- Configuring Network Security with ACLs at Layer 2, page 103 (optional)
- Configuring Quality of Service (QoS) on the EtherSwitch network module, page 115 (optional)
- Configuring a QoS Policy, page 119 (optional)

Configuring VLANs

Perform this task to configure the VLANs on an EtherSwitch network module.

VLAN Removal from the Database

When you delete a VLAN from a router with an EtherSwitch network module installed that is in VTP server mode, the VLAN is removed from all EtherSwitch routers and switches in the VTP domain. When you delete a VLAN from an EtherSwitch router or switch that is in VTP transparent mode, the VLAN is deleted only on that specific device.

You cannot delete the default VLANs for the different media types: Ethernet VLAN 1 and FDDI or Token Ring VLANs 1002 to 1005.

SUMMARY STEPS

1. **enable**
2. **vlan database**
3. **vlan** *vlan-id* [**are** *hops*] [**backupcrf** *mode*] [**bridge** *type* | *number*] [**media** *type*] [**mtu** *mtu-size*] [**name** *vlan-name*] [**parent** *parent-vlan-id*] [**ring** *ring-number*] [**said** *sa-id-value*] [**state** {**suspend** | **active**}] [**stp type** *type*] [**tb-vlan1** *tb-vlan1-id*] [**tb-vlan2** *tb-vlan2-id*]
4. **no vlan** *vlan-id*
5. **exit**
6. **show vlan-switch** [**brief** | **id** *vlan* | **name** *name*]

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	`vlan database`
	
	Example:
	`Router# configure terminal`
		Enters VLAN configuration mode.

	Command or Action	Purpose
Step 3	**vlan** *vlan-id* [**are** *hops*] [**backupcrf** *mode*] [**bridge** *type* | *number*] [**media** *type*] [**mtu** *mtu-size*] [**name** *vlan-name*] [**parent** *parent-vlan-id*] [**ring** *ring-number*] [**said** *sa-id-value*] [**state** {**suspend** | **active**}] [**stp type** *type*] [**tb-vlan1** *tb-vlan1-id*] [**tb-vlan2** *tb-vlan2-id*] **Example:** `Router(vlan)# vlan 2 media ethernet name vlan1502`	Configures a specific VLAN. • In this example, Ethernet VLAN 2 is added with the name of vlan1502. • The VLAN database is updated when you leave VLAN configuration mode.
Step 4	**no vlan** *vlan-id* **Example:** `Router(vlan)# no vlan 2`	(Optional) Deletes a specific VLAN. • In this example, VLAN 2 is deleted.
Step 5	**exit** **Example:** `Router(vlan)# exit`	Exits VLAN configuration mode and returns the router to privileged EXEC mode.
Step 6	**show vlan-switch** [**brief** | **id** *vlan* | **name** *name*] **Example:** `Router# show vlan-switch name vlan0003`	(Optional) Displays VLAN information. • The optional **brief** keyword displays only a single line for each VLAN, naming the VLAN, status, and ports. • The optional **id** keyword displays information about a single VLAN identified by VLAN ID number; valid values are from 1 to 1005. • The optional **name** keyword displays information about a single VLAN identified by VLAN name; valid values are an ASCII string from 1 to 32 characters.

Examples

Sample Output for the show vlan-switch Command

In the following example, output information is displayed to verify the VLAN configuration:

```
Router# show vlan-switch name vlan0003

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa1/0, Fa1/1, Fa1/2, Fa1/3
                                                Fa1/4, Fa1/5, Fa1/6, Fa1/7
                                                Fa1/8, Fa1/9, Fa1/10, Fa1/11
                                                Fa1/12, Fa1/13, Fa1/14, Fa1/15
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        1002   1003
1002 fddi  101002     1500  -      -      -        -    -        1      1003
1003 tr    101003     1500  1005   0      -        -    srb      1      1002
```

```
1004 fdnet 101004     1500  -      -      1        ibm  -        0      0
1005 trnet 101005     1500  -      -      1        ibm  -        0      0
```

