router# show mls rp int vlan 10
```

```
mls active on Vlan10, domain WBU
```

**Related Commands**

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



# 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		
<i>module-number</i>	(Optional) Number of the module.	
<i>port-number</i>	(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 3](#) describes the fields shown in the display.

**Table 3** *show port flowcontrol* Field Descriptions

Field	Description
Port	Module and port number.
Send-Flowcontrol Admin	Flow-control administration. Possible settings: <ul style="list-style-type: none"> <li>On indicates the local port sends flow control to the far end.</li> <li>Off indicates the local port does not send flow control to the far end.</li> <li>Desired indicates the local end sends flow control to the far end if the far end supports it.</li> </ul>

*Table 3 show port flowcontrol Field Descriptions (continued)*

Field	Description
Send-Flowcontrol Oper	Flow-control operation. Possible setting: <ul style="list-style-type: none"> <li>Disagree indicates the two ports could not agree on a link protocol.</li> <li>Off indicates that the local port cannot send flowcontrol to a remote port.</li> </ul>
Receive-Flowcntl Admin	Flow-control administration. Possible settings: <ul style="list-style-type: none"> <li>On indicates the local port requires the far end to send flow control.</li> <li>Off indicates the local port does not allow the far end to send flow control.</li> <li>Desired indicates the local end allows the far end to send flow control.</li> </ul>
Receive-Flowcntl Oper	Flow-control operation. Possible setting: <ul style="list-style-type: none"> <li>Disagree indicates the two ports could not agree on a link protocol.</li> <li>Off indicates that the local port cannot receive flowcontrol from a remote port.</li> </ul>
RxPause	Number of pause frames received.
TxPause	Number of pause frames transmitted.

**Related Commands**

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

# show spanning-tree

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

```
show spanning-tree [bridge-group] [active | backbonefast | blockedports | bridge | brief |
inconsistentports | interface interface-id | pathcost method | root | summary [totals] |
uplinkfast | vlan vlan-id]
```

Syntax	Description
<i>bridge-group</i>	(Optional) Specifies the bridge group number. The range is 1 to 255.
<b>active</b>	(Optional) Displays spanning-tree information on active interfaces only.
<b>backbonefast</b>	(Optional) Displays spanning-tree BackboneFast status.
<b>blockedports</b>	(Optional) Displays blocked port information.
<b>bridge</b>	(Optional) Displays status and configuration of this switch.
<b>brief</b>	(Optional) Specifies a brief summary of interface information.
<b>inconsistentports</b>	(Optional) Displays information about inconsistent ports.
<b>interface</b> <i>interface-id</i>	(Optional) Specifies a list of interfaces for which spanning-tree information appears. 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).
<b>pathcost method</b>	(Optional) Displays the default path cost method.
<b>root</b>	(Optional) Displays root-switch status and configuration.
<b>summary</b>	(Optional) Specifies a summary of port states.
<b>totals</b>	(Optional) Displays the total lines of the spanning-tree state section.
<b>uplinkfast</b>	(Optional) Displays spanning-tree UplinkFast status.
<b>vlan</b> <i>vlan-id</i>	(Optional) Specifies the VLAN ID. The range is 1 to 1005. If the <i>vlan-id</i> value is omitted, the command applies to the spanning-tree instance for all VLANs.

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 <i>bridge-group</i> argument and the <b>active</b> , <b>backbonefast</b> , <b>blockedports</b> , <b>bridge</b> , <b>inconsistentports</b> , <b>pathcost method</b> , <b>root</b> , <b>total</b> , and <b>uplinkfast</b> keywords were added.
	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.
	12.3(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 .

**Usage Guidelines**

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

**Examples**

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 4 describes the significant fields shown in the display.

**Table 4** *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 (STP).

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 5 describes the significant fields shown in the display.

**Table 5** *show spanning-tree brief Field Descriptions*

Field	Description
VLAN	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.
Cost	Cost associated with the port.
Sts	Status of the port.

**Table 5** *show spanning-tree brief Field Descriptions (continued)*

Field	Description
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 6 describes the significant fields shown in the display.

**Table 6** *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
```

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>spanning-tree vlan</b>	Enables the Spanning Tree Protocol on a VLAN.

---

# 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		
<i>vlan</i>	(Optional) Number of the VLAN; valid values are from 1 to 1001 and from 1025 to 4094.	
<b>active</b>	(Optional) Displays only the active ports.	
<i>mod/port</i>	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 family 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.

## 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 can be 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) channel protocol 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” using the **show port** command and as “not connected”



using the **show spantree** command. This discrepancy is because the port is physically connected but never joined between spanning tree. To get the port to join spanning tree, 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 7](#) describes the significant fields shown in the displays.

**Table 7** *show spantree Field Descriptions*

Field	Description
VLAN	VLAN for which the spanning-tree information is shown.
Spanning tree	Status of 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).

