



## Configuring Private VLANs

This chapter describes private VLANs (PVLANS) on Catalyst 4500 series switches. It also provides restrictions, procedures, and configuration examples.

This chapter includes the following major sections:

- [Overview of PVLANS, page 34-1](#)
- [How to Configure PVLANS, page 34-3](#)



### Note

For complete syntax and usage information for the switch commands used in this chapter, refer to the *Catalyst 4500 Series Switch Cisco IOS Command Reference* and related publications at <http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgcr/index.htm>.

## Overview of PVLANS

PVLANS provide Layer 2 isolation between ports within the same PVLAN. There are three types of PVLAN ports:

- **Promiscuous**—A promiscuous port can communicate with all interfaces, including the isolated and community ports within a PVLAN.
- **Isolated**—An isolated port has complete Layer 2 separation from the other ports within the same PVLAN, but not from the promiscuous ports. PVLANS block all traffic to isolated ports except traffic from promiscuous ports. Traffic from isolated port is forwarded only to promiscuous ports.
- **Community**—Community ports communicate among themselves and with their promiscuous ports. These interfaces are separated at Layer 2 from all other interfaces in other communities or isolated ports within their PVLAN.

Because trunks can support the VLANs carrying traffic between isolated, community, and promiscuous ports, isolated and community port traffic might enter or leave the switch through a trunk interface.

PVLAN ports are associated with a set of supporting VLANs that are used to create the PVLAN structure. A PVLAN uses VLANs three ways:

- As a **primary VLAN**—Carries traffic from promiscuous ports to isolated, community, and other promiscuous ports in the same primary VLAN.
- As an **isolated VLAN**—Carries traffic from isolated ports to a promiscuous port.
- As a **community VLAN**—Carries traffic between community ports and to promiscuous ports. You can configure multiple community VLANs in a PVLAN.

Isolated and community VLANs are called secondary VLANs. You can extend PVLANS across multiple devices by trunking the primary, isolated, and community VLANs to other devices that support PVLANS.

In a switched environment, you can assign an individual PVLAN and associated IP subnet to each individual or common group of end stations. The end stations need to communicate with a default gateway only to gain access outside the PVLAN. With end stations in a PVLAN, you can do the following:

- Designate which ports will be connected to end stations. For example, interfaces connected to servers as isolated ports prevent any communication at Layer 2.
- Designate the interfaces to which the default gateway(s) and selected end stations (for example, backup servers or LocalDirector) are attached as promiscuous ports to allow all end stations access.
- Reduce VLAN and IP subnet consumption, because you can prevent traffic between end stations even though they are in the same VLAN and IP subnet.

**Note**


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A promiscuous port can service only one primary VLAN. A promiscuous port can service one isolated or many community VLANs.

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With a promiscuous port, you can connect a wide range of devices as access points to a PVLAN. For example, you can connect a promiscuous port to the server port of a LocalDirector to connect an isolated VLAN or a number of community VLANs to the server. LocalDirector can load balance the servers present in the isolated or community VLANs, or you can use a promiscuous port to monitor or back up all the PVLAN servers from an administration workstation.

## PVLAN Trunks

A PVLAN trunkport can carry multiple secondary and non-PVLANS. Packets are received and transmitted with secondary or regular VLAN tags on the PVLAN trunk ports.

PVLAN trunk port behavior is the same as PVLAN isolated or community port behavior, except that PVLANS can tag packets and carry multiple secondary and regular VLANs.

**Note**


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Only IEEE 802.1q encapsulation is supported.

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## PVLANS and VLAN ACL/QoS

PVLAN ports use primary and secondary VLANs, as follows:

- A packet received on a PVLAN host port belongs to the secondary VLAN.
- A packet received on a PVLAN trunk port belongs to the secondary VLAN if the packet is tagged with a secondary VLAN or if the packet is untagged and the native VLAN on the port is a secondary VLAN.

A packet received on a PVLAN host or trunk port and assigned to a secondary VLAN is bridged on the secondary VLAN. Because of this bridging, the secondary VLAN ACL as well as the secondary VLAN QoS (on input direction) apply.

When a packet is transmitted out of a PVLAN host or trunk port, the packet logically belongs to the primary VLAN. This relationship applies even though the packet may be transmitted with the secondary VLAN tagging for PVLAN trunk ports. In this situation, the primary VLAN ACL and the primary VLAN QoS on output apply to the packet.