In the following example, the **brief** keyword is used to verify that VLAN 2 has been deleted:

```
Router# show vlan-switch brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/2, Fa0/9, Fa0/14, Gi0/0
3    VLAN0003                         active    Fa0/4, Fa0/5, Fa0/10, Fa0/11
4    VLAN0004                         active    Fa0/6, Fa0/7, Fa0/12, Fa0/13
5    VLAN0005                         active
40   VLAN0040                         active    Fa0/15
50   VLAN0050                         active
1000 VLAN1000                         active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
```

Configuring VLAN Trunking Protocol

Perform this task to configure the VLAN Trunking Protocol (VTP) on an EtherSwitch network module.

VTP Mode Behavior

When a router with an EtherSwitch network module installed is in VTP server mode, you can change the VLAN configuration and have it propagate throughout the network.

When the router is in VTP client mode, you cannot change the VLAN configuration on the device. The client device receives VTP updates from a VTP server in the management domain and modifies its configuration accordingly.

When you configure the router as VTP transparent, you disable VTP on the device. A VTP transparent device does not send VTP updates and does not act on VTP updates received from other devices. However, a VTP transparent device running VTP version 2 does forward received VTP advertisements out all of its trunk links.

SUMMARY STEPS

1. **enable**
2. **vlan database**
3. **vtp server**
4. **vtp domain** *domain-name*
5. **vtp password** *password-value*
6. **vtp client**
7. **vtp transparent**
8. **vtp v2-mode**
9. **exit**
10. **show vtp** {**counters** | **status**}

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**vlan database** **Example:** `Router# vlan database`	Enters VLAN configuration mode.
Step 3	**vlan server** **Example:** `Router(vlan)# vlan server`	Configures the EtherSwitch network module as a VTP server.
Step 4	**vtp domain** *domain-name* **Example:** `Router(vlan)# vtp domain Lab_Network`	Defines the VTP domain name. • The *domain-name* argument consists of up to 32 characters.
Step 5	**vtp password** *password-value* **Example:** `Router(vlan)# vtp password labpassword`	(Optional) Sets a password for the VTP domain. • The *password-value* argument can consist of 8 to 64 characters.
Step 6	**vtp client** **Example:** `Router(vlan)# vtp client`	(Optional) Configures the EtherSwitch network module as a VTP client. • The VLAN database is updated when you leave VLAN configuration mode. **Note** You would configure the device as either a VTP server or a VTP client.
Step 7	**vtp transparent** **Example:** `Router(vlan)# vtp transparent`	(Optional) Disables VTP on the EtherSwitch network module.
Step 8	**vtp v2-mode** **Example:** `Router(vlan)# vtp v2-mode`	(Optional) Enables VTP version 2.

	Command or Action	Purpose
Step 9	**exit** **Example:** `Router(vlan)# exit`	Exits VLAN configuration mode and returns the router to global configuration mode.
Step 10	**show vtp** {**counters** | **status**} **Example:** `Router# show vtp status`	(Optional) Displays VTP information. • The optional **counters** keyword displays the VTP counters for the EtherSwitch network module. • The optional **status** keyword displays general information about the VTP management domain.

Examples

Sample Output for the show vtp Command

In the following example, output information about the VTP management domain is displayed:

```
Router# show vtp status

VTP Version                     : 2
Configuration Revision          : 247
Maximum VLANs supported locally : 1005
Number of existing VLANs        : 33
VTP Operating Mode              : Client
VTP Domain Name                 : Lab_Network
VTP Pruning Mode                : Enabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0x45 0x52 0xB6 0xFD 0x63 0xC8 0x49 0x80
Configuration last modified by 0.0.0.0 at 8-12-99 15:04:49
```

Configuring Spanning Tree on a VLAN

Perform this task to enable spanning tree on a per-VLAN basis and configure various spanning tree features. The EtherSwitch network module maintains a separate instance of spanning tree for each VLAN (except on VLANs on which you disable spanning tree).