Table 7 *show spantree Field Descriptions (continued)*

Field	Description
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
<b>show spantree backbonefast</b>	Displays whether the spanning-tree BackboneFast Convergence feature is enabled.
<b>show spantree blockedports</b>	Displays only the blocked ports on a per-VLAN or per-instance basis.
<b>show spantree portvlancost</b>	Shows the path cost for the VLANs or extended-range VLANs.
<b>show spantree statistics</b>	Shows spanning tree statistical information
<b>show spantree summary</b>	Displays a summary of spanning-tree information.
<b>show spantree uplinkfast</b>	Shows the UplinkFast feature settings.

# show vlans dot1q

To display statistics about 802.1q virtual LAN (VLAN) subinterfaces, use the **show vlans dot1q** command in privileged EXEC mode.

```
show vlans dot1q [internal | interface-type interface-number.subinterface-number [detail] |
  outer-id [interface-type interface-number | second-dot1q [inner-id | any]] [detail]
```

Syntax Description		
<b>internal</b>	(Optional)	Displays internal Q-in-Q information. Used for troubleshooting purposes.
<i>interface-type</i>	(Optional)	Interface type.
<i>interface-number</i>	(Optional)	Interface number.
<i>.subinterface-number</i>	(Optional)	Subinterface number in the range 1 to 4294967293. A period (.) must be entered between the <i>interface-number</i> argument and the <i>subinterface-number</i> argument.
<b>detail</b>	(Optional)	Displays detailed information.
<i>outer-id</i>	(Optional)	Outer VLAN identifier. The allowed range is from 1 to 4095.
<b>second-dot1q</b>	(Optional)	Displays inner VLAN subinterface information.
<i>inner-id</i>	(Optional)	Inner VLAN identifier. The allowed range is from 1 to 4095.
<b>any</b>	(Optional)	Displays information for all of the inner VLAN subinterfaces configured as “any.”

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.3(7)T	This command was introduced.

**Usage Guidelines** If no arguments or keywords are entered, statistics for all of the 802.1q VLAN IDs are displayed.

**Examples** The following sample output from the **show vlans dot1q** command displays the statistics for all of the 802.1q VLAN IDs. Only the outer VLAN IDs are displayed.

```
Router# show vlans dot1q

Total statistics for 802.1Q VLAN 1:
  441 packets, 85825 bytes input
  1028 packets, 69082 bytes output
Total statistics for 802.1Q VLAN 101:
  5173 packets, 510384 bytes input
  3042 packets, 369567 bytes output
Total statistics for 802.1Q VLAN 201:
  1012 packets, 119254 bytes input
  1018 packets, 120393 bytes output
Total statistics for 802.1Q VLAN 301:
  3163 packets, 265272 bytes input
```

```

1011 packets, 120750 bytes output
Total statistics for 802.1Q VLAN 401:
1012 packets, 119254 bytes input
1010 packets, 119108 bytes output

```

Table 8 describes the significant fields shown in the display.

**Table 8** *show vlans dot1q Field Descriptions*

Field	Description
Total statistics for 802.1Q VLAN 1	Statistics are shown for the VLAN ID with the specified outer ID.
packets	Number of packets encapsulated by the 802.1Q-in-Q VLAN.
bytes input	Number of bytes input.
bytes output	Number of bytes output.

The following sample output from the **show vlans dot1q** command displays the statistics for the 802.1q VLAN subinterface configured on Gigabit Ethernet interface 5/0:

```

Router# show vlans dot1q GigabitEthernet5/0.1011001

GigabitEthernet5/0.1011001 (101/1001)
  1005 packets, 122556 bytes input
  1023 packets, 125136 bytes output

```

Table 9 describes the significant fields shown in the display.

**Table 9** *show vlans dot1q (subinterface) Field Descriptions*

Field	Description
GigabitEthernet5/0.1011001 (101/1001)	Statistics are shown for subinterface Gigabit Ethernet 5/0.1011001 with an outer VLAN ID of 101 and an inner VLAN ID of 1001.
packets	Number of packets encapsulated by the 802.1Q-in-Q VLAN.
bytes input	Number of bytes input.
bytes output	Number of bytes output.

