



VLAN

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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. The interface ID can also be in digits too.

Command Default

The default interface is configured.

Command Modes

WLAN configuration

Command History

Release	Modification
Cisco IOS Release 15.0(2)EX	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.

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 vmps statistics

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

clear vmps statistics

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes Privileged EXEC

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

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

```
Switch# clear vmps statistics
```

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

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 Release 15.0(2)EX	This command was introduced.

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.

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 Release 15.0(2)EX	This command was introduced.

Usage Guidelines

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

When you enable debugging on a switch stack, it is enabled only on the stack's active switch. To enable debugging on a stack member, start a session from the stack's active switch using the **session** *switch-number* EXEC command, and then enter the **debug** command at the command-line prompt of the stack member. You also can use the **remote command** *stack-member-number* *LINE* EXEC command on the stack's active switch to enable debugging on a member switch without first starting a session.

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 8 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 9 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 10 for more information.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

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

Usage Guidelines

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

When you enable debugging on a switch stack, it is enabled only on the stack's active switch. To debug a specific stack member, you can start a CLI session from the stack's active switch by using the **session switch-number** privileged EXEC command. You also can use the **remote command** *stack-member-number*

LINE EXEC command on the stack's active switch to enable debugging on a member switch without first starting a session.

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

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

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 Release 15.0(2)EX	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.

When you enable debugging on a switch stack, it is enabled only on the stack's active switch. To debug a specific stack member, you can start a CLI session from the stack's active switch by using the **session switch-number** privileged EXEC command. You also can use the **remote command stack-member-number LINE** EXEC command on the active switch to enable debugging on a member switch without first starting a session.

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

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


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** | **allowedvlanfgchange** | **fwdchange** | **linkchange** | **modechange** | **pruningcfgchange** | **statechange**}

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

Syntax Description

accfwdchange	Displays debug messages for VLAN manager notification of aggregated access interface spanning-tree forward changes.
allowedvlanfgchange	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 Release 15.0(2)EX	This command was introduced.

Usage Guidelines

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

When you enable debugging on a switch stack, it is enabled only on the stack's active switch. To debug a specific stack member, you can start a CLI session from the stack's active switch by using the **session switch-number** privileged EXEC command. You also can use the **remote command stack-member-number LINE** EXEC command on the active switch to enable debugging on a member switch without first starting a session.

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

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

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 Release 15.0(2)EX	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.

When you enable debugging on a switch stack, it is enabled only on the stack's active switch. To debug a specific stack member, you can start a CLI session from the stack's active switch by using the **session switch-number** privileged EXEC command. You also can use the **remote command** *stack-member-number*

LINE EXEC command on the stack's active switch to enable debugging on a member switch without first starting a session.

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

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

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.
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Command Default	The default VLAN interface is VLAN 1.
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Command Modes	Global configuration
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Command History	Release	Modification
	Cisco IOS Release 15.0(2)EX	This command was introduced.

Usage Guidelines	SVIs are created the first time you enter the interface vlan <i>vlan-id</i> command for a particular VLAN. The <i>vlan-id</i> 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.
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Note	When you create an SVI, it does not become active until it is associated with a physical port.
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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.
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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.

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)#
```

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
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Command History	Release	Modification
	Cisco IOS Release 15.0(2)EX	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.
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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** | **group** | **id** *vlan-id* | **mtu** | **name** *vlan-name* | **remote-span** | **summary**}]

Syntax Description		
brief		(Optional) Displays one line for each VLAN with the VLAN name, status, and its ports.
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.
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.
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 Release 15.0(2)EX	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.

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 1: 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.

Field	Description
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.
Remote SPAN VLANs	Identifies any RSPAN VLANs that have been configured.

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 id 2** 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
```


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	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Cisco IOS Release 15.0(2)EX</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Cisco IOS Release 15.0(2)EX	This command was introduced.
Release	Modification				
Cisco IOS Release 15.0(2)EX	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 2: show vmps 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 reenale 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.

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 Release 15.0(2)EX	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.

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
-----
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 3: 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.
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.

Field	Description
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>
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>

Field	Description
Number of V1 summary errors	Number of Version 1 errors. 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.
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 4: 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.

Field	Description
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.
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.

