



VLAN Command Reference, Cisco IOS Release 15.2(2)E (Catalyst 2960-XR Switch)

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Preface

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Document Conventions

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination ^D or Ctrl-D means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
bold font	Commands and keywords and user-entered text appear in bold font .
<i>Italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .
Courier font	Terminal sessions and information the system displays appear in <code>courier font</code> .
Bold Courier font	Bold Courier font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.
[x y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.

Convention	Description
{x y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Reader Alert Conventions

This document may use the following conventions for reader alerts:



Note

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.



Tip

Means *the following information will help you solve a problem*.



Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.



Timesaver

Means *the described action saves time*. You can save time by performing the action described in the paragraph.



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Related Documentation

**Note**

Before installing or upgrading the switch, refer to the switch release notes.

- Catalyst 2960-XR Switch documentation, located at:
- Cisco SFP and SFP+ modules documentation, including compatibility matrixes, located at:
http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html
- Error Message Decoder, located at:
<https://www.cisco.com/cgi-bin/Support/Errordecoder/index.cgi>

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Using the Command-Line Interface

- [Information About Using the Command-Line Interface, page 1](#)
- [How to Use the CLI to Configure Features, page 6](#)

Information About Using the Command-Line Interface

Command Modes

The Cisco IOS user interface is divided into many different modes. The commands available to you depend on which mode you are currently in. Enter a question mark (?) at the system prompt to obtain a list of commands available for each command mode.

You can start a CLI session through a console connection, through Telnet, a SSH, or by using the browser.

When you start a session, you begin in user mode, often called user EXEC mode. Only a limited subset of the commands are available in user EXEC mode. For example, most of the user EXEC commands are one-time commands, such as **show** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. The user EXEC commands are not saved when the switch reboots.

To have access to all commands, you must enter privileged EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. From this mode, you can enter any privileged EXEC command or enter global configuration mode.

Using the configuration modes (global, interface, and line), you can make changes to the running configuration. If you save the configuration, these commands are stored and used when the switch reboots. To access the various configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and line configuration mode.

This table describes the main command modes, how to access each one, the prompt you see in that mode, and how to exit the mode.

Table 1: Command Mode Summary

Mode	Access Method	Prompt	Exit Method	About This Mode
User EXEC	Begin a session using Telnet, SSH, or console.	Switch>	Enter logout or quit .	Use this mode to <ul style="list-style-type: none"> • Change terminal settings. • Perform basic tests. • Display system information.
Privileged EXEC	While in user EXEC mode, enter the enable command.	Switch#	Enter disable to exit.	Use this mode to verify commands that you have entered. Use a password to protect access to this mode.
Global configuration	While in privileged EXEC mode, enter the configure command.	Switch(config) #	To exit to privileged EXEC mode, enter exit or end , or press Ctrl-Z .	Use this mode to configure parameters that apply to the entire switch.
VLAN configuration	While in global configuration mode, enter the vlan <i>vlan-id</i> command.	Switch(config-vlan) #	To exit to global configuration mode, enter the exit command. To return to privileged EXEC mode, press Ctrl-Z or enter end .	Use this mode to configure VLAN parameters. When VTP mode is transparent, you can create extended-range VLANs (VLAN IDs greater than 1005) and save configurations in the switch startup configuration file.
Interface configuration	While in global configuration mode, enter the interface command (with a specific interface).	Switch(config-if) #		Use this mode to configure parameters for the Ethernet ports.

Mode	Access Method	Prompt	Exit Method	About This Mode
			<p>To exit to global configuration mode, enter exit.</p> <p>To return to privileged EXEC mode, press Ctrl-Z or enter end.</p>	
Line configuration	While in global configuration mode, specify a line with the line vty or line console command.	Switch(config-line) #	<p>To exit to global configuration mode, enter exit.</p> <p>To return to privileged EXEC mode, press Ctrl-Z or enter end.</p>	Use this mode to configure parameters for the terminal line.

Using the Help System

You can enter a question mark (?) at the system prompt to display a list of commands available for each command mode. You can also obtain a list of associated keywords and arguments for any command.

SUMMARY STEPS

1. **help**
2. *abbreviated-command-entry ?*
3. *abbreviated-command-entry <Tab>*
4. **?**
5. *command ?*
6. *command keyword ?*

DETAILED STEPS

	Command or Action	Purpose
Step 1	help Example: Switch# help	Obtains a brief description of the help system in any command mode.
Step 2	<i>abbreviated-command-entry ?</i> Example: Switch# di? dir disable disconnect	Obtains a list of commands that begin with a particular character string.
Step 3	<i>abbreviated-command-entry <Tab></i> Example: Switch# sh conf<tab> Switch# show configuration	Completes a partial command name.
Step 4	? Example: Switch> ?	Lists all commands available for a particular command mode.
Step 5	<i>command ?</i> Example: Switch> show ?	Lists the associated keywords for a command.
Step 6	<i>command keyword ?</i> Example: Switch(config)# cdp holdtime ? <10-255> Length of time (in sec) that receiver must keep this packet	Lists the associated arguments for a keyword.

Understanding Abbreviated Commands

You need to enter only enough characters for the switch to recognize the command as unique.

This example shows how to enter the **show configuration** privileged EXEC command in an abbreviated form:

```
Switch# show conf
```

No and Default Forms of Commands

Almost every configuration command also has a **no** form. In general, use the **no** form to disable a feature or function or reverse the action of a command. For example, the **no shutdown** interface configuration command reverses the shutdown of an interface. Use the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default.

Configuration commands can also have a **default** form. The **default** form of a command returns the command setting to its default. Most commands are disabled by default, so the **default** form is the same as the **no** form. However, some commands are enabled by default and have variables set to certain default values. In these cases, the **default** command enables the command and sets variables to their default values.

CLI Error Messages

This table lists some error messages that you might encounter while using the CLI to configure your switch.

Table 2: Common CLI Error Messages

Error Message	Meaning	How to Get Help
% Ambiguous command: "show con"	You did not enter enough characters for your switch to recognize the command.	Reenter the command followed by a question mark (?) without any space between the command and the question mark. The possible keywords that you can enter with the command appear.
% Incomplete command.	You did not enter all of the keywords or values required by this command.	Reenter the command followed by a question mark (?) with a space between the command and the question mark. The possible keywords that you can enter with the command appear.
% Invalid input detected at '^' marker.	You entered the command incorrectly. The caret (^) marks the point of the error.	Enter a question mark (?) to display all of the commands that are available in this command mode. The possible keywords that you can enter with the command appear.

Configuration Logging

You can log and view changes to the switch configuration. You can use the Configuration Change Logging and Notification feature to track changes on a per-session and per-user basis. The logger tracks each configuration command that is applied, the user who entered the command, the time that the command was entered, and the parser return code for the command. This feature includes a mechanism for asynchronous

notification to registered applications whenever the configuration changes. You can choose to have the notifications sent to the syslog.

**Note**

Only CLI or HTTP changes are logged.

How to Use the CLI to Configure Features

Configuring the Command History

The software provides a history or record of commands that you have entered. The command history feature is particularly useful for recalling long or complex commands or entries, including access lists. You can customize this feature to suit your needs.

Changing the Command History Buffer Size

By default, the switch records ten command lines in its history buffer. You can alter this number for a current terminal session or for all sessions on a particular line. This procedure is optional.

SUMMARY STEPS

1. **terminal history** [*size number-of-lines*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	terminal history [<i>size number-of-lines</i>] Example: Switch# terminal history size 200	Changes the number of command lines that the switch records during the current terminal session in privileged EXEC mode. You can configure the size from 0 to 256.

Recalling Commands

To recall commands from the history buffer, perform one of the actions listed in this table. These actions are optional.

**Note**

The arrow keys function only on ANSI-compatible terminals such as VT100s.

SUMMARY STEPS

1. **Ctrl-P** or use the **up arrow** key
2. **Ctrl-N** or use the **down arrow** key
3. **show history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Ctrl-P or use the up arrow key	Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Step 2	Ctrl-N or use the down arrow key	Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the up arrow key. Repeat the key sequence to recall successively more recent commands.
Step 3	show history Example: Switch# show history	Lists the last several commands that you just entered in privileged EXEC mode. The number of commands that appear is controlled by the setting of the terminal history global configuration command and the history line configuration command.

Disabling the Command History Feature

The command history feature is automatically enabled. You can disable it for the current terminal session or for the command line. This procedure is optional.

SUMMARY STEPS

1. **terminal no history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	terminal no history Example: Switch# terminal no history	Disables the feature during the current terminal session in privileged EXEC mode.

Enabling and Disabling Editing Features

Although enhanced editing mode is automatically enabled, you can disable it and reenable it.

SUMMARY STEPS

1. `terminal editing`
2. `terminal no editing`

DETAILED STEPS

	Command or Action	Purpose
Step 1	terminal editing Example: Switch# <code>terminal editing</code>	Reenables the enhanced editing mode for the current terminal session in privileged EXEC mode.
Step 2	terminal no editing Example: Switch# <code>terminal no editing</code>	Disables the enhanced editing mode for the current terminal session in privileged EXEC mode.

Editing Commands Through Keystrokes

The keystrokes help you to edit the command lines. These keystrokes are optional.

**Note**

The arrow keys function only on ANSI-compatible terminals such as VT100s.

Table 3: Editing Commands

Editing Commands	Description
Ctrl-B or use the left arrow key	Moves the cursor back one character.
Ctrl-F or use the right arrow key	Moves the cursor forward one character.
Ctrl-A	Moves the cursor to the beginning of the command line.
Ctrl-E	Moves the cursor to the end of the command line.
Esc B	Moves the cursor back one word.
Esc F	Moves the cursor forward one word.
Ctrl-T	Transposes the character to the left of the cursor with the character located at the cursor.
Delete or Backspace key	Erases the character to the left of the cursor.
Ctrl-D	Deletes the character at the cursor.
Ctrl-K	Deletes all characters from the cursor to the end of the command line.
Ctrl-U or Ctrl-X	Deletes all characters from the cursor to the beginning of the command line.
Ctrl-W	Deletes the word to the left of the cursor.
Esc D	Deletes from the cursor to the end of the word.
Esc C	Capitalizes at the cursor.
Esc L	Changes the word at the cursor to lowercase.
Esc U	Capitalizes letters from the cursor to the end of the word.

Ctrl-V or Esc Q	Designates a particular keystroke as an executable command, perhaps as a shortcut.
Return key	<p>Scrolls down a line or screen on displays that are longer than the terminal screen can display.</p> <p>Note The More prompt is used for any output that has more lines than can be displayed on the terminal screen, including show command output. You can use the Return and Space bar keystrokes whenever you see the More prompt.</p>
Space bar	Scrolls down one screen.
Ctrl-L or Ctrl-R	Redisplays the current command line if the switch suddenly sends a message to your screen.

Editing Command Lines That Wrap

You can use a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. The keystroke actions are optional.

To scroll back to the beginning of the command entry, press **Ctrl-B** or the left arrow key repeatedly. You can also press **Ctrl-A** to immediately move to the beginning of the line.



Note

The arrow keys function only on ANSI-compatible terminals such as VT100s.

The following example shows how to wrap a command line that extends beyond a single line on the screen.

SUMMARY STEPS

1. **access-list**
2. **Ctrl-A**
3. **Return** key

DETAILED STEPS

	Command or Action	Purpose
Step 1	access-list Example: Switch(config)# access-list 101 permit tcp	<p>Displays the global configuration command entry that extends beyond one line.</p> <p>When the cursor first reaches the end of the line, the line is shifted ten spaces to the left and redisplayed. The dollar sign (\$) shows that the</p>

	Command or Action	Purpose
	<pre> 10.15.22.25 255.255.255.0 10.15.22.35 Switch(config)# \$ 101 permit tcp 10.15.22.25 255.255.255.0 10.15.22.35 255.25 Switch(config)# \$t tcp 10.15.22.25 255.255.255.0 131.108.1.20 255.255.255.0 eq Switch(config)# \$15.22.25 255.255.255.0 10.15.22.35 255.255.255.0 eq 45 </pre>	line has been scrolled to the left. Each time the cursor reaches the end of the line, the line is again shifted ten spaces to the left.
Step 2	Ctrl-A Example: <pre> Switch(config)# access-list 101 permit tcp 10.15.22.25 255.255.255.0 10.15.2\$ </pre>	Checks the complete syntax. The dollar sign (\$) appears at the end of the line to show that the line has been scrolled to the right.
Step 3	Return key	Execute the commands. The software assumes that you have a terminal screen that is 80 columns wide. If you have a different width, use the terminal width privileged EXEC command to set the width of your terminal. Use line wrapping with the command history feature to recall and modify previous complex command entries.

Searching and Filtering Output of show and more Commands

You can search and filter the output for **show** and **more** commands. This is useful when you need to sort through large amounts of output or if you want to exclude output that you do not need to see. Using these commands is optional.