The following sample output from the **show vlans dot1q** command displays the summary statistics for all of the VLAN subinterfaces under the physical interface Gigabit Ethernet 5/0 that have an outer VLAN ID of 101:

```

Router# show vlans dot1q 101 GigabitEthernet5/0

Total statistics for 802.1Q VLAN 101 on GigabitEthernet5/0:
  5218 packets, 513444 bytes input
  3042 packets, 369567 bytes output

```

The following sample output from the **show vlans dot1q** command displays the individual subinterface statistics and summary statistics for all of the VLAN subinterfaces under the physical interface Gigabit Ethernet 5/0 that have an outer VLAN ID of 101:

```

Router# show vlans dot1q 101 GigabitEthernet5/0 detail

GigabitEthernet5/0.101 (0)
  3220 packets, 269148 bytes input

```

```

    1008 packets, 119622 bytes output
GigabitEthernet5/0.1019999 (101/1-1000,1003-2000)
    0 packets, 0 bytes input
    3 packets, 1143 bytes output
GigabitEthernet5/0.1011001 (101/1001)
    1005 packets, 122556 bytes input
    1023 packets, 125136 bytes output
GigabitEthernet5/0.1011002 (101/1002)
    1005 packets, 122556 bytes input
    1008 packets, 123666 bytes output
Total statistics for 802.1Q VLAN 101 on GigabitEthernet5/0:
    5230 packets, 514260 bytes input
    3042 packets, 369567 bytes output

```

The following sample output from the **show vlans dot1q** command displays the statistics for an outer VLAN and inner VLAN ID combination. This is a summary that displays the total for all of the subinterfaces on the router that are configured with the specified IDs.

**Note**

When ambiguous subinterfaces are used, the statistics displayed are at subinterface-level granularity, not VLAN-ID granularity. For example, when a range of inner VLAN IDs is assigned to a subinterface, the statistics are reported only at the subinterface level. Statistics are not available for each inner VLAN ID.

```

Router# show vlans dot1q 101 second-dot1q 1001 detail

GigabitEthernet5/0.1011001 (101/1001)
    1005 packets, 122556 bytes input
    1023 packets, 125136 bytes output
Total statistics for Outer/Inner VLAN 101/1001:
    1005 packets, 122556 bytes input
    1023 packets, 125136 bytes output

```

The following sample output from the **show vlans dot1q** command displays the statistics for a specific outer VLAN ID of 301 and an inner VLAN ID of any. This is a summary that displays the total for all of the subinterfaces on the router that are configured with the specified IDs.

```

Router# show vlans dot1q 301 second-dot1q any

GigabitEthernet5/0.301999 (301/any)
    0 packets, 0 bytes input
    3 packets, 1128 bytes output
Total statistics for Outer/Inner VLAN 301/"any":
    0 packets, 0 bytes input
    3 packets, 1128 bytes output

```

The following sample output from the **show vlans dot1q** command displays some internal information about the Q-in-Q subsystem and is used for troubleshooting purposes (typically by Cisco engineers):

```

Router# show vlans dot1q internal

Internal VLAN representation on FastEthernet0/0:
VLAN Id: 1 (.1Q, Fa0/0)
VLAN Id: 201 (.1Q-in-.1Q tree, 3 elements)
    Inner VLAN Id: (0 -0 ) Fa0/0.201
    dot1q software subblock bitlist missing
    Inner VLAN Id: (2001-2001) Fa0/0.2012001
    2001
    Inner VLAN Id: (2002-2002) Fa0/0.2012002
    2002
    "any" Fa0/0.201999
VLAN Id: 401 (.1Q-in-.1Q tree, 3 elements)
    Inner VLAN Id: (0 -0 ) Fa0/0.401

```

```

dot1q software subblock bitlist missing
Inner VLAN Id: (100 -900 ) Fa0/0.4019999
100-900,1001-2000
Inner VLAN Id: (1001-2000) Fa0/0.4019999
100-900,1001-2000
Internal VLAN representation on GigabitEthernet5/0:
VLAN Id: 1 (.1Q, Gi5/0)
VLAN Id: 101 (.1Q-in-.1Q tree, 5 elements)
Inner VLAN Id: (0 -0 ) Gi5/0.101
dot1q software subblock bitlist missing
Inner VLAN Id: (1 -1000) Gi5/0.1019999
1-1000,1003-2000
Inner VLAN Id: (1001-1001) Gi5/0.1011001
1001
Inner VLAN Id: (1002-1002) Gi5/0.1011002
1002
Inner VLAN Id: (1003-2000) Gi5/0.1019999
1-1000,1003-2000
VLAN Id: 301 (.1Q-in-.1Q tree, 1 elements)
Inner VLAN Id: (0 -0 ) Gi5/0.301
dot1q software subblock bitlist missing
"any" Gi5/0.301999

```

**Related Commands**

Command	Description
<b>encapsulation dot1q</b>	Enables IEEE 802.1q encapsulation of traffic on a specified subinterface in a VLAN.
<b>vlan (VLAN configuration mode)</b>	Configures a specific VLAN.
<b>vlan database</b>	Enters VLAN configuration mode.

# show vlans

To view virtual LAN (VLAN) subinterfaces, use the **show vlans** command in privileged EXEC mode.

## show vlans

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

**Command Modes** Privileged EXEC

Command History	Release	Modification
	11.0	This command was introduced.
	12.1(3)T	This command was modified to display traffic count on FastEthernet subinterfaces.