## How to Configure PVLANS

To configure a PVLAN, follow this procedure:

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- Step 1** Set VTP mode to transparent. See the “Disabling VTP (VTP Transparent Mode)” section on page 27-9.
  - Step 2** Create the secondary VLANs. See the “Configuring a VLAN as a PVLAN” section on page 34-5.
  - Step 3** Create the primary VLAN. See the “Configuring a VLAN as a PVLAN” section on page 34-5.
  - Step 4** Associate the secondary VLAN to the primary VLAN. See the “Associating a Secondary VLAN with a Primary VLAN” section on page 34-6.



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**Note** Only one isolated VLAN can be mapped to a primary VLAN, but more than one community VLAN can be mapped to a primary VLAN.

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- Step 5** Configure an interface to an isolated or community port. See the “Configuring a Layer 2 Interface as a PVLAN Host Port” section on page 34-8.
  - Step 6** Associate the isolated port or community port to the primary-secondary VLAN pair. See the “Associating a Secondary VLAN with a Primary VLAN” section on page 34-6.
  - Step 7** Configure an interface as a promiscuous port. See the “Configuring a Layer 2 Interface as a PVLAN Promiscuous Port” section on page 34-7.
  - Step 8** Map the promiscuous port to the primary-secondary VLAN pair. See the “Configuring a Layer 2 Interface as a PVLAN Promiscuous Port” section on page 34-7.
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These sections describe how to configure PVLANS:

- “PVLAN Configuration Guidelines and Restrictions” section on page 34-3
- “Configuring a VLAN as a PVLAN” section on page 34-5
- “Associating a Secondary VLAN with a Primary VLAN” section on page 34-6
- “Configuring a Layer 2 Interface as a PVLAN Promiscuous Port” section on page 34-7
- “Configuring a Layer 2 Interface as a PVLAN Host Port” section on page 34-8
- “Permitting Routing of Secondary VLAN Ingress Traffic” section on page 34-11

## PVLAN Configuration Guidelines and Restrictions

Follow these guidelines when configuring PVLANS:

- To configure a PVLAN correctly, enable VTP in transparent mode.
- Do not include VLAN 1 or VLANs 1002 through 1005 in PVLANS.

- Use only PVLAN commands to assign ports to primary, isolated, or community VLANs.  
Layer 2 interfaces on primary, isolated, or community VLANs are inactive in PVLANS. Layer 2 trunk interfaces remain in the STP forwarding state.
- You cannot configure Layer 3 VLAN interfaces for secondary VLANs.  
Layer 3 VLAN interfaces for isolated and community (secondary) VLANs are inactive while the VLAN is configured as an isolated or community VLAN.
- Do not configure PVLAN ports as EtherChannel.  
EtherChannel ports in PVLANS are inactive.
- Do not configure private VLAN ports as EtherChannels. While a port is part of the private VLAN configuration, its associated EtherChannel configuration is inactive.
- Do not apply dynamic access control entries (ACEs) to primary VLANs.  
Cisco IOS dynamic ACL configuration applied to a primary VLAN is inactive while the VLAN is part of the PVLAN configuration.
- To prevent spanning tree loops due to misconfigurations, enable PortFast on the PVLAN trunk ports with the **spanning-tree portfast trunk** command.
- Any VLAN ACL configured on a secondary VLAN is effective in the input direction, and any VLAN ACL configured on the primary VLAN associated with the secondary VLAN is effective in the output direction.
- You can stop Layer 3 switching on an isolated or community VLAN by deleting the mapping of that VLAN with its primary VLAN.
- PVLAN ports can be on different network devices as long as the devices are trunk-connected and the primary and secondary VLANs remain associated with the trunk.
- Isolated ports on two different devices cannot communicate with each other, but community VLAN ports can.
- Private VLANs support the following SPAN features:
  - You can configure a private VLAN port as a SPAN source port.
  - You can use VLAN-based SPAN (VSPAN) on primary, isolated, and community VLANs or use SPAN on only one VLAN to monitor egress or ingress traffic separately.