Field	Description
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
```


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	trust
	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.	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 Release 15.0(2)EX	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.

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 Release 15.0(2)EX	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.

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.

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 | name vlan_name}
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.
name <i>vlan_name</i>	(Optional) Specifies the VLAN name to be used for voice traffic. You can enter up to 128 characters.

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 Release 15.0(2)EX	This command was introduced.
	Option to specify a VLAN name for voice VLAN. The ' name ' keyword was added.

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.

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.

This example show how to first populate the VLAN database by associating a VLAN ID with a VLAN name, and then configure the VLAN (using the name) on an interface, in the access mode: You can also verify your configuration by entering the **show interfaces interface-id switchport** in privileged EXEC command and examining information in the Voice VLAN: row.

Part 1 - Making the entry in the VLAN database:

```
Switch# configure terminal
Switch(config)# vlan 55
Switch(config-vlan)# name test
Switch(config-vlan)# end
Switch#
```

Part 2 - Checking the VLAN database:

```
Switch# show vlan id 55
VLAN Name Status Ports
-----
55 test active
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
-----
55 enet 100055 1500 - - - - - 0 0
Remote SPAN VLAN
-----
Disabled
Primary Secondary Type Ports
-----
```

Part 3- Assigning VLAN to the interface by using the name of the VLAN:

```
Switch# configure terminal
Switch(config)# interface gigabitethernet3/1/1
Switch(config-if)# switchport mode access
Switch(config-if)# switchport voice vlan name test
Switch(config-if)# end
Switch#
```

Part 4 - Verifying configuration:

```
Switch# show running-config
interface gigabitethernet3/1/1
Building configuration...
Current configuration : 113 bytes
!
interface GigabitEthernet3/1/1
switchport voice vlan 55
```

```
switchport mode access
Switch#
```

Part 5 - Also can be verified in interface switchport:

```
Switch# show interface GigabitEthernet3/1/1 switchport
Name: Gi3/1/1
Switchport: Enabled
Administrative Mode: static access
Operational Mode: static access
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: native
Negotiation of Trunking: Off
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Administrative Native VLAN tagging: enabled
Voice VLAN: 55 (test)
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Administrative private-vlan trunk native VLAN: none
Administrative private-vlan trunk Native VLAN tagging: enabled
Administrative private-vlan trunk encapsulation: dot1q
Administrative private-vlan trunk normal VLANs: none
Administrative private-vlan trunk associations: none
Administrative private-vlan trunk mappings: none
Operational private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled
Appliance trust: none
Switch#
```

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

vlan-id 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 Release 15.0(2)EX	This command was introduced.

Usage Guidelines

Up to 1000 VLANs are supported when the switch is running the LAN Base image with the LAN Base default template, and up to 64 VLANs are supported when the switch is running the LAN Lite image.

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* 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.
- **fdi**—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.
- **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.



Note The RSPAN feature is supported only on switches running the LAN Base image.

- **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 5: 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>
Token Ring bridge relay function (TrBRF)	VTP v2 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 auto}, tb-vlan1 <i>tb-vlan1-id</i> , tb-vlan2 <i>tb-vlan2-id</i>

The following table describes the rules for configuring VLANs:

Table 6: VLAN Configuration Rules

Configuration	Rule
VTP v2 mode is enabled, and you are configuring a TrCRF VLAN media type.	Specify a parent VLAN ID of a TrBRF that already exists in the database. Specify a ring number. Do not leave this field blank. Specify unique ring numbers when TrCRF VLANs have the same parent VLAN ID. Only one backup concentrator relay function (CRF) can be enabled.
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.	No VLAN can have an STP type set to auto. This rule applies to Ethernet, FDDI, FDDI-NET, Token Ring, and Token Ring-NET VLANs.
Add a VLAN that requires translational bridging (values are not set to zero).	The translational bridging VLAN IDs that are used must already exist in the database. 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). 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). 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).

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.

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

interval 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 Release 15.0(2)EX	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
```

vmps 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 **vmps reconfirm** privileged EXEC command.

vmps reconfirm

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes Privileged EXEC

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

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

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

```
Switch# vmps reconfirm
```

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	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Cisco IOS Release 15.0(2)EX</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Cisco IOS Release 15.0(2)EX	This command was introduced.
Release	Modification				
Cisco IOS Release 15.0(2)EX	This command was introduced.				

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.

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 {hostnameip address} [primary]
no vmips server {hostnameip 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 Release 15.0(2)EX	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.

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.

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 Release 15.0(2)EX	This command was introduced.

Usage Guidelines

VTP Version 3 is supported only when the switch is running the LAN Base image.

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.

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.

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

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

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

This command is supported only when the switch is running the LAN Base image and VTP Version 3.

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
```

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 Release 15.0(2)EX	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.

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.