**Examples** The following is sample output from the **show vlans** command indicating a native VLAN and a bridged group:

```
Virtual LAN ID: 1 (IEEE 802.1Q Encapsulation)

  VLAN Trunk Interface: FastEthernet1/0/2

  This is configured as native Vlan for the following interface(s) :

FastEthernet1/0/2

  Protocols Configured: Address: Received: Transmitted:

Virtual LAN ID: 100 (IEEE 802.1Q Encapsulation)

  VLAN Trunk Interface: FastEthernet1/0/2.1

  Protocols Configured: Address: Received: Transmitted:

  Bridging Bridge Group 1 0 0
```

The following is sample output from the **show vlans** command that shows the traffic count on Fast Ethernet subinterfaces:

```
Router# show vlans

Virtual LAN ID: 2 (IEEE 802.1Q Encapsulation)

  VLAN Trunk Interface: FastEthernet5/0.1

  Protocols Configured: Address: Received: Transmitted:
  IP 56.0.0.3 16 92129

Virtual LAN ID: 3 (IEEE 802.1Q Encapsulation)

  VLAN Trunk Interface: Ethernet6/0/1.1
```

```

    Protocols Configured:  Address:          Received:      Transmitted:
                          IP              36.0.0.3      1558          1521

Virtual LAN ID:  4 (Inter Switch Link Encapsulation)

    vLAN Trunk Interface:  FastEthernet5/0.2

    Protocols Configured:  Address:          Received:      Transmitted:
                          IP              76.0.0.3      0             7
    
```

Table 10 describes the significant fields shown in the display.

**Table 10** *show vlans Field Descriptions*

Field	Description
Virtual LAN ID	Domain number of the VLAN.
vLAN Trunk Interface	Subinterface that carries the VLAN traffic.
Protocols Configured	Protocols configured on the VLAN.
Address	Network address.
Received	Packets received.
Transmitted	Packets sent.

**Related Commands**

Command	Description
<b>vlan (VLAN configuration mode)</b>	Configures a specific VLAN.
<b>vlan database</b>	Enters VLAN configuration mode.



# show vlan-switch

To display virtual LAN (VLAN) information, use the **show vlan-switch** command in privileged EXEC mode.

**show vlan-switch** [**brief** | **id** *vlan* | **name** *name*]

Syntax Description		
<b>brief</b>	(Optional)	Displays only a single line for each VLAN, naming the VLAN, status, and ports.
<b>id</b> <i>vlan</i>	(Optional)	Displays information about a single VLAN identified by VLAN ID number; valid values are from 1 to 1005.
<b>name</b> <i>name</i>	(Optional)	Displays information about a single VLAN identified by VLAN name; valid values are an ASCII string from 1 to 32 characters.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.2(2)XT	This command was introduced 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.

**Usage Guidelines** Each Ethernet switch port and Ethernet repeater group belongs to only one VLAN. Trunk ports can be on multiple VLANs.

**Examples** The following example shows how to display the VLAN parameters for all VLANs within the administrative domain:

```
Router# show vlan-switch
```

```

VLAN Name                Status    Ports
-----
1    default                active   Fa4/0, Fa4/1, Fa4/2, Fa4/3
                                   Fa4/4, Fa4/5, Fa4/6, Fa4/7
                                   Fa4/8, Fa4/9, Fa4/10, Fa4/11
                                   Fa4/12, Fa4/13, Fa4/14, Fa4/15
                                   Fa4/16, Fa4/17, Fa4/18, Fa4/19
                                   Fa4/20, Fa4/21, Fa4/22, Fa4/23
                                   Fa4/24, Fa4/25, Fa4/26, Fa4/27
                                   Fa4/28, Fa4/29, Fa4/30, Fa4/31
                                   Fa4/32, Fa4/33, Fa4/34, Fa4/35
                                   Gi4/0, Gi4/1, Po1
2    VLAN0002              active
3    VLAN0003              active
5    VLAN0005              active
1002 fddi-default         active
1003 token-ring-default  active

```

```


1004 fddinet-default          active
1005 trnet-default           active

VLAN Type  SAID      MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
-----
1    enet  100001   1500  -      -      -      -    -      1002  1003
2    enet  100002   1500  -      -      -      -    -      0      0
3    enet  100003   1500  -      -      -      -    -      0      0
5    enet  100005   1500  -      -      -      -    -      0      0
1002 fddi  101002   1500  -      0      -      -    -      1      1003
1003 tr    101003   1500  1005  0      -      -    srb    1      1002
1004 fdnet 101004   1500  -      -      1      -    ibm    -      0      0
1005 trnet 101005   1500  -      -      1      -    ibm    -      0      0

```

Table 11 describes the significant fields shown in the display.