VLAN Root Bridge

The EtherSwitch network module maintains a separate instance of spanning tree for each active VLAN configured on the device. A bridge ID, consisting of the bridge priority and the bridge MAC address, is associated with each instance. For each VLAN, the switch with the lowest bridge ID will become the root bridge for that VLAN.

To configure a VLAN instance to become the root bridge, the bridge priority can be modified from the default value (32768) to a significantly lower value so that the bridge becomes the root bridge for the specified VLAN. Use the **spanning-tree vlan** *vlan-id* **root** command to alter the bridge priority.

The switch checks the bridge priority of the current root bridges for each VLAN. The bridge priority for the specified VLANs is set to 8192 if this value will cause the switch to become the root for the specified VLANs.

If any root switch for the specified VLANs has a bridge priority lower than 8192, the switch sets the bridge priority for the specified VLANs to 1 less than the lowest bridge priority.

For example, if all switches in the network have the bridge priority for VLAN 100 set to the default value of 32768, entering the **spanning-tree vlan 100 root primary** command on a switch will set the bridge priority for VLAN 100 to 8192, causing the switch to become the root bridge for VLAN 100.

Note The root bridge for each instance of spanning tree should be a backbone or distribution switch device. Do not configure an access switch device as the spanning tree primary root.

Use the **diameter** keyword to specify the Layer 2 network diameter (that is, the maximum number of bridge hops between any two end stations in the Layer 2 network). When you specify the network diameter, the switch automatically picks an optimal hello time, forward delay time, and maximum age time for a network of that diameter, which can significantly reduce the spanning tree convergence time. You can use the **hello-time** keyword to override the automatically calculated hello time.

Note You should avoid configuring the hello time, forward delay time, and maximum age time manually after configuring the switch as the root bridge.

VLAN Bridge Priority

Caution Exercise care when using the **spanning-tree vlan** command with the **priority** keyword. For most situations **spanning-tree vlan** with the **root primary** keywords and the **spanning-tree vlan** with the **root secondary** keywords are the preferred commands to modify the bridge priority.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **spanning-tree vlan** *vlan-id* [**forward-time** *seconds* | **hello-time** *seconds* | **max-age** *seconds* | **priority** *priority* | **protocol** *protocol* | [**root** {**primary** | **secondary**} [**diameter** *net-diameter*] [**hello-time** *seconds*]]]]
4. **spanning-tree vlan** *vlan-id* [**priority** *priority*]
5. **spanning-tree vlan** *vlan-id* [**root** {**primary** | **secondary**} [**diameter** *net-diameter*] [**hello-time** *seconds*]]
6. **spanning-tree vlan** *vlan-id* [**hello-time** *seconds*]
7. **spanning-tree vlan** *vlan-id* [**forward-time** *seconds*]
8. **spanning-tree vlan** *vlan-id* [**max-age** *seconds*]
9. **spanning-tree backbonefast**
10. **interface** {**ethernet** | **fastethernet** | **gigabitethernet**} *slot/port*
11. **spanning-tree port-priority** *port-priority*
12. **spanning-tree cost** *cost*
13. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**spanning-tree vlan** *vlan-id* [**forward-time** *seconds* | **hello-time** *seconds* | **max-age** *seconds* | **priority** *priority* | **protocol** *protocol* | [**root** {**primary** | **secondary**} [**diameter** *net-diameter*] [**hello-time** *seconds*]]]] **Example:** `Router(config)# spanning-tree vlan 200`	Configures spanning tree on a per-VLAN basis. • In this example, spanning tree is enabled on VLAN 200. • Use the **no** form of this command to disable spanning tree on the specified VLAN.
Step 4	**spanning-tree vlan** *vlan-id* [**priority** *priority*] **Example:** `Router(config)# spanning-tree vlan 200 priority 33792`	(Optional) Configures the bridge priority of a VLAN. • The *priority* value can be from 1 to 65535. • Review the "VLAN Bridge Priority" section before using this command. • Use the **no** form of this command to restore the defaults.
Step 5	**spanning-tree vlan** *vlan-id* [**root** {**primary** | **secondary**} [**diameter** *net-diameter*] [**hello-time** *seconds*]] **Example:** `Router(config)# spanning-tree vlan 200 root primary diameter 4`	(Optional) Configures the EtherSwitch network module as the root bridge. • Review the "VLAN Root Bridge" concept before using this command.
Step 6	**spanning-tree vlan** *vlan-id* [**hello-time** *seconds*] **Example:** `Router(config)# spanning-tree vlan 200 hello-time 7`	(Optional) Configures the hello time of a VLAN. • The *seconds* value can be from 1 to 10 seconds. • In this example, the hello time is set to 7 seconds.
Step 7	**spanning-tree vlan** *vlan-id* [**forward-time** *seconds*] **Example:** `Router(config)# spanning-tree vlan 200 forward-time 21`	(Optional) Configures the spanning tree forward delay time of a VLAN. • The *seconds* value can be from 4 to 30 seconds. • In this example, the forward delay time is set to 21 seconds.