For more information about SPAN, see [Chapter 37, “Configuring SPAN and RSPAN.”](#)

- A primary VLAN can be associated with multiple community VLANs, but only one isolated VLAN.
- An isolated or community VLAN can be associated with only one primary VLAN.
- If you delete a VLAN used in a private VLAN configuration, the private VLAN ports associated with the VLAN become inactive.
- VTP does not support private VLANs. You must configure private VLANs on each device in which you plan to use private VLAN ports.
- To maintain the security of your PVLAN configuration and avoid other use of VLANs configured as PVLANS, configure PVLANS on all intermediate devices, even if the devices have no PVLAN ports.
- Prune the PVLANS from trunks on devices that carry no traffic in the PVLANS.
- With port ACLS functionality available, you can apply Cisco IOS ACLS to secondary VLAN ports and Cisco IOS ACLS to PVLANS (VACLs). For more information on VACLs, see [Chapter 33, “Configuring Network Security with ACLs.”](#)

- You can apply different quality of service (QoS) configurations to primary, isolated, and community VLANs. (See [Chapter 27, “Configuring QoS and Per Port Per VLAN QoS.”](#)) Cisco IOS ACLs applied to the Layer 3 VLAN interface of a primary VLAN automatically apply to the associated isolated and community VLANs.
- On a PVLAN trunk port a secondary VLAN ACL is applied on ingress traffic and a primary VLAN ACL is applied on egress traffic.
- On a promiscuous port the primary VLAN ACL is applied on ingress traffic.
- PVLAN trunk ports support only IEEE 802.1q encapsulation.
- You cannot change the VTP mode to client or server for PVLANS.
- An isolated or community VLAN can have only one primary VLAN associated with it.
- VTP does not support PVLANS. You must configure PVLANS on each device where you want PVLAN ports.
- Community VLANs cannot be propagated or carried over private VLAN trunks.
- ARP entries learned on Layer 3 PVLAN interfaces are termed “sticky” ARP entries (we recommend that you display and verify PVLAN interface ARP entries).
- For security reasons, PVLAN port sticky ARP entries do not age out. Connecting a device with a different MAC address but with the same IP address generates an error message and the ARP entry is not created.
- Because PVLAN port sticky ARP entries do not age out, you must manually remove the entries if you change the MAC address. To overwrite a sticky ARP entry, first delete the entry with the **no arp** command, then overwrite the entry with the **arp** command.
- In a DHCP environment, if you shut down your PC, it is not possible to give your IP address to someone else. To solve this problem, the Catalyst 4500 series switch supports the **no ip sticky-arp** command. This command promotes IP address overwriting and reuse in a DHCP environment.

## Configuring a VLAN as a PVLAN

To configure a VLAN as a PVLAN, perform this task:

	Command	Purpose
Step 1	Switch# <b>configure terminal</b>	Enters configuration mode.
Step 2	Switch(config)# <b>vlan</b> <i>vlan_ID</i> Switch(config-vlan)# <b>private-vlan</b> { <b>community</b>   <b>isolated</b>   <b>primary</b> }	Configures a VLAN as a PVLAN. <ul style="list-style-type: none"> <li>• This command does not take effect until you exit VLAN configuration submode.</li> <li>• You can use the <b>no</b> keyword to clear PVLAN status.</li> </ul>
Step 3	Switch(config-vlan)# <b>end</b>	Exits VLAN configuration mode.
Step 4	Switch# <b>show vlan private-vlan</b> [ <b>type</b> ]	Verifies the configuration.

This example shows how to configure VLAN 202 as a primary VLAN and verify the configuration:

```
Switch# configure terminal
Switch(config)# vlan 202
Switch(config-vlan)# private-vlan primary
Switch(config-vlan)# end
Switch# show vlan private-vlan
```

```

Primary Secondary Type          Interfaces
-----
202                primary

```

This example shows how to configure VLAN 303 as a community VLAN and verify the configuration:

```

Switch# configure terminal
Switch(config)# vlan 303
Switch(config-vlan)# private-vlan community
Switch(config-vlan)# end
Switch# show vlan private-vlan

```

```

Primary Secondary Type          Interfaces
-----
202                primary
                303      community

```

This example shows how to configure VLAN 440 as an isolated VLAN and verify the configuration:

```

Switch# configure terminal
Switch(config)# vlan 440
Switch(config-vlan)# private-vlan isolated
Switch(config-vlan)# end
Switch# show vlan private-vlan

```

```

Primary Secondary Type          Interfaces
-----
202                primary
                303      community
                440      isolated

```

## Associating a Secondary VLAN with a Primary VLAN

To associate secondary VLANs with a primary VLAN, perform this task:

	Command	Purpose
Step 1	Switch# <b>configure terminal</b>	Enters configuration mode.
Step 2	Switch(config)# <b>vlan</b> <i>primary_vlan_ID</i>	Enters VLAN configuration mode for the primary VLAN.
Step 3	Switch(config-vlan)# [ <b>no</b> ] <b>private-vlan association</b> { <i>secondary_vlan_list</i>   <b>add</b> <i>secondary_vlan_list</i>   <b>remove</b> <i>secondary_vlan_list</i> }	Associates the secondary VLAN with the primary VLAN. The list can contain only one VLAN. You can use the <b>no</b> keyword to clear all secondary associations.
Step 4	Switch(config-vlan)# <b>end</b>	Exits VLAN configuration mode.
Step 5	Switch# <b>show vlan private-vlan</b> [ <b>type</b> ]	Verifies the configuration.

When you associate secondary VLANs with a primary VLAN, note the following:

- The *secondary\_vlan\_list* parameter cannot contain spaces. It can contain multiple comma-separated items. Each item can be a single private VLAN ID or a hyphenated range of private VLAN IDs.
- The *secondary\_vlan\_list* parameter can contain multiple community VLAN IDs.
- The *secondary\_vlan\_list* parameter can contain only one isolated VLAN ID.
- Enter a *secondary\_vlan\_list* or use the **add** keyword with a *secondary\_vlan\_list* to associate secondary VLANs with a primary VLAN.

- Use the **remove** keyword with a *secondary\_vlan\_list* to clear the association between secondary VLANs and a primary VLAN.
- The command does not take effect until you exit VLAN configuration submode.

This example shows how to associate community VLANs 303 through 307 and 309 and isolated VLAN 440 with primary VLAN 202 and verify the configuration:

```
Switch# configure terminal
Switch(config)# vlan 202
Switch(config-vlan)# private-vlan association 303-307,309,440
Switch(config-vlan)# end
Switch# show vlan private-vlan
```

Primary	Secondary	Type	Interfaces
202	303	community	
202	304	community	
202	305	community	
202	306	community	
202	307	community	
202	309	community	
202	440	isolated	
	308	community	


**Note**

The secondary VLAN 308 has no associated primary VLAN.

## Configuring a Layer 2 Interface as a PVLAN Promiscuous Port

To configure a Layer 2 interface as a PVLAN promiscuous port, perform this task:

	Command	Purpose
Step 1	Switch# <b>configure terminal</b>	Enters global configuration mode.
Step 2	Switch(config)# <b>interface</b> {fastethernet   gigabitethernet   tengigabitethernet} slot/port	Specifies the LAN interface to configure.
Step 3	Switch(config-if)# <b>switchport mode private-vlan</b> {host   promiscuous   trunk}	Configures a Layer 2 interface as a PVLAN promiscuous port.
Step 4	Switch(config-if)# [no] <b>switchport private-vlan mapping primary_vlan_ID</b> {secondary_vlan_list   add secondary_vlan_list   remove secondary_vlan_list}	Maps the PVLAN promiscuous port to a primary VLAN and to selected secondary VLANs.  You can use the <b>no</b> keyword to delete all associations from the primary VLAN.
Step 5	Switch(config-if)# <b>end</b>	Exits configuration mode.
Step 6	Switch# <b>show interfaces</b> {fastethernet   gigabitethernet   tengigabitethernet} slot/port switchport	Verifies the configuration.

When you configure a Layer 2 interface as a PVLAN promiscuous port, note the following:

- The *secondary\_vlan\_list* parameter cannot contain spaces. It can contain multiple comma-separated items. Each item can be a single PVLAN ID or a hyphenated range of PVLAN IDs.
- Enter a *secondary\_vlan\_list* or use the **add** keyword with a *secondary\_vlan\_list* to map the secondary VLANs to the PVLAN promiscuous port.

- Use the **remove** keyword with a *secondary\_vlan\_list* to clear the mapping between secondary VLANs and the PVLAN promiscuous port.