**Table 11** *show vlan Field Descriptions*

Field	Description
VLAN	VLAN number.
Name	Name, if configured, of the VLAN.
Status	Status of the VLAN (active or suspend).
Ports	Ports that belong to the VLAN.
Type	Media type of the VLAN.
SAID	Security association ID value for the VLAN.
MTU	Maximum transmission unit size for the VLAN.
Parent	Parent VLAN, if one exists.
RingNo	Ring number for the VLAN, if applicable.
BrdgNo	Bridge number for the VLAN, if applicable.
Stp	Spanning-Tree Protocol type used on the VLAN.
BrdgMode	Bridging mode for this VLAN—possible values are source-route bridging (SRB) and source-route transparent bridging (SRT); the default is SRB.
Trans1, Trans2	Types of translational bridges that the VLAN in the VLAN column is configured to translate to. Translational bridge VLANs must be a VLAN media type different from the affected VLAN; if two VLANs are specified, each one must be a different type.  Common VLAN types include Ethernet (enet), FDDI (fdnet), and Token Ring (tnet). The numbers in the “Trans1” and “Trans2” columns refer to the VLAN ID numbers of the translational bridge VLANs.
	 <p><b>Note</b> The term “VLAN translation” is also used in Cisco configuration guides for mapping specific VLANs in a given trunk to another VLAN that is of the same media type. In this context the term VLAN translation refers to a form of VLAN mapping that is using the term “VLAN translation” to describe it.&gt;</p>

# show vtp

To display general information about the virtual LAN (VLAN) Trunk Protocol (VTP) management domain, status, and counters, use the **show vtp** command in privileged EXEC mode.

**show vtp {counters | status}**

## Syntax Description

<b>counters</b>	Displays the VTP counters for the switch.
<b>status</b>	Displays the general information about the VTP management domain.

## Command Modes

Privileged EXEC

## Command History

Release	Modification
11.2(8)SA4	This command was introduced.
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.

## Examples

The following is sample output from the **show vtp counters** command:

```
Router# show vtp counters
```

```
VTP statistics:
Summary advertisements received      : 38
Subset advertisements received      : 0
Request advertisements received     : 0
Summary advertisements transmitted  : 13
Subset advertisements transmitted   : 3
Request advertisements transmitted  : 0
Number of config revision errors    : 0
Number of config digest errors      : 0
Number of V1 summary errors         : 0
```

```
VTP pruning statistics:
```

Trunk	Join Transmitted	Join Received	Summary advts received from non-pruning-capable device
Fa0/9	827	824	0
Fa0/10	827	823	0
Fa0/11	827	823	0

[Table 12](#) describes the significant fields shown in the display.

*Table 12 show vtp counters Field Descriptions*

Field	Description
Summary advertisements received	Number of summary advertisements received by this switch on its trunk ports. Summary advertisements contain the management domain name, the configuration revision number, the update time stamp and identity, the authentication checksum, and the number of subset advertisements to follow.
Subset advertisements received	Number of subset advertisements received by this switch on its trunk ports. Subset advertisements contain all the information for one or more VLANs.
Request advertisements received	Number of advertisement requests received by this switch on its trunk ports. Advertisement requests normally request information on all VLANs. They can also request information on a subset of VLANs.
Summary advertisements transmitted	Number of summary advertisements sent by this switch on its trunk ports. Summary advertisements contain the management domain name, the configuration revision number, the update timestamp and identity, the authentication checksum, and the number of subset advertisements to follow.
Subset advertisements transmitted	Number of subset advertisements sent by this switch on its trunk ports. Subset advertisements contain all the information for one or more VLANs.
Request advertisements transmitted	Number of advertisement requests sent by this switch on its trunk ports. Advertisement requests normally request information on all VLANs. They can also request information on a subset of VLANs.
Number of config revision errors	<p>Number of revision errors.</p> <p>Whenever you define a new VLAN, delete an existing VLAN, suspend or resume an existing VLAN, or modify the parameters on an existing VLAN, the configuration revision number of the switch increments.</p> <p>Revision errors increment whenever the switch receives an advertisement whose revision number matches the revision number of the switch, but the MD5 digest values do not match. This error indicates that the VTP password in the two switches is different, or the switches have different configurations.</p> <p>These errors indicate that the switch is filtering incoming advertisements, which causes the VTP database to become unsynchronized across the network.</p>

**Table 12** *show vtp counters Field Descriptions (continued)*

Field	Description
Number of config digest errors	<p>Number of MD5 digest errors.</p> <p>Digest errors increment whenever the MD5 digest in the summary packet and the MD5 digest of the received advertisement calculated by the switch do not match. This error usually indicates that the VTP password in the two switches is different. To solve this problem, make sure the VTP password on all switches is the same.</p> <p>These errors indicate that the switch is filtering incoming advertisements, which causes the VTP database to become unsynchronized across the network.</p>
Number of V1 summary errors	<p>Number of version 1 errors.</p> <p>Version 1 summary errors increment whenever a switch in VTP V2 mode receives a VTP version 1 frame. These errors indicate that at least one neighboring switch is either running VTP version 1 or VTP version 2 with V2-mode disabled. To solve this problem, change the configuration of the switches in VTP V2-mode to disabled.</p>
Join Transmitted	Number of VTP pruning messages transmitted on the trunk.
Join Received	Number of VTP pruning messages received on the trunk.
Summary Advts Received from non-pruning-capable device	Number of VTP summary messages received on the trunk from devices that do not support pruning.