	Command or Action	Purpose
Step 8	**spanning-tree vlan** *vlan-id* [**max-age** *seconds*] **Example:** `Router(config)# spanning-tree vlan 200 max-age 36`	(Optional) Configures the maximum aging time of a VLAN. • The *seconds* value can be from 6 to 40 seconds. • In this example, the maximum number of seconds that the information in a BPDU is valid is set to 36 seconds.
Step 9	**spanning-tree backbonefast** **Example:** `Router(config)# spanning-tree vlan 200 max-age 36`	(Optional) Enables BackboneFast on the EtherSwitch network module. • Use this command to detect indirect link failures and to start the spanning tree reconfiguration sooner. **Note** If you use BackboneFast, you must enable it on all switch devices in the network. BackboneFast is not supported on Token Ring VLANs but it is supported for use with third-party switches.
Step 10	**interface** {**ethernet** | **fastethernet** | **gigabitethernet**} *slot*/*port* **Example:** `Router(config)# interface fastethernet 5/8`	Selects the Ethernet interface to configure and enters interface configuration mode. • The *slot*/*port* argument identifies the slot and port numbers of the interface. The space between the interface name and number is optional.
Step 11	**spanning-tree port-priority** *port-priority* **Example:** `Router(config-if)# spanning-tree port-priority 64`	(Optional) Configures the port priority for an interface. • The *port-priority* value can be from 1 to 255 in increments of 4.
Step 12	**spanning-tree cost** *cost* **Example:** `Router(config-if)# spanning-tree cost 18`	(Optional) Configures the port cost for an interface. • The *cost* value can be from 1 to 200000000 (1 to 65535 in Cisco IOS Releases 12.1(2)E and earlier).
Step 13	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns the router to global configuration mode.

Verifying Spanning Tree on a VLAN

Perform this optional task to verify the spanning tree configuration on a VLAN.

SUMMARY STEPS

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

DETAILED STEPS

Step 1 **enable**

Enables privileged EXEC mode. Enter your password if prompted:

```
Router> enable
```

Step 2 **show spanning-tree** [*bridge-group*] [**active** | **backbonefast** | **blockedports** | **bridge** | **brief** | **inconsistentports** | **interface** *interface-type interface-number* | **pathcost method** | **root** | **summary** [**totals**] | **uplinkfast** | **vlan** *vlan-id*]

