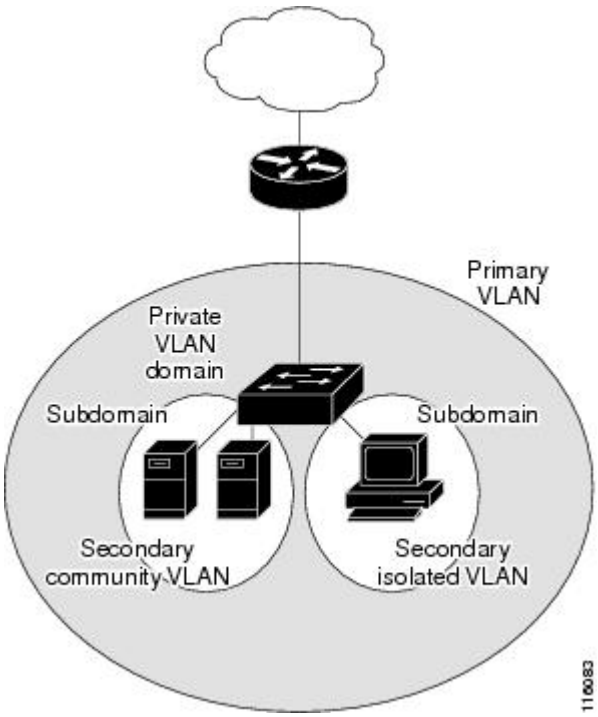
Configuring Private VLANs

This chapter contains the following sections:

Information About Private VLANs

A private VLAN (PVLAN) partitions the Ethernet broadcast domain of a VLAN into subdomains, allowing you to isolate the ports on the switch from each other. A subdomain consists of a primary VLAN and one or more secondary VLANs (see the following figure). All VLANs in a PVLAN domain share the same primary VLAN. The secondary VLAN ID differentiates one subdomain from another. The secondary VLAN can either be isolated VLAN or community VLAN. A host on an isolated VLAN can communicate only with the associated promiscuous port in its primary VLAN. Hosts on community VLAN can communicate among themselves and with their associated promiscuous port but not with ports in other community VLANs.

Figure 1: Private VLAN Domain



Note You must first create the VLAN before converting it to a PVLAN, either a primary VLAN or secondary VLAN.

Primary and Secondary VLANs in Private VLANs

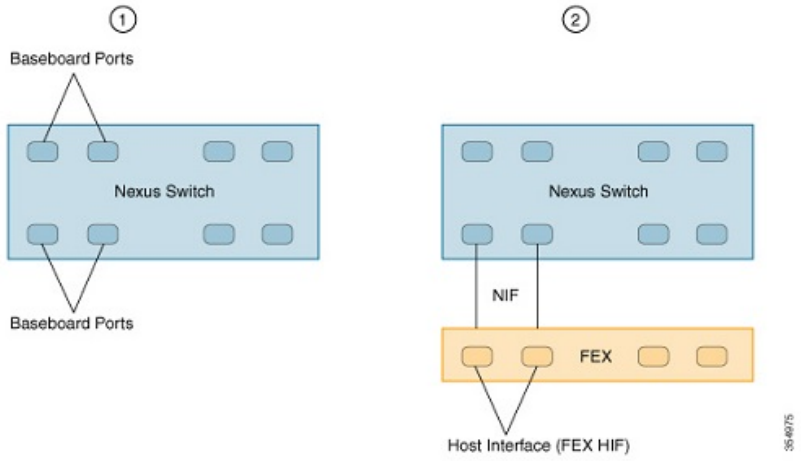
A private VLAN domain has only one primary VLAN. Each port in a private VLAN domain is a member of the primary VLAN; the primary VLAN is the entire private VLAN domain.

Secondary VLAN provide isolation between the ports within the same private VLAN domain. The following two types are secondary VLANs within a primary VLAN:

- Isolated VLANs—Ports within an isolated VLAN cannot communicate directly with each other at the Layer 2 level.
- Community VLANs—Ports within a community VLAN can communicate with each other but cannot communicate with ports in other community VLANs or in any isolated VLANs at the Layer 2 level.

Baseboard Ports and HIF Ports

The following figure shows the baseboard and host interface (HIF) ports on a Cisco Nexus switch.



1	Baseboard ports are ports on a baseboard module in a Cisco Nexus switch.
2	FEX HIF ports are ports on the FEX module.

Private VLAN Ports

The following are three types of PVLAN ports:

- Promiscuous port—A promiscuous port belongs to a primary VLAN. The promiscuous port can communicate with all interfaces, including the community and isolated host ports, that belong to those secondary VLANs associated to the promiscuous port and associated with the primary VLAN. You can have several promiscuous ports in a primary VLAN. Each promiscuous port can have several secondary VLANs or no secondary VLANs that are associated to that port. You can associate a secondary VLAN to more than one promiscuous port, as long as the promiscuous port and secondary VLANs are within the same primary VLAN. You may want to do this for load-balancing or redundancy purposes. You can also have secondary VLANs that are not associated to any promiscuous port.