The following is sample output from the **show vtp status** command:

```
Router# show vtp status

VTP Version                : 2
Configuration Revision     : 1
Maximum VLANs supported locally : 68
Number of existing VLANs   : 7
VTP Operating Mode         : Server
VTP Domain Name            : test1
VTP Pruning Mode           : Disabled
VTP V2 Mode                 : Disabled
VTP Traps Generation       : Disabled
MD5 digest                  : 0x3D 0x02 0xD4 0x3A 0xC4 0x46 0xA1 0x03
Configuration last modified by 172.20.130.52 at 3-4-93 22:25:
```

[Table 13](#) describes the significant fields shown in the display.

*Table 13 show vtp status Field Descriptions*

Field	Description
VTP Version	<b>Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers</b> Displays the VTP version operating on the switch. By default, switches implement version 1. <b>Catalyst Switches</b> Displays the VTP version operating on the switch. By default, Catalyst 2900 and 3500 XL switches implement version 1 but can be set to version 2.
Configuration Revision	Current configuration revision number on this switch.
Maximum VLANs Supported Locally	Maximum number of VLANs supported locally.
Number of Existing VLANs	Number of existing VLANs.

Table 13 *show vtp status Field Descriptions (continued)*

Field	Description
VTP Operating Mode	<p data-bbox="808 317 1505 373">Displays the VTP operating mode, which can be server, client, or transparent.</p> <p data-bbox="808 394 1505 548">Server—A switch in VTP server mode is enabled for VTP and sends advertisements. You can configure VLANs on it. The switch guarantees that it can recover all VLAN information in the current VTP database from nonvolatile storage after reboot. By default, every switch is a VTP server.</p> <p data-bbox="808 569 1505 751">Client—A switch in VTP client mode is enabled for VTP, can send advertisements, but does not have enough nonvolatile storage to store VLAN configurations. You cannot configure VLANs on it. When a VTP client starts up, it does not transmit VTP advertisements until it receives advertisements to initialize its VLAN database.</p> <p data-bbox="808 772 1505 1020">Transparent—A switch in VTP transparent mode is disabled for VTP, does not transmit advertisements or learn from advertisements sent by other devices, and cannot affect VLAN configurations on other devices in the network. The switch receives VTP advertisements and forwards them on all trunk ports except the one on which the advertisement was received. The configuration of multi-VLAN ports causes the switch to automatically enter transparent mode.</p> <p data-bbox="808 1041 1505 1289"><b>Note</b> Catalyst 2912MF, 2924M, and 3500 XL switches support up to 250 VLANs. All other Catalyst 2900 XL switches support up to 64 VLANs. If you define more than 250 or 64 or if the switch receives an advertisement that contains more than 250 or 64 VLANs, the switch automatically enters VTP transparent mode and operates with the VLAN configuration preceding the one that sent it into transparent mode.</p> <p data-bbox="808 1310 1505 1409"><b>Note</b> Catalyst 2912MF, 2924M, and 3500 XL switches support up to 250 VLANs. All other Catalyst 2900 XL switches support up to 64 VLANs.</p> <p data-bbox="889 1430 1505 1633">For Catalyst 2912MF, 2924M, and 3500 XL switches, if you define more than 250 or if the switch receives an advertisement that contains more than 250 VLANs, the switch automatically enters VTP transparent mode and operates with the VLAN configuration preceding the one that sent it into transparent mode.</p> <p data-bbox="889 1654 1505 1858">For all other Catalyst 2900 XL switches, if you define more than 64 or if the switch receives an advertisement that contains more than 64 VLANs, the switch automatically enters VTP transparent mode and operates with the VLAN configuration preceding the one that sent it into transparent mode.</p>
VTP Domain Name	Name that identifies the administrative domain for the switch.

Table 13 *show vtp status Field Descriptions (continued)*

Field	Description
VTP Pruning Mode	<p><b>Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series Routers</b></p> <p>VTP pruning mode is not supported on the Cisco 2600 series and Cisco 3600 series routers.</p> <p><b>Catalyst Switches</b></p> <p>Displays whether pruning is enabled or disabled. Enabling pruning on a VTP server enables pruning for the entire management domain. Pruning restricts flooded traffic to those trunk links that the traffic must use to access the appropriate network devices.</p>
VTP V2 Mode	Displays if VTP version 2 mode is enabled. All VTP version 2 switches operate in version 1 mode by default. Each VTP switch automatically detects the capabilities of all other VTP devices. A network of VTP devices should be configured to version 2 only if all VTP switches in the network can operate in version 2 mode.
VTP Traps Generation	Displays whether VTP traps are transmitted to a network management station.
MD5 Digest	16-byte checksum of the VTP configuration.
Configuration Last Modified	Displays the date and time of the last configuration modification. Displays the IP address of the switch that caused the configuration change to the database.