Use this command with the **vlan** keyword to display spanning tree information about a specified VLAN:

```
Router# show spanning-tree vlan 200

VLAN200 is executing the ieee compatible Spanning Tree protocol
  Bridge Identifier has priority 32768, address 0050.3e8d.6401
  Configured hello time 2, max age 20, forward delay 15
  Current root has priority 16384, address 0060.704c.7000
  Root port is 264 (FastEthernet5/8), cost of root path is 38
  Topology change flag not set, detected flag not set
  Number of topology changes 0 last change occurred 01:53:48 ago
  Times:  hold 1, topology change 24, notification 2
          hello 2, max age 14, forward delay 10
  Timers: hello 0, topology change 0, notification 0


 Port 264 (FastEthernet5/8) of VLAN200 is forwarding
   Port path cost 19, Port priority 128, Port Identifier 129.9.
   Designated root has priority 16384, address 0060.704c.7000
   Designated bridge has priority 32768, address 00e0.4fac.b000
   Designated port id is 128.2, designated path cost 19
   Timers: message age 3, forward delay 0, hold 0
   Number of transitions to forwarding state: 1
   BPDU: sent 3, received 3417
```

Use this command with the **interface** keyword to display spanning tree information about a specified interface:

```
Router# show spanning-tree interface fastethernet 5/8

Port 264 (FastEthernet5/8) of VLAN200 is forwarding
   Port path cost 19, Port priority 100, Port Identifier 129.8.
   Designated root has priority 32768, address 0010.0d40.34c7
   Designated bridge has priority 32768, address 0010.0d40.34c7
   Designated port id is 128.1, designated path cost 0
   Timers: message age 2, forward delay 0, hold 0
   Number of transitions to forwarding state: 1
   BPDU: sent 0, received 13513
```

Use this command with the **bridge**, **brief**, and **vlan** keywords to display the bridge priority information:

```
Router# show spanning-tree bridge brief vlan 200

    Hello Max  Fwd
Vlan                 Bridge ID      Time  Age Delay  Protocol
---------------- -------------------- ---- ---- -----  --------
VLAN200          33792 0050.3e8d.64c8    2   20    15  ieee
```

Configuring Layer 2 Interfaces

Perform this task to configure a range of interfaces, define a range macro, set the interface speed, set the duplex mode, and add a description for the interface.

Interface Speed and Duplex Mode Guidelines

When configuring an interface speed and duplex mode, note these guidelines:

- If both ends of the line support autonegotiation, Cisco highly recommends the default autonegotiation settings.
- If one interface supports autonegotiation and the other end does not, configure duplex and speed on both interfaces; do not use the **auto** setting on the supported side.
- Both ends of the line need to be configured to the same setting. For example, both hard-set or both auto-negotiate. Mismatched settings are not supported.

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

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface range** {**vlan** *vlan-id - vlan-id*} | {{**ethernet** | **fastethernet** | **macro** *macro-name*} *slot/interface - interface*} [**,** {{**ethernet** | **fastethernet** | **macro** *macro-name*} *slot/interface - interface*}]
4. **define interface-range** *macro-name* {**vlan** *vlan-id - vlan-id*} | {{**ethernet** | **fastethernet**} *slot/interface - interface*} [**,** {{**ethernet** | **fastethernet**} *slot/interface - interface*}]
5. **interface fastethernet** *slot/interface*
6. **speed** [**10** | **100** | **auto**]
7. **duplex** [**auto** | **full** | **half**]
8. **description** *string*
9. **exit**
10. **show interfaces fastethernet** *slot/port*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface range** {**vlan** *vlan-id* **-** *vlan-id*} | {{**ethernet** | **fastethernet** | **macro** *macro-name*} *slot*/*interface* **-** *interface*}[**,** {{**ethernet** | **fastethernet** | **macro** *macro-name*} *slot*/*interface* **-** *interface*}] **Example:** `Router(config)# interface range fastethernet 5/1 - 4`	Selects the range of interfaces to be configured. • The space before and after the dash is required. For example, the command **interface range fastethernet 1 - 5** is valid; the command **interface range fastethernet 1-5** is not valid. • You can enter one macro or up to five comma-separated ranges. • Comma-separated ranges can include both VLANs and physical interfaces. • You are not required to enter spaces before or after the comma. The **interface range** command only supports VLAN interfaces that are configured with the **interface vlan** command.
Step 4	**define interface-range** *macro-name* {**vlan** *vlan-id* **-** *vlan-id*} | {{**ethernet** | **fastethernet**} *slot*/*interface* **-** *interface*} [**,** {{**ethernet** | **fastethernet**} *slot*/*interface* **-** *interface*}] **Example:** `Router(config)# define interface-range sales vlan 2 - 5`	• Defines the interface range macro and saves it in NVRAM. • In this example, the interface range macro is named sales and contains VLAN numbers from 2 to 5.
Step 5	**interface fastethernet** *slot*/*interface* **Example:** `Router(config)# interface fastethernet 1/4`	Configures a specific Fast Ethernet interface.
Step 6	**speed** [**10** | **100** | **auto**] **Example:** `Router(config-if)# speed 100`	Sets the speed for a Fast Ethernet interface. **Note** If you set the interface speed to auto on a 10/100-Mbps Ethernet interface, both speed and duplex are autonegotiated.