SUMMARY STEPS

1. `{show | more} command {begin | include | exclude} regular-expression`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>{show more} command {begin include exclude} regular-expression</code> Example: <pre> Switch# show interfaces include protocol Vlan1 is up, line protocol is up Vlan10 is up, line protocol is down GigabitEthernet1/0/1 is up, line protocol is down GigabitEthernet1/0/2 is up, line protocol is up </pre>	Searches and filters the output. Expressions are case sensitive. For example, if you enter exclude output , the lines that contain output are not displayed, but the lines that contain output appear.

Accessing the CLI on a Switch Stack

You can access the CLI through a console connection, through Telnet, a SSH, or by using the browser.

You manage the switch stack and the stack member interfaces through the stack master. You cannot manage stack members on an individual switch basis. You can connect to the stack master through the console port or the Ethernet management port of one or more stack members. Be careful with using multiple CLI sessions on the stack master. Commands that you enter in one session are not displayed in the other sessions. Therefore, it is possible to lose track of the session from which you entered commands.

**Note**

We recommend using one CLI session when managing the switch stack.

If you want to configure a specific stack member port, you must include the stack member number in the CLI command interface notation.

Accessing the CLI Through a Console Connection or Through Telnet

Before you can access the CLI, you must connect a terminal or a PC to the switch console or connect a PC to the Ethernet management port and then power on the switch, as described in the hardware installation guide that shipped with your switch.

If your switch is already configured, you can access the CLI through a local console connection or through a remote Telnet session, but your switch must first be configured for this type of access.

You can use one of these methods to establish a connection with the switch:

- Connect the switch console port to a management station or dial-up modem, or connect the Ethernet management port to a PC. For information about connecting to the console or Ethernet management port, see the switch hardware installation guide.
- Use any Telnet TCP/IP or encrypted Secure Shell (SSH) package from a remote management station. The switch must have network connectivity with the Telnet or SSH client, and the switch must have an enable secret password configured.
 - The switch supports up to 16 simultaneous Telnet sessions. Changes made by one Telnet user are reflected in all other Telnet sessions.
 - The switch supports up to five simultaneous secure SSH sessions.

After you connect through the console port, through the Ethernet management port, through a Telnet session or through an SSH session, the user EXEC prompt appears on the management station.



VLAN Commands

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client vlan

To configure a WLAN interface or an interface group, use the **client vlan** command. To disable the WLAN interface, use the **no** form of this command.

client vlan *interface-id-name-or-group-name*

no client vlan

Syntax Description

interface--id-name-or-group-name

Interface ID, name, or VLAN group name.

Command Default

The default interface is configured.

Command Modes

WLAN configuration

Command History

Release

Cisco IOS 15.0(2)EX1

Modification

This command was introduced.

Usage Guidelines

You must disable the WLAN before using this command. See Related Commands section for more information on how to disable a WLAN.

Examples

This example shows how to enable a client VLAN on a WLAN:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# wlan wlan1
Switch(config-wlan)# client vlan client-vlan1
Switch(config-wlan)# end
```

This example shows how to disable a client VLAN on a WLAN:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# wlan wlan1
Switch(config-wlan)# no client vlan
Switch(config-wlan)# end
```

clear l2protocol-tunnel counters

To clear the protocol counters in protocol tunnel ports, use the **clear l2protocol-tunnel counters** command in privileged EXEC mode.

clear l2protocol-tunnel counters [*interface-id*]

Syntax Description

<i>interface-id</i>	(Optional) The interface (physical interface or port channel) for which protocol counters are to be cleared.
---------------------	--

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command to clear protocol tunnel counters on the switch or on the specified interface.

Examples

This example shows how to clear Layer 2 protocol tunnel counters on an interface:

```
Switch# clear l2protocol-tunnel counters gigabitethernet1/0/3
```

Related Commands

Command	Description
l2protocol-tunnel	Enables tunneling of Layer 2 protocols on an access port, IEEE 802.1Q tunnel port, or a port channel.
show l2protocol-tunnel	Displays information about Layer 2 protocol tunnel ports.

clear vmmps statistics

To clear the VLAN Membership Policy Server (VMPS) statistics maintained by the VLAN Query Protocol (VQP) client, use the **clear vmmps statistics** command in privileged EXEC mode.

clear vmmps statistics

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Examples This example shows how to clear VLAN Membership Policy Server (VMPS) statistics:

```
Switch# clear vmmps statistics
```

You can verify that information was deleted by entering the **show vmmps statistics** privileged EXEC command.

Related Commands	Command	Description
	show vmmps	Displays the VQP version, reconfirmation interval, retry count, VMPS IP addresses, and the current and primary servers.

clear vtp counters

To clear the VLAN Trunking Protocol (VTP) and pruning counters, use the **clear vtp counters** command in privileged EXEC mode.

clear vtp counters

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows how to clear the VTP counters:

```
Switch# clear vtp counters
```

You can verify that information was deleted by entering the **show vtp counters** privileged EXEC command.

Related Commands

Command	Description
show vtp	Displays general information about VTP management domain, status, and counters.

debug platform vlan

To enable debugging of the VLAN manager software, use the **debug platform vlan** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug platform vlan {error| mvid| rpc}

no debug platform vlan {error| mvid| rpc}

Syntax Description

error	Displays VLAN error debug messages.
mvid	Displays mapped VLAN ID allocations and free debug messages.
rpc	Displays remote procedure call (RPC) debug messages.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **undebug platform vlan** command is the same as the **no debug platform vlan** command.

Examples

This example shows how to display VLAN error debug messages:

```
Switch# debug platform vlan error
```

debug sw-vlan

To enable debugging of VLAN manager activities, use the **debug sw-vlan** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug sw-vlan {badpmcookies| **cfg-vlan** {bootup| cli}| **events**| **ifs**| **mapping**| **notification**| **packets**| **redundancy**| **registries**| **vtp**}

no debug sw-vlan {badpmcookies| **cfg-vlan** {bootup| cli}| **events**| **ifs**| **mapping**| **notification**| **packets**| **redundancy**| **registries**| **vtp**}

Syntax Description

badpmcookies	Displays debug messages for VLAN manager incidents of bad port manager cookies.
cfg-vlan	Displays VLAN configuration debug messages.
bootup	Displays messages when the switch is booting up.
cli	Displays messages when the command-line interface (CLI) is in VLAN configuration mode.
events	Displays debug messages for VLAN manager events.
ifs	Displays debug messages for the VLAN manager IOS file system (IFS). See debug sw-vlan ifs , on page 22 for more information.
mapping	Displays debug messages for VLAN mapping.
notification	Displays debug messages for VLAN manager notifications. See debug sw-vlan notification , on page 23 for more information.
packets	Displays debug messages for packet handling and encapsulation processes.
redundancy	Displays debug messages for VTP VLAN redundancy.
registries	Displays debug messages for VLAN manager registries.
vtp	Displays debug messages for the VLAN Trunking Protocol (VTP) code. See debug sw-vlan vtp , on page 25 for more information.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **undebug sw-vlan** command is the same as the **no debug sw-vlan** command.

Examples

This example shows how to display debug messages for VLAN manager events:

```
Switch# debug sw-vlan events
```

Related Commands

Command	Description
debug sw-vlan ifs	Enables debugging of the VLAN manager IOS file system (IFS) error tests.
debug sw-vlan notification	Enables debugging of VLAN manager notifications.
debug sw-vlan vtp	Enables debugging of the VTP code.
show vlan	Displays the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) in the administrative domain.
show vtp	Displays general information about VTP management domain, status, and counters.

debug sw-vlan ifs

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

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

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

Syntax Description

open read	Displays VLAN manager IFS file-read operation debug messages.
open write	Displays VLAN manager IFS file-write operation debug messages.
read	Displays file-read operation debug messages for the specified error test (1 , 2 , 3 , or 4).
write	Displays file-write operation debug messages.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **undebug sw-vlan ifs** command is the same as the **no debug sw-vlan ifs** command.

When selecting the file read operation, Operation **1** reads the file header, which contains the header verification word and the file version number. Operation **2** reads the main body of the file, which contains most of the domain and VLAN information. Operation **3** reads type length version (TLV) descriptor structures. Operation **4** reads TLV data.

Examples

This example shows how to display file-write operation debug messages:

```
Switch# debug sw-vlan ifs write
```

Related Commands

Command	Description
show vlan	Displays the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) in the administrative domain.

debug sw-vlan notification

To enable debugging of VLAN manager notifications, use the **debug sw-vlan notification** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

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

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

Syntax Description

accfwdchange	Displays debug messages for VLAN manager notification of aggregated access interface spanning-tree forward changes.
allowedvlancfgchange	Displays debug messages for VLAN manager notification of changes to the allowed VLAN configuration.
fwdchange	Displays debug messages for VLAN manager notification of spanning-tree forwarding changes.
linkchange	Displays debug messages for VLAN manager notification of interface link-state changes.
modechange	Displays debug messages for VLAN manager notification of interface mode changes.
pruningcfgchange	Displays debug messages for VLAN manager notification of changes to the pruning configuration.
statechange	Displays debug messages for VLAN manager notification of interface state changes.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **undebug sw-vlan notification** command is the same as the **no debug sw-vlan notification** command.

Examples

This example shows how to display debug messages for VLAN manager notification of interface mode changes:

```
Switch# debug sw-vlan notification
```

Related Commands

Command	Description
show vlan	Displays the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) in the administrative domain.

debug sw-vlan vtp

To enable debugging of the VLAN Trunking Protocol (VTP) code, use the **debug sw-vlan vtp** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

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

no debug sw-vlan vtp {events| packets| pruning| redundancy| xmit}

Syntax Description

events	Displays debug messages for general-purpose logic flow and detailed VTP messages generated by the VTP_LOG_RUNTIME macro in the VTP code.
packets	Displays debug messages for the contents of all incoming VTP packets that have been passed into the VTP code from the Cisco IOS VTP platform-dependent layer, except for pruning packets.
pruning	Displays debug messages generated by the pruning segment of the VTP code.
packets	(Optional) Displays debug messages for the contents of all incoming VTP pruning packets that have been passed into the VTP code from the Cisco IOS VTP platform-dependent layer.
xmit	(Optional) Displays debug messages for the contents of all outgoing VTP packets that the VTP code requests the Cisco IOS VTP platform-dependent layer to send.
redundancy	Displays debug messages for VTP redundancy.
xmit	Displays debug messages for the contents of all outgoing VTP packets that the VTP code requests the Cisco IOS VTP platform-dependent layer to send, except for pruning packets.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **undebug sw-vlan vtp** command is the same as the **no debug sw-vlan vtp** command.

If no additional parameters are entered after the **pruning** keyword, VTP pruning debugging messages appear. They are generated by the VTP_PRUNING_LOG_NOTICE, VTP_PRUNING_LOG_INFO, VTP_PRUNING_LOG_DEBUG, VTP_PRUNING_LOG_ALERT, and VTP_PRUNING_LOG_WARNING macros in the VTP pruning code.

Examples

This example shows how to display debug messages for VTP redundancy:

```
Switch# debug sw-vlan vtp redundancy
```

Related Commands

Command	Description
show vtp	Displays general information about VTP management domain, status, and counters.

interface vlan

To create or access a dynamic switch virtual interface (SVI) and to enter interface configuration mode, use the **interface vlan** command in global configuration mode. To delete an SVI, use the **no** form of this command.

interface vlan *vlan-id*

no interface vlan *vlan-id*

Syntax Description

<i>vlan-id</i>	VLAN number. The range is 1 to 4094.
----------------	--------------------------------------

Command Default

The default VLAN interface is VLAN 1.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

SVIs are created the first time you enter the **interface vlan** *vlan-id* command for a particular VLAN. The *vlan-id* corresponds to the VLAN-tag associated with data frames on an IEEE 802.1Q encapsulated trunk or the VLAN ID configured for an access port.



Note

When you create an SVI, it does not become active until it is associated with a physical port.

If you delete an SVI using the **no interface vlan** *vlan-id* command, it is no longer visible in the output from the **show interfaces** privileged EXEC command.



Note

You cannot delete the VLAN 1 interface.

You can reinstate a deleted SVI by entering the **interface vlan** *vlan-id* command for the deleted interface. The interface comes back up, but the previous configuration is gone.

The interrelationship between the number of SVIs configured on a switch or a switch stack and the number of other features being configured might have an impact on CPU utilization due to hardware limitations. You can use the **sdm prefer** global configuration command to reallocate system hardware resources based on templates and feature tables.

You can verify your setting by entering the **show interfaces** and **show interfaces vlan *vlan-id*** privileged EXEC commands.