## Related Commands

Command	Description
<b>clear vtp counters</b>	Clears the VTP and pruning counters.
<b>vtp</b>	Configures the VTP mode.



# spanning-tree backbonefast

To enable the BackboneFast feature, use the **spanning-tree backbonefast** command in global configuration mode. To return to the default setting, use the **no** form of this command.

**spanning-tree backbonefast**

**no spanning-tree backbonefast**

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

**Defaults** BackboneFast is disabled.

**Command Modes** Global configuration

Command History	Release	Modification
	12.1(6)EA2	This command was introduced.
	12.2(15)ZJ	This command was implemented on the 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.

**Usage Guidelines** BackboneFast should be enabled on all of the Cisco routers containing an Ethernet switch network module. BackboneFast provides for fast convergence in the network backbone after a spanning-tree topology change. It enables the switch to detect an indirect link failure and to start the spanning-tree reconfiguration sooner than it would under normal spanning-tree rules.

Use the **show spanning-tree** privileged EXEC command to verify your settings.

**Examples** The following example shows how to enable BackboneFast on the switch:

```
Router(config)# spanning-tree backbonefast
```

Related Commands	Command	Description
	<b>show spanning-tree</b>	Displays spanning-tree information for the specified spanning-tree instances.

# spanning-tree cost

To set the path cost of the interface for Spanning Tree Protocol (STP) calculations, use the **spanning-tree cost** command in interface configuration mode. To revert to the default value, use the **no** form of this command.

**spanning-tree cost** *cost*

**no spanning-tree cost**

<b>Syntax Description</b>	<i>cost</i>	Path cost; valid values are from 1 to 200000000 for Cisco IOS Releases 12.1(3a)E and later releases and from 1 to 65535 for Cisco IOS releases prior to Cisco IOS Release 12.1(3a)E.
---------------------------	-------------	--

<b>Defaults</b>	The default path cost is computed from the bandwidth setting of the interface; default path costs are: Ethernet: 100 16-Mb Token Ring: 62 FDDI: 10 FastEthernet: 10 ATM 155: 6 GigabitEthernet: 1 HSSI: 647
-----------------	--

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.0(7)XE	This command was introduced on the Catalyst 6000 family switches.
	12.1(3a)E	This command was modified to support 32-bit path cost.
	12.2(2)XT	This command was introduced 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.

<b>Usage Guidelines</b>	When you specify a value for the cost argument, higher values indicate higher costs. This range applies regardless of the protocol type specified.
-------------------------	--

<b>Examples</b>	The following example shows how to access an interface and set a path cost value of 250 for the spanning tree VLAN associated with that interface:
-----------------	--

```
Router(config)# interface ethernet 2/0
Router(config-if)# spanning-tree cost 250
```

Related Commands	Command	Description
	<b>show spanning-tree</b>	Displays spanning-tree information for the specified spanning-tree instances.
	<b>spanning-tree port-priority</b>	Sets an interface priority when two bridges tie for position as the root bridge.
	<b>spanning-tree portfast (global configuration mode)</b>	Enables PortFast mode, where the interface is immediately put into the forwarding state upon linkup without waiting for the timer to expire.
	<b>spanning-tree portfast (interface configuration mode)</b>	Enables PortFast mode, where the interface is immediately put into the forwarding state upon linkup without waiting for the timer to expire.
	<b>spanning-tree uplinkfast</b>	Enables the UplinkFast feature.
	<b>spanning-tree vlan</b>	Configures STP on a per-VLAN basis.

# spanning-tree port-priority

To set an interface priority when two bridges tie for position as the root bridge, use the **spanning-tree port-priority** command in interface configuration mode. To revert to the default value, use the **no** form of this command.

**spanning-tree port-priority** *port-priority*

**no spanning-tree port-priority**

## Syntax Description

*port-priority* Port priority; valid values are from 2 to 255. The default is 128.

## Defaults

The port priority is 128.

## Command Modes

Interface configuration

## Command History

Release	Modification
12.0(7)XE	This command was introduced on the Catalyst 6000 family 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.

## Usage Guidelines

The priority you set breaks the tie.

## Examples

The following example shows how to increase the likelihood that the spanning tree instance 20 is chosen as the root-bridge on interface ethernet 2/0:

```
Router(config)# interface ethernet 2/0
Router(config-if)# spanning-tree port-priority 20
Router(config-if)#
```

## Related Commands

Command	Description
<b>show spanning-tree</b>	Displays spanning-tree information for the specified spanning-tree instances.
<b>spanning-tree cost</b>	Sets the path cost of the interface for STP calculations.
<b>spanning-tree portfast (global configuration mode)</b>	Enables PortFast mode, where the interface is immediately put into the forwarding state upon linkup without waiting for the timer to expire.