This example shows how to configure interface FastEthernet 5/2 as a PVLAN promiscuous port, map it to a PVLAN, and verify the configuration:

```
Switch# configure terminal
Switch(config)# interface fastethernet 5/2
Switch(config-if)# switchport mode private-vlan promiscuous
Switch(config-if)# switchport private-vlan mapping 200 2
Switch(config-if)# end

Switch#show interfaces fastethernet 5/2 switchport
Name:Fa5/2
Switchport:Enabled
Administrative Mode:private-vlan promiscuous
Operational Mode:private-vlan promiscuous
Administrative Trunking Encapsulation:negotiate
Operational Trunking Encapsulation:native
Negotiation of Trunking:Off
Access Mode VLAN:1 (default)
Trunking Native Mode VLAN:1 (default)
Voice VLAN:none
Administrative Private VLAN Host Association:none
Administrative Private VLAN Promiscuous Mapping:200 (VLAN0200) 2 (VLAN0002)
Private VLAN Trunk Native VLAN:none
Administrative Private VLAN Trunk Encapsulation:dot1q
Administrative Private VLAN Trunk Normal VLANs:none
Administrative Private VLAN Trunk Private VLANs:none
Operational Private VLANs:
  200 (VLAN0200) 2 (VLAN0002)
Trunking VLANs Enabled:ALL
Pruning VLANs Enabled:2-1001
Capture Mode Disabled
Capture VLANs Allowed:ALL
```

## Configuring a Layer 2 Interface as a PVLAN Host Port

To configure a Layer 2 interface as a PVLAN host port, perform this task:

	Command	Purpose
Step 1	Switch# <b>configure terminal</b>	Enters configuration mode.
Step 2	Switch(config)# <b>interface</b> {fastethernet   gigabitethernet   tengigabitethernet} slot/port	Specifies the LAN port to configure.
Step 3	Switch(config-if)# <b>switchport mode private-vlan</b> {host   promiscuous}   trunk	Configures a Layer 2 interface as a PVLAN host port.
Step 4	Switch(config-if)# [no] <b>switchport private-vlan host-association</b> primary_vlan_ID secondary_vlan_ID	Associates the Layer 2 interface with a PVLAN. You can use the <b>no</b> keyword to delete all associations from the primary VLAN.
Step 5	Switch(config-if)# <b>end</b>	Exits configuration mode.
Step 6	Switch# <b>show interfaces</b> {fastethernet   gigabitethernet   tengigabitethernet} slot/port switchport	Verifies the configuration.

This example shows how to configure interface FastEthernet 5/1 as a PVLAN host port and verify the configuration:

```
Switch# configure terminal
Switch(config)# interface fastethernet 5/1
Switch(config-if)# switchport mode private-vlan host
Switch(config-if)# switchport private-vlan host-association 202 440
Switch(config-if)# end

Switch#show interfaces fastethernet 5/1 switchport
Name: Fa5/1
Switchport: Enabled
Administrative Mode: private-vlan host
Operational Mode: private-vlan host
Administrative Trunking Encapsulation: negotiate
Operational Trunking Encapsulation: native
Negotiation of Trunking: Off
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Appliance trust: none
Administrative Private Vlan
  Host Association: 202 (VLAN0202) 440 (VLAN0440)
  Promiscuous Mapping: none
  Trunk encapsulation : dot1q
  Trunk vlans:
Operational private-vlan(s):
  2 (VLAN0202) 3 (VLAN0440)
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
```

## Configuring a Layer 2 Interface as a PVLAN Trunk Port

To configure a Layer 2 interface as a PVLAN trunk port, perform this task:

	Command	Purpose
Step 1	Switch> <b>enable</b>	Enters privileged EXEC mode.
Step 2	Switch# <b>configure terminal</b>	Enters global configuration mode.
Step 3	Switch(config)# <b>interface</b> {fastethernet   gigabitethernet   tengigabitethernet} <i>slot/port</i>	Specifies the LAN port to configure.
Step 4	Switch(config-if)# <b>switchport mode private-vlan</b> {host   promiscuous   trunk}	Configures a Layer 2 interface as a PVLAN trunk port for multiple secondary VLANs.