Examples

This example shows how to create a new SVI with VLAN ID 23 and enter interface configuration mode:

```
Switch(config)# interface vlan 23  
Switch(config-if)#
```

Related Commands

Command	Description
show interfaces	Displays the administrative and operational status of all interfaces or a specified interface.

l2protocol-tunnel

To enable tunneling of Layer 2 protocols on an access port, IEEE 802.1Q tunnel port, or a port channel, use the **l2protocol-tunnel** command in interface configuration mode on the switch stack or on a standalone switch. Use the **no** form of this command to disable tunneling on the interface.

l2protocol-tunnel [**drop-threshold** | **shutdown-threshold**] [*value*] [**cdp** | **stp** | **vtp**] [**lldp**] [**point-to-point** | **pagp** | **lacp** | **udld**]

no l2protocol-tunnel [**drop-threshold** | **shutdown-threshold**] [*value*] [**cdp** | **stp** | **vtp**] [**lldp**] [**point-to-point** | **pagp** | **lacp** | **udld**]

Syntax Description

drop-threshold	(Optional) Sets a drop threshold for the maximum rate of Layer 2 protocol packets per second to be received before an interface drops packets.
shutdown-threshold	(Optional) Sets a shutdown threshold for the maximum rate of Layer 2 protocol packets per second to be received before an interface is shut down.
<i>value</i>	A threshold in packets per second to be received for encapsulation before the interface shuts down, or the threshold before the interface drops packets. The range is 1 to 4096. The default is no threshold.
cdp	(Optional) Enables tunneling of CDP, specifies a shutdown threshold for CDP, or specifies a drop threshold for CDP.
stp	(Optional) Enables tunneling of STP, specifies a shutdown threshold for STP, or specifies a drop threshold for STP.
vtp	(Optional) Enables tunneling of VTP, specifies a shutdown threshold for VTP, or specifies a drop threshold for VTP.
lldp	(Optional) Enables tunneling of LLDP packets.
point-to-point	(Optional) Enables point-to-point tunneling of PAgP, LACP, and UDLD packets.
pagp	(Optional) Enables point-to-point tunneling of PAgP, specifies a shutdown threshold for PAgP, or specifies a drop threshold for PAgP.
lacp	(Optional) Enables point-to-point tunneling of LACP, specifies a shutdown threshold for LACP, or specifies a drop threshold for LACP.
udld	(Optional) Enables point-to-point tunneling of UDLD, specifies a shutdown threshold for UDLD, or specifies a drop threshold for UDLD.

Command Default

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

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

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

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You can enable tunneling for Cisco Discovery Protocol (CDP), Spanning Tree Protocol (STP), or VLAN Trunking Protocol (VTP) packets. You can also enable point-to-point tunneling for Port Aggregation Protocol (PAgP), Link Aggregation Control Protocol (LACP), or UniDirectional Link Detection (UDLD) packets.

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

If you enter this command for a port channel, all ports in the channel must have the same configuration.

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

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

In a service-provider network, you can use Layer 2 protocol tunneling to enhance the creation of EtherChannels by emulating a point-to-point network topology. When protocol tunneling is enabled on the service-provider switch for PAgP or LACP, remote customer switches receive the protocol data units (PDUs) and can negotiate automatic creation of EtherChannels.

To enable tunneling of PAgP, LACP, and UDLD packets, you must have a point-to-point network topology. To decrease the link-down detection time, you should also enable UDLD on the interface when you enable tunneling of PAgP or LACP packets.

You can enable point-to-point protocol tunneling for PAgP, LACP, and UDLD individually or for all three protocols.



Caution

PAgP, LACP, and UDLD tunneling is only intended to emulate a point-to-point topology. An erroneous configuration that sends tunneled packets to many ports could lead to a network failure.

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

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

Enter the **drop-threshold** keyword to control the number of protocol packets per second that are received on an interface before it drops packets. When no protocol option is specified with a keyword, the threshold is

applied to each of the tunneled Layer 2 protocol types. If you also set a shutdown threshold on the interface, the drop-threshold value must be less than or equal to the shutdown-threshold value.

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

The configuration is saved in NVRAM.

For more information about Layer 2 protocol tunneling, see the software configuration guide for this release.

Examples

This example shows how to enable protocol tunneling for CDP packets and to configure the shutdown threshold as 50 packets per second:

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

This example shows how to enable protocol tunneling for STP packets and to configure the drop threshold as 400 packets per second:

```
Switch(config-if) # l2protocol-tunnel stp
Switch(config-if) # l2protocol-tunnel drop-threshold stp 400
```

This example shows how to enable point-to-point protocol tunneling for PAgP and UDLD packets and to configure the PAgP drop threshold as 1000 packets per second:

```
Switch(config-if) # l2protocol-tunnel point-to-point pagp
Switch(config-if) # l2protocol-tunnel point-to-point udld
Switch(config-if) # l2protocol-tunnel drop-threshold point-to-point pagp 1000
```

Related Commands

Command	Description
show errdisable recovery	Displays the error-disabled recovery timer information.
l2protocol-tunnel cos	Configures class of service (CoS) value for all tunneled Layer 2 protocol packets.
show l2protocol-tunnel	Displays information about Layer 2 protocol tunnel ports.

l2protocol-tunnel cos

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

l2protocol-tunnel cos *value*

no l2protocol-tunnel cos

Syntax Description

<i>value</i>	CoS priority value for tunneled Layer 2 protocol packets. If a CoS value is configured for data packets for the interface, the default is to use this CoS value. If no CoS value is configured for the interface, the default is 5. The range is 0 to 7, with 7 being the highest priority.
--------------	---

Command Default

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

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

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

Examples

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

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

Related Commands

Command	Description
show l2protocol-tunnel	Displays information about Layer 2 protocol tunnel ports.

private-vlan

To configure private VLANs and to configure the association between private VLAN primary and secondary VLANs, use the **private-vlan** VLAN configuration command on the switch stack or on a standalone switch. Use the **no** form of this command to return the VLAN to normal VLAN configuration.

private-vlan {**association** [**add**| **remove**] *secondary-vlan-list*| **community**| **isolated**| **primary**}

no private-vlan {**association**| **community**| **isolated**| **primary**}

Syntax Description

association	Creates an association between the primary VLAN and a secondary VLAN.
add	Associates a secondary VLAN to a primary VLAN.
remove	Clears the association between a secondary VLAN and a primary VLAN.
<i>secondary-vlan-list</i>	One or more secondary VLANs to be associated with a primary VLAN in a private VLAN.
community	Designates the VLAN as a community VLAN.
isolated	Designates the VLAN as an isolated VLAN.
primary	Designates the VLAN as a primary VLAN.

Command Default

The default is to have no private VLANs configured.

Command Modes

VLAN configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Before configuring private VLANs, you must disable VTP (VTP mode transparent). After you configure a private VLAN, you should not change the VTP mode to client or server.

VTP does not propagate private VLAN configurations. You must manually configure private VLANs on all switches in the Layer 2 network to merge their Layer 2 databases and to prevent flooding of private VLAN traffic.

You cannot include VLAN 1 or VLANs 1002 to 1005 in the private VLAN configuration. Extended VLANs (VLAN IDs 1006 to 4094) can be configured in private VLANs.

You can associate a secondary (isolated or community) VLAN with only one primary VLAN. A primary VLAN can have one isolated VLAN and multiple community VLANs associated with it.

- A secondary VLAN cannot be configured as a primary VLAN.
- The *secondary-vlan-list* cannot contain spaces. It can contain multiple comma-separated items. Each item can be a single private VLAN ID or a hyphenated range of private VLAN IDs. The list can contain one isolated VLAN and multiple community VLANs.
- If you delete either the primary or secondary VLANs, the ports associated with the VLAN become inactive.

A community VLAN carries traffic among community ports and from community ports to the promiscuous ports on the corresponding primary VLAN.

An isolated VLAN is used by isolated ports to communicate with promiscuous ports. It does not carry traffic to other community ports or isolated ports with the same primary VLAN domain.

A primary VLAN is the VLAN that carries traffic from a gateway to customer end stations on private ports.

Configure Layer 3 VLAN interfaces (SVIs) only for primary VLANs. You cannot configure Layer 3 VLAN interfaces for secondary VLANs. SVIs for secondary VLANs are inactive while the VLAN is configured as a secondary VLAN.

The **private-vlan** commands do not take effect until you exit from VLAN configuration mode.

Do not configure private VLAN ports as EtherChannels. While a port is part of the private VLAN configuration, any EtherChannel configuration for it is inactive.

Do not configure a private VLAN as a Remote Switched Port Analyzer (RSPAN) VLAN.

Do not configure a private VLAN as a voice VLAN.

Do not configure fallback bridging on switches with private VLANs.

Although a private VLAN contains more than one VLAN, only one STP instance runs for the entire private VLAN. When a secondary VLAN is associated with the primary VLAN, the STP parameters of the primary VLAN are propagated to the secondary VLAN.

For more information about private VLAN interaction with other features, see the software configuration guide for this release.

Examples

This example shows how to configure VLAN 20 as a primary VLAN, VLAN 501 as an isolated VLAN, and VLANs 502 and 503 as community VLANs, and to associate them in a private VLAN:

```
Switch# configure terminal
Switch(config)# vlan 20
Switch(config-vlan)# private-vlan primary
Switch(config-vlan)# exit
Switch(config)# vlan 501
Switch(config-vlan)# private-vlan isolated
Switch(config-vlan)# exit
Switch(config)# vlan 502
Switch(config-vlan)# private-vlan community
Switch(config-vlan)# exit
Switch(config)# vlan 503
Switch(config-vlan)# private-vlan community
Switch(config-vlan)# exit
Switch(config)# vlan 20
Switch(config-vlan)# private-vlan association 501-503
Switch(config-vlan)# end
```

You can verify your setting by entering the **show vlan private-vlan** or **show interfaces status privileged EXEC** command.

private-vlan mapping

To create a mapping between the primary and the secondary VLANs so that both VLANs share the same primary VLAN switched virtual interface (SVI), use the **private-vlan mapping** interface configuration command on a switch virtual interface (SVI). Use the **no** form of this command to remove private VLAN mappings from the SVI.

private-vlan mapping [**add**|**remove**] *secondary-vlan-list*

no private-vlan mapping

Syntax Description

add	(Optional) Maps the secondary VLAN to the primary VLAN SVI.
remove	(Optional) Removes the mapping between the secondary VLAN and the primary VLAN SVI.
<i>secondary-vlan-list</i>	One or more secondary VLANs to be mapped to the primary VLAN SVI.

Command Default

No private VLAN SVI mapping is configured.

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The switch must be in VTP transparent mode when you configure private VLANs.

The SVI of the primary VLAN is created at Layer 3.

Configure Layer 3 VLAN interfaces (SVIs) only for primary VLANs. You cannot configure Layer 3 VLAN interfaces for secondary VLANs. SVIs for secondary VLANs are inactive while the VLAN is configured as a secondary VLAN.

The *secondary-vlan-list* argument cannot contain spaces. It can contain multiple comma-separated items. Each item can be a single private VLAN ID or a hyphenated range of private VLAN IDs. The list can contain one isolated VLAN and multiple community VLANs.

Traffic that is received on the secondary VLAN is routed by the SVI of the primary VLAN.

A secondary VLAN can be mapped to only one primary SVI. If you configure the primary VLAN as a secondary VLAN, all SVIs specified in this command are brought down.

If you configure a mapping between two VLANs that do not have a valid Layer 2 private VLAN association, the mapping configuration does not take effect.

Examples

This example shows how to map the interface of VLAN 20 to the SVI of VLAN 18:

```
Switch# configure terminal
Switch# interface vlan 18
Switch(config-if)# private-vlan mapping 20
Switch(config-vlan)# end
```

This example shows how to permit routing of secondary VLAN traffic from secondary VLANs 303 to 305 and 307 through VLAN 20 SVI:

```
Switch# configure terminal
Switch# interface vlan 20
Switch(config-if)# private-vlan mapping 303-305, 307
Switch(config-vlan)# end
```

You can verify your settings by entering the **show interfaces private-vlan mapping** privileged EXEC command.

Related Commands

Command	Description
show interfaces private-vlan mapping	Displays private VLAN mapping information for the VLAN switch virtual interfaces (SVIs).

show dot1q-tunnel

To display information about IEEE 802.1Q tunnel ports, use the **show dot1q-tunnel** in EXEC mode.

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

Syntax Description	interface <i>interface-id</i> (Optional) Specifies the interface for which to display IEEE 802.1Q tunneling information. Valid interfaces include physical ports and port channels.
--------------------	--

Command Default	None
-----------------	------

Command Modes	User EXEC Privileged EXEC
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Command History	<table><tr><th>Release</th><th>Modification</th></tr><tr><td>Cisco IOS 15.0(2)EX1</td><td>This command was introduced.</td></tr></table>	Release	Modification	Cisco IOS 15.0(2)EX1	This command was introduced.
Release	Modification				
Cisco IOS 15.0(2)EX1	This command was introduced.				