Command	Description
<b>spanning-tree portfast (interface configuration mode)</b>	Enables PortFast mode, which places the interface immediately into the forwarding state upon linkup without waiting for the timer to expire.
<b>spanning-tree uplinkfast</b>	Enables the UplinkFast feature.
<b>spanning-tree vlan</b>	Configures STP on a per-VLAN basis.

# spanning-tree vlan

To configure Spanning Tree Protocol (STP) on a per-virtual LAN (VLAN) basis, use the **spanning-tree vlan** command in global configuration mode. To return to the default value, use the **no** form of this command.

```
spanning-tree vlan vlan-id [forward-time seconds | hello-time seconds | max-age seconds |
priority priority | protocol protocol | [root {primary | secondary}] [diameter net-diameter
[hello-time seconds]]]]
```

```
no spanning-tree vlan vlan-id [forward-time | hello-time | max-age | priority | protocol | root]
```

## Syntax Description

<i>vlan-id</i>	VLAN identification number; valid values are from 1 to 1005.
<b>forward-time</b> <i>seconds</i>	(Optional) Sets the STP forward delay time; valid values are from 4 to 30 seconds.
<b>hello-time</b> <i>seconds</i>	(Optional) Specifies in seconds, the duration between the generation of configuration messages by the root switch; valid values are from 1 to 10 seconds.
<b>max-age</b> <i>seconds</i>	(Optional) Sets the maximum number of seconds the information in a bridge packet data unit (BPDU) is valid; valid values are from 6 to 40 seconds.
<b>priority</b> <i>priority</i>	(Optional) Sets the STP bridge priority; valid values are from 0 to 65535.
<b>protocol</b> <i>protocol</i>	(Optional) Sets the STP. See the “Usage Guidelines” section for a list of valid values.
<b>root primary</b>	(Optional) Forces this switch to be the root bridge.
<b>root secondary</b>	(Optional) Specifies this switch to act as the root switch should the primary root fail.
<b>diameter</b> <i>net-diameter</i>	(Optional) Specifies the maximum number of bridges between any two points of attachment of end stations; valid values are from 2 through 7.

## Defaults

**forward-time:** 15 seconds  
**hello-time:** 2 seconds  
**max-age:** 20 seconds  
**priority:** The default with IEEE STP enabled is 32,768; with STP enabled, the default is 128.  
**protocol:** IEEE  
**root:** No STP root

## Command Modes

Global configuration

## Command History

Release	Modification
12.0(7)XE	This command was introduced on the Catalyst 6000 family switches.
12.1(1)E	Support for this command on the Catalyst 6000 family switches was extended to the E train.

Release	Modification
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.

### Usage Guidelines

When setting the **max-age seconds**, if a bridge does not hear Bridge Protocol Data Units (BPDU) from the root bridge within the specified interval, it assumes that the network has changed and recomputes the spanning tree topology.

Valid values for *protocol* are **dec** (Digital STP), **ibm** (IBM STP), **ieee** (IEEE Ethernet STP), and **vlan-bridge** (VLAN Bridge STP).

The **spanning-tree root primary** command alters this switch's bridge priority to 8,192. If you enter after **spanning-tree root primary** command and the switch does not become root, then the bridge priority is changed to 100 less than the bridge priority of the current bridge. If the switch does not become root, an error results.

The **spanning-tree root secondary** command alters this switch's bridge priority to 16,384. If the root switch should fail, this switch becomes the next root switch.

Use the **spanning-tree root** commands on backbone switches only.

### Examples

The following example shows how to enable spanning tree on VLAN 200:

```
Router(config)# spanning-tree vlan 200
```

The following example shows how to configure the switch as the root switch for VLAN 10 with a network diameter of 4:

```
Router(config)# spanning-tree vlan 10 root primary diameter 4
```

The following example shows how to configure the switch as the secondary root switch for VLAN 10 with a network diameter of 4:

```
Router(config)# spanning-tree vlan 10 root secondary diameter 4
```

### Related Commands

Command	Description
<b>show spanning-tree</b>	Displays spanning-tree information for the specified spanning-tree instances.
<b>spanning-tree cost</b>	Sets the path cost of the interface for STP calculations.
<b>spanning-tree port-priority</b>	Sets an interface priority when two bridges tie for position as the root bridge.
<b>spanning-tree portfast (global configuration mode)</b>	Enables PortFast mode, where the interface is immediately put into the forwarding state upon linkup, without waiting for the timer to expire.

Command	Description
<b>spanning-tree portfast (interface configuration mode)</b>	Enables PortFast mode, where the interface is immediately put into the forwarding state upon linkup, without waiting for the timer to expire.
<b>spanning-tree uplinkfast</b>	Enables the UplinkFast feature.