	Command	Purpose
Step 5	Switch(config-if)# [no] <b>switchport private-vlan association trunk</b> <i>primary_vlan_ID</i> <i>secondary_vlan_ID</i>	Configures association between primary VLANs and secondary VLANs the PVLAN trunk port with a PVLAN.  <b>Note</b> Multiple PVLAN pairs can be specified using this command so that a PVLAN trunk port can carry multiple secondary VLANs. If an association is specified for the existing primary VLAN, the existing association is replaced. If there is no trunk association, any packets received on secondary VLANs are dropped.  You can use the <b>no</b> keyword to delete all associations from the primary VLAN.
Step 6	Switch(config-if)# [no] <b>switchport private-vlan trunk allowed vlan</b> <i>vlan_list</i> <b>all</b>   <b>none</b>   [ <b>add</b>   <b>remove</b>   <b>except</b> ] <i>vlan_atom[,vlan_atom...]</i>	Configures a list of allowed normal VLANs on a PVLAN trunk port.  You can use the <b>no</b> keyword to remove all allowed normal VLANs on a PVLAN trunk port.
Step 7	Switch(config-if)# [no] <b>switchport private-vlan trunk native vlan</b> <i>vlan_id</i>	Configures a VLAN to which untagged packets (as in IEEE 802.1Q tagging) are assigned on a PVLAN trunk port.  If there is no native VLAN configured, all untagged packets are dropped.  If the native VLAN is a secondary VLAN and the port does not have the association for the secondary VLAN, the untagged packets are dropped.  You can use the <b>no</b> keyword to remove all native VLANs on a PVLAN trunk port.
Step 8	Switch(config-if)# <b>end</b>	Exits configuration mode.
Step 9	Switch# <b>show interfaces</b> { <b>fastethernet</b>   <b>gigabitethernet</b>   <b>tengigabitethernet</b> } <i>slot/port</i> <b>switchport</b>	Verifies the configuration.

This example shows how to configure interface FastEthernet 5/1 as a PVLAN trunk port, maps VLAN0202 to VLAN0440, and configures the PVLAN trunk:

```
Switch# configure terminal
Switch(config)# interface fastethernet 5/1
Switch(config-if)# switchport private-vlan association trunk 202 440
Switch(config-if)# switchport mode private-vlan trunk
Switch(config-if)# end
```

```
Switch#show interfaces fastethernet 5/1 switchport
Name: Fa5/1
Switchport: Enabled
Administrative Mode: private-vlan trunk
Operational Mode: private-vlan trunk
Administrative Trunking Encapsulation: negotiate
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
```

```

Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Appliance trust: none
Administrative Private Vlan
  Host Association: 202 (VLAN0202) 440 (VLAN0440)
  Promiscuous Mapping: none
  Trunk encapsulation : dot1q
  Trunk vlans:
    202 (VLAN0202) 440 (VLAN0440)
Operational private-vlan(s):
  202 (VLAN0202) 440 (VLAN0440)
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL

```

## Permitting Routing of Secondary VLAN Ingress Traffic



### Note

Isolated and community VLANs are both called secondary VLANs.

To permit routing of secondary VLAN ingress traffic, perform this task:

	Command	Purpose
Step 1	Switch# <b>configure terminal</b>	Enters global configuration mode.
Step 2	Switch(config)# <b>interface vlan</b> <i>primary_vlan_ID</i>	Enters interface configuration mode for the primary VLAN.
Step 3	Switch(config-if)# [ <b>no</b> ] <b>private-vlan mapping</b> <i>primary_vlan_ID</i> { <i>secondary_vlan_list</i>   <b>add</b> <i>secondary_vlan_list</i>   <b>remove</b> <i>secondary_vlan_list</i> }	To permit routing on the secondary VLAN ingress traffic, map the secondary VLAN to the primary VLAN.  You can use the <b>no</b> keyword to delete all associations from the primary VLAN.
Step 4	Switch(config-if)# <b>end</b>	Exits configuration mode.
Step 5	Switch# <b>show interface private-vlan mapping</b>	Verifies the configuration.

When you permit routing on the secondary VLAN ingress traffic, note the following:

- The **private-vlan mapping** interface configuration command only affects private VLAN ingress traffic that is Layer 3 switched.
- The *secondary\_vlan\_list* parameter cannot contain spaces. It can contain multiple comma-separated items. Each item can be a single private VLAN ID or a hyphenated range of private VLAN IDs.
- Enter a *secondary\_vlan\_list* parameter or use the **add** keyword with a *secondary\_vlan\_list* parameter to map the secondary VLANs to the primary VLAN.
- Use the **remove** keyword with a *secondary\_vlan\_list* parameter to clear the mapping between secondary VLANs and the primary VLAN.

This example shows how to permit routing of secondary VLAN ingress traffic from private VLANs 303 through 307, 309, and 440 and verify the configuration:

```
Switch# configure terminal
Switch(config)# interface vlan 202
Switch(config-if)# private-vlan mapping add 303-307,309,440
Switch(config-if)# end
Switch# show interfaces private-vlan mapping
Interface Secondary VLAN Type
-----
vlan202 303 community
vlan202 304 community
vlan202 305 community
vlan202 306 community
vlan202 307 community
vlan202 309 community
vlan202 440 isolated

Switch#
```