Examples The following are examples of output from the **show dot1q-tunnel** command:

```
Switch# show dot1q-tunnel
dot1q-tunnel mode LAN Port(s)
-----
Gi1/0/1
Gi1/0/2
Gi1/0/3
Gi1/0/6
Po2

Switch# show dot1q-tunnel interface gigabitethernet1/0/1
dot1q-tunnel mode LAN Port(s)
-----
Gi1/0/1
```

Related Commands	<table><tr><th>Command</th><th>Description</th></tr><tr><td>show vlan</td><td>Displays the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) in the administrative domain.</td></tr><tr><td>switchport mode</td><td>Configures the VLAN membership mode of a port.</td></tr></table>	Command	Description	show vlan	Displays the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) in the administrative domain.	switchport mode	Configures the VLAN membership mode of a port.
Command	Description						
show vlan	Displays the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) in the administrative domain.						
switchport mode	Configures the VLAN membership mode of a port.						

show interfaces private-vlan mapping

To display private VLAN mapping information for the VLAN switch virtual interfaces (SVIs), use the **show interfaces private-vlan mapping** command in user EXEC or privileged EXEC mode.

show interfaces [*interface-id*] **private-vlan mapping**

Syntax Description	<i>interface-id</i> (Optional) ID of the interface for which to display private VLAN mapping information.	
Command Default	None	
Command Modes	User EXEC Privileged EXEC	
Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.
Examples	<p>This example shows how to display the information about the private VLAN mapping:</p> <pre>Switch#show interfaces private-vlan mapping Interface Secondary VLAN Type ----- vlan2 301 community vlan3 302 community</pre>	
Related Commands	Command	Description
	private-vlan mapping	Creates a mapping between the primary and the secondary VLANs so that both VLANs share the same primary VLAN switched virtual interface (SVI).

show l2protocol-tunnel

To display information about Layer 2 protocol tunnel ports, use the **show l2protocol-tunnel** in EXEC mode.

show l2protocol-tunnel [*interface interface-id*] **summary**

Syntax Description

interface <i>interface-id</i>	(Optional) Specifies the interface for which protocol tunneling information appears. Valid interfaces are physical ports and port channels; the port channel range is 1 to 48.
summary	(Optional) Displays only Layer 2 protocol summary information.

Command Default

None

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

After enabling Layer 2 protocol tunneling on an access or IEEE 802.1Q tunnel port by using the **l2protocol-tunnel** interface configuration command, you can configure some or all of these parameters:

- Protocol type to be tunneled
- Shutdown threshold
- Drop threshold

If you enter the **show l2protocol-tunnel interface** command, only information about the active ports on which all the parameters are configured appears.

If you enter the **show l2protocol-tunnel summary** command, only information about the active ports on which some or all of the parameters are configured appears.

Examples

This is an example of output from the **show l2protocol-tunnel** command:

```
Switch> show l2protocol-tunnel
COS for Encapsulated Packets: 5
Drop Threshold for Encapsulated Packets: 0

Port          Protocol Shutdown Drop      Encapsulation Decapsulation Drop
              Threshold Threshold Counter      Counter      Counter
```


Gi3/0/3	---	---	---	---	---	---
	---	---	---	---	---	---
	pagp	---	---	0	242500	---
	lacp	---	---	24268	242640	---
	udld	---	---	0	897960	---
Gi3/0/4	---	---	---	---	---	---
	---	---	---	---	---	---
	pagp	1000	---	24249	242700	---
	lacp	---	---	24256	242660	---
	udld	---	---	0	897960	---
Gi6/0/1	cdp	---	---	134482	1344820	---
	---	---	---	---	---	---
	pagp	1000	---	0	242500	---
	lacp	500	---	0	485320	---
	udld	300	---	44899	448980	---
Gi6/0/2	cdp	---	---	134482	1344820	---
	---	---	---	---	---	---
	pagp	---	1000	0	242700	---
	lacp	---	---	0	485220	---
	udld	300	---	44899	448980	---

This is an example of output from the **show l2protocol-tunnel summary** command:

```
Switch> show l2protocol-tunnel summary
COS for Encapsulated Packets: 5
Drop Threshold for Encapsulated Packets: 0
```

Port	Protocol	Shutdown Threshold (cdp/stp/vtp) (pagp/lacp/udld)	Drop Threshold (cdp/stp/vtp) (pagp/lacp/udld)	Status
Gi3/0/2	pagp lacp udld	----/----/----	----/----/----	up
Gi4/0/3	pagp lacp udld	1000/ 500/----	----/----/----	up
Gi9/0/1	pagp ----	----/----/----	1000/----/----	down
Gi9/0/2	pagp ----	----/----/----	1000/----/----	down

Related Commands

Command	Description
clear l2protocol-tunnel counters	Clears the protocol counters in protocol tunnel ports.
l2protocol-tunnel	Enables tunneling of Layer 2 protocols on an access port, IEEE 802.1Q tunnel port, or a port channel.
l2protocol-tunnel cos	Configures class of service (CoS) value for all tunneled Layer 2 protocol packets.

show platform vlan

To display platform-dependent VLAN information, use the **show platform vlan** privileged EXEC command.

show platform vlan {misc| mvid| prune| refcount| rpc {receive| transmit}}

Syntax Description

misc	Displays miscellaneous VLAN module information.
mvid	Displays the mapped VLAN ID (MVID) allocation information.
prune	Displays the stack or platform-maintained pruning database.
refcount	Displays the VLAN lock module-wise reference counts.
rpc	Displays remote procedure call (RPC) messages.
receive	Displays received information.
transmit	Displays sent information.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command only when you are working directly with your technical support representative while troubleshooting a problem. Do not use this command unless your technical support representative asks you to do so.

Examples

This example shows how to display remote procedure call (RPC) messages:

```
Switch# show platform vlan rpc
```

show vlan

To display the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) on the switch, use the **show vlan** command in user EXEC mode.

show vlan [**brief**] **dot1q tag native** | **group** | **id** *vlan-id* | **internal usage** | **mtu** | **name** *vlan-name* | **private-vlan** [**type**] | **remote-span** | **summary**]

Syntax Description

brief	(Optional) Displays one line for each VLAN with the VLAN name, status, and its ports.
dot1q tag native	(Optional) Displays the IEEE 802.1Q native VLAN tagging status.
group	(Optional) Displays information about VLAN groups.
id <i>vlan-id</i>	(Optional) Displays information about a single VLAN identified by the VLAN ID number. For <i>vlan-id</i> , the range is 1 to 4094.
internal usage	(Optional) Displays a list of VLANs being used internally by the switch. These VLANs are always from the extended range (VLAN IDs 1006 to 4094), and you cannot create VLANs with these IDs by using the vlan global configuration command until you remove them from internal use.
mtu	(Optional) Displays a list of VLANs and the minimum and maximum transmission unit (MTU) sizes configured on ports in the VLAN.
name <i>vlan-name</i>	(Optional) Displays information about a single VLAN identified by the VLAN name. The VLAN name is an ASCII string from 1 to 32 characters.
private-vlan	(Optional) Displays information about configured private VLANs, including primary and secondary VLAN IDs, type (community, isolated, or primary) and ports belonging to the private VLAN. This keyword is only supported if your switch is running the IP services feature set.
type	(Optional) Displays only private VLAN ID and type.
remote-span	(Optional) Displays information about Remote SPAN (RSPAN) VLANs.
summary	(Optional) Displays VLAN summary information.

**Note**

The **ifindex** keyword is not supported, even though it is visible in the command-line help string.

Command Default

None

Command Modes

User EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

In the **show vlan mtu** command output, the MTU_Mismatch column shows whether all the ports in the VLAN have the same MTU. When yes appears in the column, it means that the VLAN has ports with different MTUs, and packets that are switched from a port with a larger MTU to a port with a smaller MTU might be dropped. If the VLAN does not have an SVI, the hyphen (-) symbol appears in the SVI_MTU column. If the MTU-Mismatch column displays yes, the names of the ports with the MinMTU and the MaxMTU appear.

If you try to associate a private VLAN secondary VLAN with a primary VLAN before you define the secondary VLAN, the secondary VLAN is not included in the **show vlan private-vlan** command output.

In the **show vlan private-vlan type** command output, a type displayed as normal means a VLAN that has a private VLAN association but is not part of the private VLAN. For example, if you define and associate two VLANs as primary and secondary VLANs and then delete the secondary VLAN configuration without removing the association from the primary VLAN, the VLAN that was the secondary VLAN is shown as normal in the display. In the **show vlan private-vlan** output, the primary and secondary VLAN pair is shown as nonoperational.

Examples

This is an example of output from the **show vlan** command. See the table that follows for descriptions of the fields in the display.

```
Switch> show vlan
VLAN Name                Status    Ports
-----
1    default                active    Gi1/0/2, Gi1/0/3, Gi1/0/4
                                           Gi1/0/5, Gi1/0/6, Gi1/0/7
                                           Gi1/0/8, Gi1/0/9, Gi1/0/10
                                           Gi1/0/11, Gi1/0/12, Gi1/0/13
                                           Gi1/0/14, Gi1/0/15, Gi1/0/16
                                           Gi1/0/17, Gi1/0/18, Gi1/0/19
                                           Gi1/0/20, Gi1/0/21, Gi1/0/22
                                           Gi1/0/23, Gi1/0/24, Gi1/0/25
                                           Gi1/0/26, Gi1/0/27, Gi1/0/28
                                           Gi1/0/29, Gi1/0/30, Gi1/0/31
                                           Gi1/0/32, Gi1/0/33, Gi1/0/34
                                           Gi1/0/35, Gi1/0/36, Gi1/0/37
                                           Gi1/0/38, Gi1/0/39, Gi1/0/40
                                           Gi1/0/41, Gi1/0/42, Gi1/0/43
                                           Gi1/0/44, Gi1/0/45, Gi1/0/46
                                           Gi1/0/47, Gi1/0/48
2    VLAN0002                active
40   vlan-40                  active
```

```

300  VLAN0300                                active
1002 fddi-default                            act/unsup
1003 token-ring-default                      act/unsup
1004 fddinet-default                        act/unsup
1005 trnet-default                          act/unsup

```

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
2	enet	100002	1500	-	-	-	-	-	0	0
40	enet	100040	1500	-	-	-	-	-	0	0
300	enet	100300	1500	-	-	-	-	-	0	0
1002	fddi	101002	1500	-	-	-	-	-	0	0
1003	tr	101003	1500	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0
2000	enet	102000	1500	-	-	-	-	-	0	0
3000	enet	103000	1500	-	-	-	-	-	0	0

Remote SPAN VLANs

2000,3000

Primary	Secondary	Type	Ports
-----	-----	-----	-----

Table 4: show vlan Command Output Fields

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 (SRT); the default is SRB.
Trans1	Translation bridge 1.
Trans2	Translation bridge 2.

Field	Description
Remote SPAN VLANs	Identifies any RSPAN VLANs that have been configured.
Primary/Secondary/Type/Ports	Includes any private VLANs that have been configured, including the primary VLAN ID, the secondary VLAN ID, the type of secondary VLAN (community or isolated), and the ports that belong to it.

This is an example of output from the **show vlan dot1q tag native** command:

```
Switch> show vlan dot1q tag native
dot1q native vlan tagging is disabled
```

This is an example of output from the **show vlan private-vlan** command:

```
Switch> show vlan private-vlan
Primary Secondary Type Ports
-----
10      501      isolated      Gi3/0/3
10      502      community     Gi2/0/11
10      503      non-operational3 -
20      25      isolated      Gi1/0/13, Gi1/0/20, Gi1/0/22, Gi1/0/1, Gi2/0/13, Gi2/0/22,
Gi3/0/13, Gi3/0/14, Gi3/0/20, Gi3/0/1
20      30      community     Gi1/0/13, Gi1/0/20, Gi1/0/21, Gi1/0/1, Gi2/0/13, Gi2/0/20,
Gi3/0/14, Gi3/0/20, Gi3/0/21, Gi3/0/1
20      35      community     Gi1/0/13, Gi1/0/20, Gi1/0/23, Gi1/0/33. Gi1/0/1, Gi2/0/13,
Gi3/0/14, Gi3/0/20. Gi3/0/23, Gi3/0/33, Gi3/0/1
20      55      non-operational
2000    2500     isolated      Gi1/0/5, Gi1/0/10, Gi2/0/5, Gi2/0/10, Gi2/0/15
```

This is an example of output from the **show vlan private-vlan type** command:

```
Switch> show vlan private-vlan type
Vlan Type
----
10      primary
501     isolated
502     community
503     normal
```

This is an example of output from the **show vlan summary** command:

```
Switch> show vlan summary
Number of existing VLANs           : 45
Number of existing VTP VLANs       : 45
Number of existing extended VLANs   : 0
```

This is an example of output from the **show vlan internal usage** command. It shows that VLANs 1025 and 1026 are being used as internal VLANs for Gigabit Ethernet routed ports 23 and 24 on stack member 1. If you want to use one of these VLAN IDs, you must first shut down the routed port, which releases the internal VLAN, and then create the extended-range VLAN. When you start up the routed port, another internal VLAN number is assigned to it.

```
Switch> show vlan internal usage
VLAN Usage
----
1025 GigabitEthernet1/0/23
1026 GigabitEthernet1/0/24
```

This is an example of output from the **show vlan id** command:

```
Switch# show vlan id 2
VLAN Name                               Status Ports
-----
2      VLAN0200                            active Gi1/0/7, Gi1/0/8
```

```
2      VLAN0200                                active      Gi2/0/1, Gi2/0/2

VLAN Type  SAID      MTU    Parent RingNo BridgeNo  Stp  BrdgMode Trans1 Trans2
-----
2      enet  100002    1500    -      -      -      -    -         0      0

Remote SPAN VLANs
-----
Disabled
```