	Command or Action	Purpose
Step 7	**duplex** [**auto** | **full** | **half**] **Example:** `Router(config-if)# duplex full`	Sets the duplex mode for an Ethernet or Fast Ethernet interface. **Note** If you set the port speed to auto on a 10/100-Mbps Ethernet interface, both speed and duplex are autonegotiated. You cannot change the duplex mode of autonegotiation interfaces.
Step 8	**description** *string* **Example:** `Router(config-if)# description salesgroup1`	Adds a description for an interface.
Step 9	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns the router to global configuration mode. • Repeat this step one more time to exit global configuration mode.
Step 10	**show interfaces fastethernet** *slot*/*port* **Example:** `Router# show interfaces fastethernet 1/4`	(Optional) Displays information about Fast Ethernet interfaces.

Examples

Sample Output for the show interfaces fastethernet Command

In the following example, output information is displayed to verify the speed and duplex mode of a Fast Ethernet interface:

```
Router# show interfaces fastethernet 1/4

FastEthernet1/4 is up, line protocol is down
  Hardware is Fast Ethernet, address is 0000.0000.0c89 (bia 0000.0000.0c89)
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Auto-duplex, Auto-speed
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 input packets with dribble condition detected
     3 packets output, 1074 bytes, 0 underruns(0/0/0)
     0 output errors, 0 collisions, 5 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

Configuring an Ethernet Interface as a Layer 2 Trunk

Perform this task to configure an Ethernet interface as a Layer 2 trunk.

Restrictions

Note Ports do not support Dynamic Trunk Protocol (DTP). Ensure that the neighboring switch is set to a mode that will not send DTP traffic.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** {**ethernet** | **fastethernet** | **gigabitethernet**} *slot/port*
4. **shutdown**
5. **switchport mode** {**access** | **trunk**}
6. **switchport trunk** {**encapsulation dot1q** | **native vlan** | **allowed vlan** *vlan-list*}
7. **switchport trunk allowed vlan** {**add** | **except** | **none** | **remove**} *vlan1*[**,***vlan*[**,***vlan*[**,**...]]
8. **no shutdown**
9. **exit**
10. **show interfaces fastethernet** *slot/port* {**switchport** | **trunk**}

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** {**ethernet** | **fastethernet** | **gigabitethernet**} *slot/port* **Example:** `Router(config)# interface fastethernet 5/8`	Selects the Ethernet interface to configure.
Step 4	**shutdown** **Example:** `Router(config-if)# shutdown`	(Optional) Shuts down the interface to prevent traffic flow until configuration is complete. **Note** Encapsulation is always dot1q.

	Command or Action	Purpose
Step 5	**switchport mode** {**access** | **trunk**} **Example:** `Router(config-if)# switchport mode trunk`	Configures the interface type. • In this example, the interface type is set to be trunk.
Step 6	**switchport trunk** [**encapsulation dot1q** | **native vlan** | **allowed vlan** *vlan-list*] **Example:** `Router(config-if)# switchport trunk native vlan`	Specifies the trunk options when the interface is in trunking mode. • In this example, native VLAN is set for the trunk in 802.1Q trunking mode.
Step 7	**switchport trunk allowed vlan** {**add** | **except** | **none** | **remove**} *vlan1*[,*vlan*[,*vlan*[,...]] **Example:** `Router(config-if)# switchport trunk allowed vlan add 2,3,4,5`	(Optional) Configures the list of VLANs allowed on the trunk. • All VLANs are allowed by default. • You cannot remove any of the default VLANs from a trunk.
Step 8	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Activates the interface. (Required only if you shut down the interface.)
Step 9	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns the router to global configuration mode. • Repeat this step one more time to exit global configuration mode.
Step 10	**show interfaces fastethernet** *slot*/*port* {**switchport** | **trunk**} **Example:** `Router# show interfaces fastethernet 5/8 switchport`	(Optional) Displays information about Fast Ethernet interfaces.

Examples

Sample Output for the show interfaces fastethernet Command

In the following two examples, output information is displayed to verify the configuration of Fast Ethernet interface as a Layer 2 trunk:

```
Router# show interfaces fastethernet 5/8 switchport

Name: Fa5/8
Switchport: Enabled
Administrative Mode: static access
Operational Mode: static access
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: native
Negotiation of Trunking: Disabled
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Protected: false
```

```
Unknown unicast blocked: false
Unknown multicast blocked: false
Broadcast Suppression Level: 100
Multicast Suppression Level: 100
Unicast Suppression Level: 100
Voice VLAN: none
Appliance trust: none

Router# show interfaces fastethernet 5/8 trunk

Port      Mode         Encapsulation  Status        Native vlan
Fa1/15    off          802.1q         not-trunking  1
Port      Vlans allowed on trunk
Fa1/15    1
Port      Vlans allowed and active in management domain
Fa1/15    1
Port      Vlans in spanning tree forwarding state and not pruned
Fa1/15    1
```

Configuring an Ethernet Interface as a Layer 2 Access

Perform this task to configure an Ethernet interface as a Layer 2 access.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** {**ethernet** | **fastethernet** | **gigabitethernet**} *slot/port*
4. **shutdown**
5. **switchport mode** {**access** | **trunk**}
6. **switchport access vlan** *vlan-id*
7. **no shutdown**
8. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**interface** {**ethernet** | **fastethernet** | **gigabitethernet**} *slot*/*port* **Example:** `Router(config)# interface fastethernet 1/0`	Selects the Ethernet interface to configure.
Step 4	**shutdown** **Example:** `Router(config-if)# shutdown`	(Optional) Shuts down the interface to prevent traffic flow until configuration is complete. **Note** Encapsulation is always dot1q.
Step 5	**switchport mode** {**access** | **trunk**} **Example:** `Router(config-if)# switchport mode access`	Configures the interface type. • In this example, the interface type is set to be Layer 2 access.
Step 6	**switchport access vlan** *vlan* **Example:** `Router(config-if)# switchport access vlan 5`	For access ports, specifies the access VLAN. • In this example, the Layer 2 access VLAN 5 is set.
Step 7	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Activates the interface. (Required only if you shut down the interface.)
Step 8	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns the router to global configuration mode. • Repeat this step one more time to exit global configuration mode.

Configuring Separate Voice and Data VLANs

Perform this task to configure separate voice and data VLANs on the EtherSwitch network module.

Separate Voice and Data VLANs

For ease of network administration and increased scalability, network managers can configure the EtherSwitch network module to support Cisco IP phones such that the voice and data traffic reside on separate VLANs. We recommend configuring separate VLANs when you are able to segment the existing IP address space of your branch office.

User priority bits in the 802.1p portion of the 802.1Q standard header are used to provide prioritization in Ethernet switches. This is a vital component in designing Cisco AVVID networks.

The EtherSwitch network module provides the performance and intelligent services of Cisco IOS software for branch office applications. The EtherSwitch network module can identify user applications—such as voice or multicast video—and classify traffic with the appropriate priority levels. QoS policies are enforced using Layer 2 and 3 information such as 802.1p, IP precedence, and DSCP.