Related Commands

Command	Description
switchport mode	Configures the VLAN membership mode of a port.
vlan	Adds a VLAN and enters the VLAN configuration mode.

show vmps

To display the VLAN Query Protocol (VQP) version, reconfirmation interval, retry count, VLAN Membership Policy Server (VMPS) IP addresses, and the current and primary servers, use the **show vmps** command in EXEC mode.

show vmps [**statistics**]

Syntax Description

statistics	(Optional) Displays VQP client-side statistics and counters.
-------------------	--

Command Default

None

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This is an example of output from the **show vmps** command:

```
Switch> show vmps
VQP Client Status:
-----
VMPS VQP Version: 1
Reconfirm Interval: 60 min
Server Retry Count: 3
VMPS domain server:

Reconfirmation status
-----
VMPS Action:          other
```

This is an example of output from the **show vmps statistics** command. The table that follows describes each field in the display.

```
Switch> show vmps statistics
VMPS Client Statistics
-----
VQP  Queries:           0
VQP  Responses:         0
VMPS  Changes:          0
VQP  Shutdowns:         0
VQP  Denied:            0
VQP  Wrong Domain:      0
VQP  Wrong Version:     0
VQP  Insufficient Resource: 0
```


Table 5: show vmmps statistics Field Descriptions

Field	Description
VQP Queries	Number of queries sent by the client to the VMPS.
VQP Responses	Number of responses sent to the client from the VMPS.
VMPS Changes	Number of times that the VMPS changed from one server to another.
VQP Shutdowns	Number of times the VMPS sent a response to shut down the port. The client disables the port and removes all dynamic addresses on this port from the address table. You must administratively reenable the port to restore connectivity.
VQP Denied	Number of times the VMPS denied the client request for security reasons. When the VMPS response denies an address, no frame is forwarded to or from the workstation with that address (broadcast or multicast frames are delivered to the workstation if the port has been assigned to a VLAN). The client keeps the denied address in the address table as a blocked address to prevent more queries from being sent to the VMPS for each new packet received from this workstation. The client ages the address if no new packets are received from this workstation on this port within the aging time period.
VQP Wrong Domain	Number of times the management domain in the request does not match the one for the VMPS. Any previous VLAN assignments of the port are not changed. This response means that the server and the client have not been configured with the same VTP management domain.
VQP Wrong Version	Number of times the version field in the query packet contains a value that is higher than the version supported by the VMPS. The VLAN assignment of the port is not changed. The switches send only VMPS Version 1 requests.
VQP Insufficient Resource	Number of times the VMPS is unable to answer the request because of a resource availability problem. If the retry limit has not yet been reached, the client repeats the request with the same server or with the next alternate server, depending on whether the per-server retry count has been reached.

Related Commands

Command	Description
clear vmmps statistics	Clears the VLAN Membership Policy Server (VMPS) statistics maintained by the VQP client.
vmmps reconfirm (global configuration)	Changes the reconfirmation interval for the VQP client.
vmmps retry	Configures the per-server retry count for the VLAN Query Protocol (VQP) client.
vmmps server	Configures the primary VLAN Membership Policy Server (VMPS) and up to three secondary servers.

show vtp

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

show vtp {**counters**| **devices** [**conflicts**]| **interface** [*interface-id*]| **password**| **status**}

Syntax Description

counters	Displays the VTP statistics for the switch.
devices	Displays information about all VTP version 3 devices in the domain. This keyword applies only if the switch is not running VTP version 3.
conflicts	(Optional) Displays information about VTP version 3 devices that have conflicting primary servers. This command is ignored when the switch is in VTP transparent or VTP off mode.
interface	Displays VTP status and configuration for all interfaces or the specified interface.
<i>interface-id</i>	(Optional) Interface for which to display VTP status and configuration. This can be a physical interface or a port channel.
password	Displays the configured VTP password (available in privileged EXEC mode only).
status	Displays general information about the VTP management domain status.

Command Default

None

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When you enter the **show vtp password** command when the switch is running VTP version 3, the display follows these rules:

- If the **password password** global configuration command did not specify the **hidden** keyword and encryption is not enabled on the switch, the password appears in clear text.

- If the **password** *password* command did not specify the **hidden** keyword and encryption is enabled on the switch, the encrypted password appears.
- If the **password** *password* command is included the **hidden** keyword, the hexadecimal secret key is displayed.

Examples

This is an example of output from the **show vtp devices** command. A Yes in the Conflict column indicates that the responding server is in conflict with the local server for the feature; that is, when two switches in the same domain do not have the same primary server for a database.

```
Switch# show vtp devices
Retrieving information from the VTP domain. Waiting for 5 seconds.
VTP Database Conf switch ID      Primary Server Revision  System Name
      list
-----
VLAN      Yes  00b0.8e50.d000 000c.0412.6300 12354      main.cisco.com
MST       No   00b0.8e50.d000 0004.AB45.6000 24         main.cisco.com
VLAN      Yes  000c.0412.6300=000c.0412.6300 67         qwerty.cisco.com
```

This is an example of output from the **show vtp counters** command. The table that follows describes each field in the display.

```
Switch> show vtp counters
VTP statistics:
Summary advertisements received      : 0
Subset advertisements received      : 0
Request advertisements received      : 0
Summary advertisements transmitted  : 0
Subset advertisements transmitted    : 0
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
-----
Gi1/0/47   0                    0                    0
Gi1/0/48   0                    0                    0
Gi2/0/1    0                    0                    0
Gi3/0/2    0                    0                    0
```

Table 6: 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 timestamp 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.

Field	Description
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 configuration revision errors	<p>Number of revision errors.</p> <p>Whenever you define a new VLAN, delete an existing one, 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 means that the VTP password in the two switches is different or that 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>

Field	Description
Number of configuration 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 means 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 sent 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.

This is an example of output from the **show vtp status** command. The table that follows describes each field in the display.

```
Switch> show vtp status
VTP Version capable      : 1 to 3
VTP version running     : 1
VTP Domain Name         :
VTP Pruning Mode        : Disabled
VTP Traps Generation     : Disabled
Device ID                : 2037.06ce.3580
Configuration last modified by 192.168.1.1 at 10-10-12 04:34:02
Local updater ID is 192.168.1.1 on interface LIIN0 (first layer3 interface found
)
```

Feature VLAN:

```
-----
VTP Operating Mode       : Server
Maximum VLANs supported locally : 1005
Number of existing VLANs : 7
Configuration Revision    : 2
MD5 digest                : 0xA0 0xA1 0xFE 0x4E 0x7E 0x5D 0x97 0x41
                          : 0x89 0xB9 0x9B 0x70 0x03 0x61 0xE9 0x27
```

Table 7: show vtp status Field Descriptions

Field	Description
VTP Version capable	Displays the VTP versions that are capable of operating on the switch.
VTP Version running	Displays the VTP version operating on the switch. By default, the switch implements Version 1 but can be set to Version 2.
VTP Domain Name	Name that identifies the administrative domain for the switch.
VTP Pruning Mode	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.
VTP Traps Generation	Displays whether VTP traps are sent to a network management station.
Device ID	Displays the MAC address of the local device.
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.

Field	Description
VTP Operating Mode	<p>Displays the VTP operating mode, which can be server, client, or transparent.</p> <p>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 the VLAN information in the current VTP database from NVRAM after reboot. By default, every switch is a VTP server.</p> <p>Note The switch automatically changes from VTP server mode to VTP client mode if it detects a failure while writing the configuration to NVRAM and cannot return to server mode until the NVRAM is functioning.</p> <p>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 send VTP advertisements until it receives advertisements to initialize its VLAN database.</p> <p>Transparent—A switch in VTP transparent mode is disabled for VTP, does not send 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.</p>
Maximum VLANs Supported Locally	Maximum number of VLANs supported locally.
Number of Existing VLANs	Number of existing VLANs.
Configuration Revision	Current configuration revision number on this switch.
MD5 Digest	A 16-byte checksum of the VTP configuration.

This is an example of output from the **show vtp status** command for a switch running VTP version 3:

```
Switch# show vtp status
VTP Version capable      : 1 to 3
VTP version running     : 3
VTP Domain Name         : Cisco
VTP Pruning Mode        : Disabled
VTP Traps Generation    : Disabled
Device ID               : 0cd9.9624.dd80

Feature VLAN:
-----
VTP Operating Mode      : Off
Number of existing VLANs : 11
```



```
Number of existing extended VLANs : 0
Maximum VLANs supported locally   : 1005

Feature MST:
-----
VTP Operating Mode                 : Transparent

Feature UNKNOWN:
-----
VTP Operating Mode                 : Transparent
```

Related Commands

Command	Description
clear vtp counters	Clears the VLAN Trunking Protocol (VTP) and pruning counters.

switchport mode private-vlan

To configure an interface as either a host private-VLAN port or a promiscuous private-VLAN port, use the **switchport mode private-vlan** command in interface configuration mode. To reset the mode to the appropriate default for the device, use the **no** form of this command.

switchport mode private-vlan {host| promiscuous}

no switchport mode private-vlan

Syntax Description

host	Configures the interface as a private-VLAN host port. Host ports belong to private-VLAN secondary VLANs and are either community ports or isolated ports, depending on the VLAN to which they belong.
promiscuous	Configures the interface as a private-VLAN promiscuous port. Promiscuous ports are members of private-VLAN primary VLANs.

Command Default

None

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

A private-VLAN host or promiscuous port cannot be a Switched Port Analyzer (SPAN) destination port. If you configure a SPAN destination port as a private-VLAN host or promiscuous port, the port becomes inactive.

Do not configure private VLAN on ports with these other features:

- Dynamic-access port VLAN membership
- Dynamic Trunking Protocol (DTP)
- Port Aggregation Protocol (PAgP)
- Link Aggregation Control Protocol (LACP)
- Multicast VLAN Registration (MVR)
- Voice VLAN

While a port is part of the private-VLAN configuration, any EtherChannel configuration for it is inactive.

A private-VLAN port cannot be a secure port and should not be configured as a protected port.

For more information about private-VLAN interaction with other features, see the software configuration guide for this release.

We strongly recommend that you enable spanning tree Port Fast and bridge-protocol-data-unit (BPDU) guard on isolated and community host ports to prevent STP loops due to misconfigurations and to speed up STP convergence.

If you configure a port as a private-VLAN host port and you do not configure a valid private-VLAN association by using the **switchport private-vlan host-association** command, the interface becomes inactive.

If you configure a port as a private-VLAN promiscuous port and you do not configure a valid private VLAN mapping by using the **switchport private-vlan mapping** command, the interface becomes inactive.

Examples

This example shows how to configure an interface as a private-VLAN host port and associate it to primary VLAN 20. The interface is a member of secondary isolated VLAN 501 and primary VLAN 20.

```
Switch(config)# interface gigabitethernet2/0/1
Switch(config-if)# switchport mode private-vlan host
Switch (config-if)# switchport private-vlan host-association 20 501
Switch (config-if)# end
```

This example shows how to configure an interface as a private-VLAN promiscuous port and map it to a private VLAN. The interface is a member of primary VLAN 20 and secondary VLANs 501 to 503 are mapped to it.

```
Switch(config)# interface gigabitethernet2/0/1
Switch(config-if)# switchport mode private-vlan promiscuous
Switch (config-if)# switchport private-vlan mapping 20 501-503
Switch (config-if)# end
```

switchport priority extend

To set a port priority for the incoming untagged frames or the priority of frames received by the IP phone connected to the specified port, use the **switchport priority extend** command in interface configuration mode. To return to the default setting, use the **no** form of this command.

switchport priority extend {*cos value*| **trust**}

no switchport priority extend

Syntax Description

cos value	Sets the IP phone port to override the IEEE 802.1p priority received from the PC or the attached device with the specified class of service (CoS) value. The range is 0 to 7. Seven is the highest priority. The default is 0.
trust	Sets the IP phone port to trust the IEEE 802.1p priority received from the PC or the attached device.

Command Default

The default port priority is set to a CoS value of 0 for untagged frames received on the port.

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When voice VLAN is enabled, you can configure the switch to send the Cisco Discovery Protocol (CDP) packets to instruct the IP phone how to send data packets from the device attached to the access port on the Cisco IP Phone. You must enable CDP on the switch port connected to the Cisco IP Phone to send the configuration to the Cisco IP Phone. (CDP is enabled by default globally and on all switch interfaces.)

You should configure voice VLAN on switch access ports. You can configure a voice VLAN only on Layer 2 ports.

Before you enable voice VLAN, we recommend that you enable quality of service (QoS) on the switch by entering the **mls qos** global configuration command and configure the port trust state to trust by entering the **mls qos trust cos** interface configuration command.

Examples

This example shows how to configure the IP phone connected to the specified port to trust the received IEEE 802.1p priority:

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# switchport priority extend trust
```

You can verify your settings by entering the **show interfaces *interface-id* switchport** privileged EXEC command.

switchport trunk

To set the trunk characteristics when the interface is in trunking mode, use the **switchport trunk** command in interface configuration mode. To reset a trunking characteristic to the default, use the **no** form of this command.

switchport trunk {**allowed vlan** *vlan-list*| **native vlan** *vlan-id*| **pruning vlan** *vlan-list*}

no switchport trunk {**allowed vlan**| **native vlan**| **pruning vlan**}

Syntax Description

allowed vlan <i>vlan-list</i>	Sets the list of allowed VLANs that can receive and send traffic on this interface in tagged format when in trunking mode. See the Usage Guidelines for the <i>vlan-list</i> choices.
native vlan <i>vlan-id</i>	Sets the native VLAN for sending and receiving untagged traffic when the interface is in IEEE 802.1Q trunking mode. The range is 1 to 4094.
pruning vlan <i>vlan-list</i>	Sets the list of VLANs that are eligible for VTP pruning when in trunking mode. See the Usage Guidelines for the <i>vlan-list</i> choices.

Command Default

VLAN 1 is the default native VLAN ID on the port.
The default for all VLAN lists is to include all VLANs.

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The *vlan-list* format is **all** | **none** | [**add** | **remove** | **except**] *vlan-atom* [,*vlan-atom*...]:

- **all** specifies all VLANs from 1 to 4094. This is the default. This keyword is not allowed on commands that do not permit all VLANs in the list to be set at the same time.
- **none** specifies an empty list. This keyword is not allowed on commands that require certain VLANs to be set or at least one VLAN to be set.
- **add** adds the defined list of VLANs to those currently set instead of replacing the list. Valid IDs are from 1 to 1005; extended-range VLANs (VLAN IDs greater than 1005) are valid in some cases.



Note You can add extended-range VLANs to the allowed VLAN list, but not to the pruning-eligible VLAN list.

Separate nonconsecutive VLAN IDs with a comma; use a hyphen to designate a range of IDs.

- **remove** removes the defined list of VLANs from those currently set instead of replacing the list. Valid IDs are from 1 to 1005; extended-range VLAN IDs are valid in some cases.



Note You can remove extended-range VLANs from the allowed VLAN list, but you cannot remove them from the pruning-eligible list.

- **except** lists the VLANs that should be calculated by inverting the defined list of VLANs. (VLANs are added except the ones specified.) Valid IDs are from 1 to 1005. Separate nonconsecutive VLAN IDs with a comma; use a hyphen to designate a range of IDs.
- *vlan-atom* is either a single VLAN number from 1 to 4094 or a continuous range of VLANs described by two VLAN numbers, the lesser one first, separated by a hyphen.

Native VLANs:

- All untagged traffic received on an IEEE 802.1Q trunk port is forwarded with the native VLAN configured for the port.
- If a packet has a VLAN ID that is the same as the sending-port native VLAN ID, the packet is sent without a tag; otherwise, the switch sends the packet with a tag.
- The **no** form of the **native vlan** command resets the native mode VLAN to the appropriate default VLAN for the device.

Allowed VLAN:

- To reduce the risk of spanning-tree loops or storms, you can disable VLAN 1 on any individual VLAN trunk port by removing VLAN 1 from the allowed list. When you remove VLAN 1 from a trunk port, the interface continues to send and receive management traffic, for example, Cisco Discovery Protocol (CDP), Port Aggregation Protocol (PAgP), Link Aggregation Control Protocol (LACP), Dynamic Trunking Protocol (DTP), and VLAN Trunking Protocol (VTP) in VLAN 1.
- The **no** form of the **allowed vlan** command resets the list to the default list, which allows all VLANs.

Trunk pruning:

- The pruning-eligible list applies only to trunk ports.
- Each trunk port has its own eligibility list.
- If you do not want a VLAN to be pruned, remove it from the pruning-eligible list. VLANs that are pruning-ineligible receive flooded traffic.
- VLAN 1, VLANs 1002 to 1005, and extended-range VLANs (VLANs 1006 to 4094) cannot be pruned.

Examples

This example shows how to configure VLAN 3 as the default for the port to send all untagged traffic:

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# switchport trunk native vlan 3
```

This example shows how to add VLANs 1, 2, 5, and 6 to the allowed list:

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# switchport trunk allowed vlan add 1,2,5,6
```

This example shows how to remove VLANs 3 and 10 to 15 from the pruning-eligible list:

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# switchport trunk pruning vlan remove 3,10-15
```

You can verify your settings by entering the **show interfaces *interface-id* switchport** privileged EXEC command.

Related Commands

Command	Description
show interfaces	Displays the administrative and operational status of all interfaces or a specified interface.
switchport mode	Configures the VLAN membership mode of a port.

switchport voice vlan

To configure voice VLAN on the port, use the **switchport voice vlan** command in interface configuration mode. To return to the default setting, use the **no** form of this command.

switchport voice vlan {*vlan-id*| **dot1p**| **none**| **untagged**}

no switchport voice vlan

Syntax Description

<i>vlan-id</i>	The VLAN to be used for voice traffic. The range is 1 to 4094. By default, the IP phone forwards the voice traffic with an IEEE 802.1Q priority of 5.
dot1p	Configures the telephone to use IEEE 802.1p priority tagging and uses VLAN 0 (the native VLAN). By default, the Cisco IP phone forwards the voice traffic with an IEEE 802.1p priority of 5.
none	Does not instruct the IP telephone about the voice VLAN. The telephone uses the configuration from the telephone key pad.
untagged	Configures the telephone to send untagged voice traffic. This is the default for the telephone.

Command Default

The default is not to automatically configure the telephone (**none**).
The telephone default is not to tag frames.

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You should configure voice VLAN on Layer 2 access ports.

You must enable Cisco Discovery Protocol (CDP) on the switch port connected to the Cisco IP phone for the switch to send configuration information to the phone. CDP is enabled by default globally and on the interface.

Before you enable voice VLAN, we recommend that you enable quality of service (QoS) on the switch by entering the **mls qos** global configuration command and configure the port trust state to trust by entering the **mls qos trust cos** interface configuration command.

When you enter a VLAN ID, the IP phone forwards voice traffic in IEEE 802.1Q frames, tagged with the specified VLAN ID. The switch puts IEEE 802.1Q voice traffic in the voice VLAN.

When you select **dot1p**, **none**, or **untagged**, the switch puts the indicated voice traffic in the access VLAN.

In all configurations, the voice traffic carries a Layer 2 IP precedence value. The default is 5 for voice traffic.

When you enable port security on an interface that is also configured with a voice VLAN, set the maximum allowed secure addresses on the port to 2. When the port is connected to a Cisco IP phone, the IP phone requires one MAC address. The Cisco IP phone address is learned on the voice VLAN, but not on the access VLAN. If you connect a single PC to the Cisco IP phone, no additional MAC addresses are required. If you connect more than one PC to the Cisco IP phone, you must configure enough secure addresses to allow one for each PC and one for the Cisco IP phone.

If any type of port security is enabled on the access VLAN, dynamic port security is automatically enabled on the voice VLAN.

You cannot configure static secure MAC addresses in the voice VLAN.

A voice-VLAN port cannot be a private-VLAN port.

The Port Fast feature is automatically enabled when voice VLAN is configured. When you disable voice VLAN, the Port Fast feature is not automatically disabled.

Examples

This example shows how to configure VLAN 2 as the voice VLAN for the port:

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# switchport voice vlan 2
```

You can verify your settings by entering the **show interfaces *interface-id* switchport** privileged EXEC command.

Related Commands

Command	Description
show interfaces	Displays the administrative and operational status of all interfaces or a specified interface.
switchport priority extend	Sets a port priority for the incoming untagged frames or the priority of frames received by the IP phone connected to the specified port.

vlan

To add a VLAN and to enter the VLAN configuration mode, use the **vlan** command in global configuration mode. To delete the VLAN, use the **no** form of this command.

vlan *vlan-id*

no vlan *vlan-id*

Syntax Description

<i>vlan-id</i>	ID of the VLAN to be added and configured. The range is 1 to 4094. You can enter a single VLAN ID, a series of VLAN IDs separated by commas, or a range of VLAN IDs separated by hyphens.
----------------	---

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You can use the **vlan** *vlan-id* global configuration command to add normal-range VLANs (VLAN IDs 1 to 1005) or extended-range VLANs (VLAN IDs 1006 to 4094). Configuration information for normal-range VLANs is always saved in the VLAN database, and you can display this information by entering the **show vlan** privileged EXEC command. With VTP version 1 and 2, extended-range VLANs are not recognized by VTP and are not added to the VLAN database. With VTP version 1 and version 2, before adding extended-range VLANs, you must use the **vtp transparent** global configuration command to put the switch in VTP transparent mode. When VTP mode is transparent, VTP mode and domain name and all VLAN configurations are saved in the running configuration, and you can save them in the switch startup configuration file.

VTP version 3 supports propagation of extended-range VLANs and you can create them in VTP server or client mode. VTP versions 1 and 2 propagate only VLANs 1 to 1005.

When you save the VLAN and VTP configurations in the startup configuration file and reboot the switch, the configuration is selected as follows:

- If the VTP mode is transparent in the startup configuration and the VLAN database and the VTP domain name from the VLAN database matches that in the startup configuration file, the VLAN database is ignored (cleared), and the VTP and VLAN configurations in the startup configuration file are used. The VLAN database revision number remains unchanged in the VLAN database.
- If the VTP mode or domain name in the startup configuration do not match the VLAN database, the domain name and VTP mode and configuration for VLAN IDs 1 to 1005 use the VLAN database information.

With VTP version 1 and version 2, if you try to create an extended-range VLAN when the switch is not in VTP transparent mode, the VLAN is rejected, and you receive an error message.

If you enter an invalid VLAN ID, you receive an error message and do not enter VLAN configuration mode.

Entering the **vlan** command with a VLAN ID enables VLAN configuration mode. When you enter the VLAN ID of an existing VLAN, you do not create a new VLAN, but you can modify VLAN parameters for that VLAN. The specified VLANs are added or modified when you exit the VLAN configuration mode. Only the **shutdown** command (for VLANs 1 to 1005) takes effect immediately.



Note

Although all commands are visible, the only VLAN configuration commands that are supported on extended-range VLANs are **mtu** *mtu-size*, **private-vlan**, and **remote-span**. For extended-range VLANs, all other characteristics must remain at the default state.

These configuration commands are available in VLAN configuration mode. The **no** form of each command returns the characteristic to its default state:

- **are** *are-number*—Defines the maximum number of all-routes explorer (ARE) hops for this VLAN. This keyword applies only to TrCRF VLANs. The range is 0 to 13. The default is 7. If no value is entered, 0 is assumed to be the maximum.
- **backupcrf**—Specifies the backup CRF mode. This keyword applies only to TrCRF VLANs.
 - **enable**—Backup CRF mode for this VLAN.
 - **disable**—Backup CRF mode for this VLAN (the default).
- **bridge** *{bridge-number | type}*—Specifies the logical distributed source-routing bridge, the bridge that interconnects all logical rings that have this VLAN as a parent VLAN in FDDI-NET, Token Ring-NET, and TrBRF VLANs. The range is 0 to 15. The default bridge number is 0 (no source-routing bridge) for FDDI-NET, TrBRF, and Token Ring-NET VLANs. The **type** keyword applies only to TrCRF VLANs and is one of these:
 - **srb**—Source-route bridging
 - **srt**—Source-route transparent) bridging VLAN
- **exit**—Applies changes, increments the VLAN database revision number (VLANs 1 to 1005 only), and exits VLAN configuration mode.
- **media**—Defines the VLAN media type and is one of these:



Note

The switch supports only Ethernet ports. You configure only FDDI and Token Ring media-specific characteristics for VLAN Trunking Protocol (VTP) global advertisements to other switches. These VLANs are locally suspended.

- **ethernet**—Ethernet media type (the default).
- **fd-net**—FDDI network entity title (NET) media type.
- **fddi**—FDDI media type.

- **tokenring**—Token Ring media type if the VTP v2 mode is disabled, or TrCRF if the VTP Version 2 (v) mode is enabled.
- **tr-net**—Token Ring network entity title (NET) media type if the VTP v2 mode is disabled or TrBRF media type if the VTP v2 mode is enabled.

See the table that follows for valid commands and syntax for different media types.

- **mtu** *mtu-size*—Specifies the maximum transmission unit (MTU) (packet size in bytes). The range is 576 to 18190. The default is 1500 bytes.
- **name** *vlan-name*—Names the VLAN with an ASCII string from 1 to 32 characters that must be unique within the administrative domain. The default is VLANxxxx where xxxx represents four numeric digits (including leading zeros) equal to the VLAN ID number.
- **no**—Negates a command or returns it to the default setting.
- **parent** *parent-vlan-id*—Specifies the parent VLAN of an existing FDDI, Token Ring, or TrCRF VLAN. This parameter identifies the TrBRF to which a TrCRF belongs and is required when defining a TrCRF. The range is 0 to 1005. The default parent VLAN ID is 0 (no parent VLAN) for FDDI and Token Ring VLANs. For both Token Ring and TrCRF VLANs, the parent VLAN ID must already exist in the database and be associated with a Token Ring-NET or TrBRF VLAN.
- **private-vlan**—Configures the VLAN as a private VLAN community, isolated, or primary VLAN or configures the association between private VLAN primary and secondary VLANs. For more information, see the **private-vlan** command.
- **remote-span**—Configures the VLAN as a Remote SPAN (RSPAN) VLAN. When the RSPAN feature is added to an existing VLAN, the VLAN is first deleted and is then recreated with the RSPAN feature. Any access ports are deactivated until the RSPAN feature is removed. If VTP is enabled, the new RSPAN VLAN is propagated by VTP for VLAN IDs that are lower than 1024. Learning is disabled on the VLAN.
- **ring** *ring-number*—Defines the logical ring for an FDDI, Token Ring, or TrCRF VLAN. The range is 1 to 4095. The default for Token Ring VLANs is 0. For FDDI VLANs, there is no default.
- **said** *said-value*—Specifies the security association identifier (SAID) as documented in IEEE 802.10. The range is 1 to 4294967294, and the number must be unique within the administrative domain. The default value is 100000 plus the VLAN ID number.
- **shutdown**—Shuts down VLAN switching on the VLAN. This command takes effect immediately. Other commands take effect when you exit VLAN configuration mode.
- **state**—Specifies the VLAN state:
 - **active** means the VLAN is operational (the default).
 - **suspend** means the VLAN is suspended. Suspended VLANs do not pass packets.
- **ste** *ste-number*—Defines the maximum number of spanning-tree explorer (STE) hops. This keyword applies only to TrCRF VLANs. The range is 0 to 13. The default is 7.
- **stp type**—Defines the spanning-tree type for FDDI-NET, Token Ring-NET, or TrBRF VLANs. For FDDI-NET VLANs, the default STP type is ieee. For Token Ring-NET VLANs, the default STP type is ibm. For FDDI and Token Ring VLANs, the default is no type specified.
 - **ieee**—IEEE Ethernet STP running source-route transparent (SRT) bridging.
 - **ibm**—IBM STP running source-route bridging (SRB).

◦ **auto**—STP running a combination of source-route transparent bridging (IEEE) and source-route bridging (IBM).

- **tb-vlan1** *tb-vlan1-id* and **tb-vlan2** *tb-vlan2-id*—Specifies the first and second VLAN to which this VLAN is translationally bridged. Translational VLANs translate FDDI or Token Ring to Ethernet, for example. The range is 0 to 1005. If no value is specified, 0 (no transitional bridging) is assumed.

Table 8: Valid Commands and Syntax for Different Media Types

Media Type	Valid Syntax
Ethernet	name <i>vlan-name</i> , media ethernet, state {suspend active}, said <i>said-value</i> , mtu <i>mtu-size</i> , remote-span , tb-vlan1 <i>tb-vlan1-id</i> , tb-vlan2 <i>tb-vlan2-id</i>
FDDI	name <i>vlan-name</i> , media fddi, state {suspend active}, said <i>said-value</i> , mtu <i>mtu-size</i> , ring <i>ring-number</i> , parent <i>parent-vlan-id</i> , tb-vlan1 <i>tb-vlan1-id</i> , tb-vlan2 <i>tb-vlan2-id</i>
FDDI-NET	name <i>vlan-name</i> , media fd-net, state {suspend active}, said <i>said-value</i> , mtu <i>mtu-size</i> , bridge <i>bridge-number</i> , stp type {ieee ibm auto}, tb-vlan1 <i>tb-vlan1-id</i> , tb-vlan2 <i>tb-vlan2-id</i> If VTP v2 mode is disabled, do not set the stp type to auto .
Token Ring	VTP v1 mode is enabled. name <i>vlan-name</i> , media tokenring, state {suspend active}, said <i>said-value</i> , mtu <i>mtu-size</i> , ring <i>ring-number</i> , parent <i>parent-vlan-id</i> , tb-vlan1 <i>tb-vlan1-id</i> , tb-vlan2 <i>tb-vlan2-id</i>
Token Ring concentrator relay function (TrCRF)	VTP v2 mode is enabled. name <i>vlan-name</i> , media tokenring, state {suspend active}, said <i>said-value</i> , mtu <i>mtu-size</i> , ring <i>ring-number</i> , parent <i>parent-vlan-id</i> , bridge type {srb srt}, are <i>are-number</i> , ste <i>ste-number</i> , backupcrf {enable disable}, tb-vlan1 <i>tb-vlan1-id</i> , tb-vlan2 <i>tb-vlan2-id</i>
Token Ring-NET	VTP v1 mode is enabled. name <i>vlan-name</i> , media tr-net, state {suspend active}, said <i>said-value</i> , mtu <i>mtu-size</i> , bridge <i>bridge-number</i> , stp type {ieee ibm}, tb-vlan1 <i>tb-vlan1-id</i> , tb-vlan2 <i>tb-vlan2-id</i>

Media Type	Valid Syntax
Token Ring bridge relay function (TrBRF)	<p>VTP v2 mode is enabled.</p> <p>name <i>vlan-name</i>, media <i>tr-net</i>, state {<i>suspend</i> <i>active</i>}, said <i>said-value</i>, mtu <i>mtu-size</i>, bridge <i>bridge-number</i>, stp type {<i>ieee</i> <i>ibm</i> <i>auto</i>}, tb-vlan1 <i>tb-vlan1-id</i>, tb-vlan2 <i>tb-vlan2-id</i></p>

The following table describes the rules for configuring VLANs:

Table 9: VLAN Configuration Rules

Configuration	Rule
VTP v2 mode is enabled, and you are configuring a TrCRF VLAN media type.	<p>Specify a parent VLAN ID of a TrBRF that already exists in the database.</p> <p>Specify a ring number. Do not leave this field blank.</p> <p>Specify unique ring numbers when TrCRF VLANs have the same parent VLAN ID. Only one backup concentrator relay function (CRF) can be enabled.</p>
VTP v2 mode is enabled, and you are configuring VLANs other than TrCRF media type.	Do not specify a backup CRF.
VTP v2 mode is enabled, and you are configuring a TrBRF VLAN media type.	Specify a bridge number. Do not leave this field blank.
VTP v1 mode is enabled.	<p>No VLAN can have an STP type set to auto.</p> <p>This rule applies to Ethernet, FDDI, FDDI-NET, Token Ring, and Token Ring-NET VLANs.</p>
Add a VLAN that requires translational bridging (values are not set to zero).	<p>The translational bridging VLAN IDs that are used must already exist in the database.</p> <p>The translational bridging VLAN IDs that a configuration points to must also contain a pointer to the original VLAN in one of the translational bridging parameters (for example, Ethernet points to FDDI, and FDDI points to Ethernet).</p> <p>The translational bridging VLAN IDs that a configuration points to must be different media types than the original VLAN (for example, Ethernet can point to Token Ring).</p> <p>If both translational bridging VLAN IDs are configured, these VLANs must be different media types (for example, Ethernet can point to FDDI and Token Ring).</p>

Examples

This example shows how to add an Ethernet VLAN with default media characteristics. The default includes a *vlan-name* of VLAN *xxxx*, where *xxxx* represents four numeric digits (including leading zeros) equal to the VLAN ID number. The default media is ethernet; the state is active. The default said-value is 100000 plus the VLAN ID; the mtu-size variable is 1500; the stp-type is ieee. When you enter the **exit** VLAN configuration command, the VLAN is added if it did not already exist; otherwise, this command does nothing.

This example shows how to create a new VLAN with all default characteristics and enter VLAN configuration mode:

```
Switch(config)# vlan 200
Switch(config-vlan)# exit
Switch(config)#
```

This example shows how to create a new extended-range VLAN with all the default characteristics, to enter VLAN configuration mode, and to save the new VLAN in the switch startup configuration file:

```
Switch(config)# vtp mode transparent
Switch(config)# vlan 2000
Switch(config-vlan)# end
Switch# copy running-config startup config
```

You can verify your setting by entering the **show vlan** privileged EXEC command.

Related Commands

Command	Description
show vlan	Displays the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) in the administrative domain.

vlan dot1q tag native

To enable tagging of native VLAN frames on all IEEE 802.1Q trunk ports, use the **vlan dot1q tag native** command in global configuration mode. To return to the default setting, use the **no** form of this command.

vlan dot1q tag native

no vlan dot1q tag native

Syntax Description This command has no arguments or keywords.

Command Default The IEEE 802.1Q native VLAN tagging is disabled.

Command Modes Global configuration

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When enabled, native VLAN packets going out of all IEEE 802.1Q trunk ports are tagged.

When disabled, native VLAN packets going out of all IEEE 802.1Q trunk ports are not tagged.

You can use this command with the IEEE 802.1Q tunneling feature. This feature operates on an edge switch of a service-provider network and expands VLAN space by using a VLAN-in-VLAN hierarchy and tagging the tagged packets. You must use IEEE 802.1Q trunk ports for sending packets to the service-provider network. However, packets going through the core of the service-provider network might also be carried on IEEE 802.1Q trunks. If the native VLANs of an IEEE 802.1Q trunks match the native VLAN of a tunneling port on the same switch, traffic on the native VLAN is not tagged on the sending trunk port. This command ensures that native VLAN packets on all IEEE 802.1Q trunk ports are tagged.

For more information about IEEE 802.1Q tunneling, see the software configuration guide for this release.

Examples This example shows how to enable IEEE 802.1Q tagging on native VLAN frames:

```
Switch# configure terminal
Switch (config)# vlan dot1q tag native
Switch (config)# end
```

You can verify your settings by entering the **show vlan dot1q tag native** privileged EXEC command.

Related Commands	Command	Description
	show vlan	Displays the parameters for all configured VLANs or one VLAN (if the VLAN ID or name is specified) in the administrative domain.

vmps reconfirm (global configuration)

To change the reconfirmation interval for the VLAN Query Protocol (VQP) client, use the **vmps reconfirm** global configuration command. To return to the default setting, use the **no** form of this command.

vmps reconfirm *interval*

no vmps reconfirm

Syntax Description

<i>interval</i>	Reconfirmation interval for VQP client queries to the VLAN Membership Policy Server (VMPS) to reconfirm dynamic VLAN assignments. The range is 1 to 120 minutes.
-----------------	--

Command Default

The default reconfirmation interval is 60 minutes.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You can verify your setting by entering the **show vmps** privileged EXEC command and examining information in the Reconfirm Interval row.

Examples

This example shows how to set the VQP client to reconfirm dynamic VLAN entries every 20 minutes:

```
Switch(config)# vmps reconfirm 20
```

Related Commands

Command	Description
show vmps	Displays the VQP version, reconfirmation interval, retry count, VMPS IP addresses, and the current and primary servers.
vmps reconfirm (privileged EXEC)	Immediately sends VQP queries to reconfirm all dynamic VLAN assignments with the VMPS.

vmmps reconfirm (privileged EXEC)

To immediately send VLAN Query Protocol (VQP) queries to reconfirm all dynamic VLAN assignments with the VLAN Membership Policy Server (VMPS), use the **vmmps reconfirm** privileged EXEC command.

vmmps reconfirm

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes Privileged EXEC

Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines You can verify your setting by entering the **show vmmps** privileged EXEC command and examining the VMPS Action row of the Reconfirmation Status section. The **show vmmps** command shows the result of the last time the assignments were reconfirmed either because the reconfirmation timer expired or because the **vmmps reconfirm** command was entered.

Examples This example shows how to immediately send VQP queries to the VMPS:

```
Switch# vmmps reconfirm
```

Related Commands	Command	Description
	show vmmps	Displays the VQP version, reconfirmation interval, retry count, VMPS IP addresses, and the current and primary servers.
	vmmps reconfirm (global configuration)	Changes the reconfirmation interval for the VQP client.

vmps retry

To configure the per-server retry count for the VLAN Query Protocol (VQP) client, use the **vmps retry** command in global configuration mode. Use the **no** form of this command to return to the default setting.

vmps retry *count*

no vmps retry

Syntax Description

<i>count</i>	Number of attempts to contact the VLAN Membership Policy Server (VMPS) by the client before querying the next server in the list. The range is 1 to 10.
--------------	---

Command Default

The default retry count is 3.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This example shows how to set the retry count to 7:

```
Switch(config)# vmps retry 7
```

You can verify your setting by entering the **show vmps** privileged EXEC command and examining information in the Server Retry Count row.

Related Commands

Command	Description
show vmps	Displays the VQP version, reconfirmation interval, retry count, VMPS IP addresses, and the current and primary servers.

vmips server

To configure the primary VLAN Membership Policy Server (VMPS) and up to three secondary servers, use the **vmips server** command in global configuration mode. Use the **no** form of this command to remove a VMPS server.

vmips server {*hostname*| *ip address*} [**primary**]

no vmips server {*hostname*| *ip address*} [**primary**]

Syntax Description

<i>hostname</i>	Hostname of the primary or secondary VMPS servers. If you specify a hostname, the Domain Name System (DNS) server must be configured.
<i>ip address</i>	IP address of the primary or secondary VMPS servers.
primary	(Optional) Decides whether primary or secondary VMPS servers are being configured.

Command Default

No primary or secondary VMPS servers are defined.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The first server entered is automatically selected as the primary server whether or not primary is entered. The first server address can be overridden by using primary in a subsequent command.

If a member switch in a cluster configuration does not have an IP address, the cluster does not use the VMPS server configured for that member switch. Instead, the cluster uses the VMPS server on the command switch, and the command switch proxies the VMPS requests. The VMPS server treats the cluster as a single switch and uses the IP address of the command switch to respond to requests.

When using the **no** form without specifying the IP address, all configured servers are deleted. If you delete all servers when dynamic access ports are present, the switch cannot forward packets from new sources on these ports because it cannot query the VMPS.

Examples

This example shows how to configure the server with IP address 191.10.49.20 as the primary VMPS server. The servers with IP addresses 191.10.49.21 and 191.10.49.22 are configured as secondary servers:

```
Switch(config)# vmips server 191.10.49.20 primary
Switch(config)# vmips server 191.10.49.21
```

```
Switch(config)# vmips server 191.10.49.22
```

This example shows how to delete the server with IP address 191.10.49.21:

```
Switch(config)# no vmips server 191.10.49.21
```

You can verify your setting by entering the **show vmips** privileged EXEC command and examining information in the VMPS Domain Server row.

Related Commands

Command	Description
show vmips	Displays the VQP version, reconfirmation interval, retry count, VMPS IP addresses, and the current and primary servers.

vtp (global configuration)

To set or modify the VLAN Trunking Protocol (VTP) configuration characteristics, use the **vtp** command in global configuration mode. To remove the settings or to return to the default settings, use the **no** form of this command.

vtp {**domain** *domain-name*| **file** *filename*| **interface** *interface-name* [**only**]| **mode** {**client**| **off**| **server**| **transparent**} [**mst**| **unknown**| **vlan**]| **password** *password* [**hidden**| **secret**]| **pruning**| **version** *number*}

no vtp {**file**| **interface**| **mode** [**client**| **off**| **server**| **transparent**] [**mst**| **unknown**| **vlan**]| **password**| **pruning**| **version**}

Syntax Description

domain <i>domain-name</i>	Specifies the VTP domain name, an ASCII string from 1 to 32 characters that identifies the VTP administrative domain for the switch. The domain name is case sensitive.
file <i>filename</i>	Specifies the Cisco IOS file system file where the VTP VLAN configuration is stored.
interface <i>interface-name</i>	Specifies the name of the interface providing the VTP ID updated for this device.
only	(Optional) Uses only the IP address of this interface as the VTP IP updater.
mode	Specifies the VTP device mode as client, server, or transparent.
client	Places the switch in VTP client mode. A switch in VTP client mode is enabled for VTP, and can send advertisements, but does not have enough nonvolatile storage to store VLAN configurations. You cannot configure VLANs on a VTP client. VLANs are configured on another switch in the domain that is in server mode. When a VTP client starts up, it does not send VTP advertisements until it receives advertisements to initialize its VLAN database.
off	Places the switch in VTP off mode. A switch in VTP off mode functions the same as a VTP transparent device except that it does not forward VTP advertisements on trunk ports.
server	Places the switch in VTP server mode. A switch in VTP server mode is enabled for VTP and sends advertisements. You can configure VLANs on the switch. The switch can recover all the VLAN information in the current VTP database from nonvolatile storage after reboot.
transparent	Places the switch in VTP transparent mode. A switch in VTP transparent mode is disabled for VTP, does not send 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. When VTP mode is transparent, the mode and domain name are saved in the switch running configuration file, and you can save them in the switch startup configuration file by entering the copy running-config startup config privileged EXEC command.

mst	(Optional) Sets the mode for the multiple spanning tree (MST) VTP database (only VTP Version 3).
unknown	(Optional) Sets the mode for unknown VTP databases (only VTP Version 3).
vlan	(Optional) Sets the mode for VLAN VTP databases. This is the default (only VTP Version 3).
password <i>password</i>	Sets the administrative domain password for the generation of the 16-byte secret value used in MD5 digest calculation to be sent in VTP advertisements and to validate received VTP advertisements. The password can be an ASCII string from 1 to 32 characters. The password is case sensitive.
hidden	(Optional) Specifies that the key generated from the password string is saved in the VLAN database file. When the hidden keyword is not specified, the password string is saved in clear text. When the hidden password is entered, you need to reenter the password to issue a command in the domain. This keyword is supported only in VTP Version 3.
secret	(Optional) Allows the user to directly configure the password secret key (only VTP Version 3).
pruning	Enables VTP pruning on the switch.
version <i>number</i>	Sets the VTP Version to Version 1, Version 2, or Version 3.

Command Default

The default filename is *flash:vlan.dat*.

The default mode is server mode and the default database is VLAN.

In VTP Version 3, for the MST database, the default mode is transparent.

No domain name or password is defined.

No password is configured.

Pruning is disabled.

The default version is Version 1.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When you save VTP mode, domain name, and VLAN configurations in the switch startup configuration file and reboot the switch, the VTP and VLAN configurations are selected by these conditions:

- If the VTP mode is transparent in the startup configuration and the VLAN database and the VTP domain name from the VLAN database matches that in the startup configuration file, the VLAN database is ignored (cleared), and the VTP and VLAN configurations in the startup configuration file are used. The VLAN database revision number remains unchanged in the VLAN database.
- If the VTP mode or domain name in the startup configuration do not match the VLAN database, the domain name and VTP mode and configuration for VLAN IDs 1 to 1005 use the VLAN database information.

The **vtp file** *filename* cannot be used to load a new database; it renames only the file in which the existing database is stored.

Follow these guidelines when configuring a VTP domain name:

- The switch is in the no-management-domain state until you configure a domain name. While in the no-management-domain state, the switch does not send any VTP advertisements even if changes occur to the local VLAN configuration. The switch leaves the no-management-domain state after it receives the first VTP summary packet on any port that is trunking or after you configure a domain name by using the **vtp domain** command. If the switch receives its domain from a summary packet, it resets its configuration revision number to 0. After the switch leaves the no-management-domain state, it cannot be configured to reenter it until you clear the NVRAM and reload the software.
- Domain names are case-sensitive.
- After you configure a domain name, it cannot be removed. You can only reassign it to a different domain.

Follow these guidelines when setting VTP mode:

- The **no vtp mode** command returns the switch to VTP server mode.
- The **vtp mode server** command is the same as **no vtp mode** except that it does not return an error if the switch is not in client or transparent mode.
- If the receiving switch is in client mode, the client switch changes its configuration to duplicate the configuration of the server. If you have switches in client mode, be sure to make all VTP or VLAN configuration changes on a switch in server mode, as it has a higher VTP configuration revision number. If the receiving switch is in server mode or transparent mode, the switch configuration is not changed.
- A switch in transparent mode does not participate in VTP. If you make VTP or VLAN configuration changes on a switch in transparent mode, the changes are not propagated to other switches in the network.
- If you change the VTP or VLAN configuration on a switch that is in server mode, that change is propagated to all the switches in the same VTP domain.
- The **vtp mode transparent** command disables VTP from the domain but does not remove the domain from the switch.
- In VTP Versions 1 and 2, the VTP mode must be transparent for you to add extended-range VLANs or for VTP and VLAN information to be saved in the running configuration file. VTP supports extended-range VLANs in client and server mode and saves them in the VLAN database.
- With VTP Versions 1 and 2, if extended-range VLANs are configured on the switch and you attempt to set the VTP mode to server or client, you receive an error message, and the configuration is not allowed. Changing VTP mode is allowed with extended VLANs in VTP Version 3.
- The VTP mode must be transparent for you to add extended-range VLANs or for VTP and VLAN information to be saved in the running configuration file.

- VTP can be set to either server or client mode only when dynamic VLAN creation is disabled.
- The **vtp mode off** command sets the device to off. The **no vtp mode off** command resets the device to the VTP server mode.

Follow these guidelines when setting a VTP password:

- Passwords are case sensitive. Passwords should match on all switches in the same domain.
- When you use the **no vtp password** form of the command, the switch returns to the no-password state.
- The **hidden** and **secret** keywords are supported only in VTP Version 3. If you convert from VTP Version 2 to VTP Version 3, you must remove the hidden or secret keyword before the conversion.

Follow these guidelines when setting VTP pruning:

- VTP pruning removes information about each pruning-eligible VLAN from VTP updates if there are no stations belonging to that VLAN.
- If you enable pruning on the VTP server, it is enabled for the entire management domain for VLAN IDs 1 to 1005.
- Only VLANs in the pruning-eligible list can be pruned.
- Pruning is supported with VTP Version 1 and Version 2.

Follow these guidelines when setting the VTP version:

- Toggling the Version 2 (v2) mode state modifies parameters of certain default VLANs.
- Each VTP switch automatically detects the capabilities of all the other VTP devices. To use Version 2, all VTP switches in the network must support Version 2; otherwise, you must configure them to operate in VTP Version 1 mode.
- If all switches in a domain are VTP Version 2-capable, you only need to configure Version 2 on one switch; the version number is then propagated to the other Version-2 capable switches in the VTP domain.
- If you are using VTP in a Token Ring environment, VTP Version 2 must be enabled.
- If you are configuring a Token Ring bridge relay function (TrBRF) or Token Ring concentrator relay function (TrCRF) VLAN media type, you must use Version 2.
- If you are configuring a Token Ring or Token Ring-NET VLAN media type, you must use Version 1.
- In VTP Version 3, all database VTP information is propagated across the VTP domain, not only VLAN database information.
- Two VTP Version 3 regions can only communicate over a VTP Version 1 or VTP Version 2 region in transparent mode.

You cannot save password, pruning, and version configurations in the switch configuration file.

Examples

This example shows how to rename the filename for VTP configuration storage to vtpfilename:

```
Switch(config)# vtp file vtpfilename
```

This example shows how to clear the device storage filename:

```
Switch(config)# no vtp file vtpconfig
Clearing device storage filename.
```

This example shows how to specify the name of the interface providing the VTP updater ID for this device:

```
Switch(config)# vtp interface gigabitethernet
```

This example shows how to set the administrative domain for the switch:

```
Switch(config)# vtp domain OurDomainName
```

This example shows how to place the switch in VTP transparent mode:

```
Switch(config)# vtp mode transparent
```

This example shows how to configure the VTP domain password:

```
Switch(config)# vtp password ThisIsOurDomainsPassword
```

This example shows how to enable pruning in the VLAN database:

```
Switch(config)# vtp pruning
Pruning switched ON
```

This example shows how to enable Version 2 mode in the VLAN database:

```
Switch(config)# vtp version 2
```

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

Related Commands

Command	Description
show vtp	Displays general information about VTP management domain, status, and counters.
vtp (interface configuration)	Enables or disables VTP on an interface.

vtp (interface configuration)

To enable the VLAN Trunking Protocol (VTP) on a per-port basis, use the **vtp** command in interface configuration mode. To disable VTP on the interface, use the **no** form of this command.

vtp

no vtp

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

Command Default	None
------------------------	------

Command Modes	Interface configuration
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Command History	Release	Modification
	Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines	Enter this command only on interfaces that are in trunking mode.
-------------------------	--

Examples	This example shows how to enable VTP on an interface:
-----------------	---

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

This example shows how to disable VTP on an interface:

```
Switch(config-if) # no vtp
```

Related Commands	Command	Description
	switchport trunk	Configures the trunk characteristics when an interface is in trunking mode.
	vtp (global configuration)	Globally configures VTP domain name, password, pruning, version, and mode.

vtp primary

To configure a switch as the VLAN Trunking Protocol (VTP) primary server, use the **vtp primary** command in privileged EXEC mode.

vtp primary [**mst**| **vlan**] [**force**]

Syntax Description

mst	(Optional) Configures the switch as the primary VTP server for the multiple spanning tree (MST) feature.
vlan	(Optional) Configures the switch as the primary VTP server for VLANs.
force	(Optional) Configures the switch to not check for conflicting devices when configuring the primary server.

Command Default

The switch is a VTP secondary server.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

A VTP primary server updates the database information and sends updates that are honored by all devices in the system. A VTP secondary server can only back up the updated VTP configurations received from the primary server to NVRAM.

By default, all devices come up as secondary servers. Primary server status is needed only for database updates when the administrator issues a takeover message in the domain. You can have a working VTP domain without any primary servers.

Primary server status is lost if the device reloads or domain parameters change.



Note

This command is supported only when the switch is running VTP Version 3.

Examples

This example shows how to configure the switch as the primary VTP server for VLANs:

```
Switch# vtp primary vlan
Setting device to VTP TRANSPARENT mode.
```

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

Related Commands

Command	Description
show vtp	Displays general information about VTP management domain, status, and counters.
vtp (global configuration)	Globally configures VTP domain name, password, pruning, version, and mode.



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