  A promiscuous port can be configured either as an access port or as a trunk port.

- Isolated port—An isolated port is a host port that belongs to an isolated secondary VLAN. This port has complete isolation from other ports within the same PVLAN domain, except that it can communicate with associated promiscuous ports. PVLANs block all the traffic to isolated ports except traffic from promiscuous ports. Traffic received from an isolated port is forwarded only to promiscuous ports. You can have more than one isolated port in a specified isolated VLAN. Each port is completely isolated from all other ports in the isolated VLAN.

  An isolated port can be configured as either an access port or a trunk port.

- Community port—A community port is a host port that belongs to a community secondary VLAN. Community ports communicate with other ports in the same community VLAN and with associated promiscuous ports. These interfaces are isolated from all other interfaces in other communities and from all isolated ports within the PVLAN domain.

  A community port must be configured as an access port. A community VLAN must not be enabled on an isolated trunk port.

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

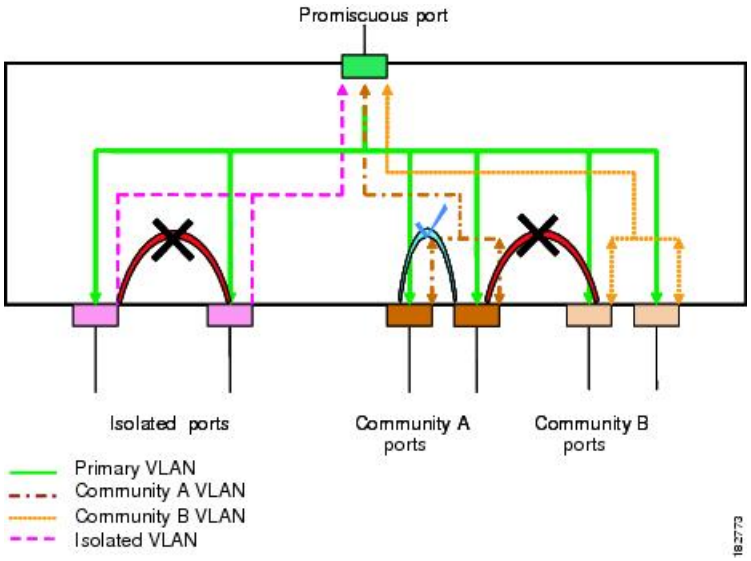
Primary, Isolated, and Community Private VLANs

Primary VLANs and the two types of secondary VLANs (isolated and community) have the following characteristics:

- Primary VLAN—The primary VLAN carries traffic from the promiscuous ports to the host ports, both isolated and community, and to other promiscuous ports.
- Isolated VLAN—An isolated VLAN is a secondary VLAN that carries unidirectional traffic upstream from the hosts toward the promiscuous ports. You can configure only one isolated VLAN in a PVLAN domain. An isolated VLAN can have several isolated ports. The traffic from each isolated port also remains completely separate.
- Community VLAN—A community VLAN is a secondary VLAN that carries upstream traffic from the community ports to the promiscuous port and to other host ports in the same community. You can configure multiple community VLANs in a PVLAN domain. The ports within one community can communicate, but these ports cannot communicate with ports in any other community or isolated VLAN in the private VLAN.

The following figure shows the traffic flow within a PVLAN, along with the types of VLANs and types of ports.

Figure 2: Private VLAN Traffic Flows



Note The PVLAN traffic flows are unidirectional from the host ports to the promiscuous ports. Traffic received on primary VLAN enforces no separation and forwarding is done as in a normal VLAN.

A promiscuous access port can serve only one primary VLAN and multiple secondary VLANs (community and isolated VLANs). A promiscuous trunk port can carry traffic for several primary VLANs. Multiple secondary VLANs under a given primary VLAN can be mapped to promiscuous trunk ports. With a promiscuous port, you can connect a wide range of devices as access points to a PVLAN. For example, you can use a promiscuous port to monitor or back up all the PVLAN servers from an administration workstation.

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 only with a default gateway to communicate outside the private VLAN.

Associating Primary and Secondary VLANs

To allow host ports in secondary VLANs to communicate outside the PVLAN, you associate secondary VLANs to the primary VLAN. If the association is not operational, the host ports (community and isolated ports) in the secondary VLAN are brought down.

Note You can associate a secondary VLAN with only one primary VLAN.

For an association to be operational, the following conditions must be met:

- The primary VLAN must exist and be configured as a primary VLAN.
- The secondary VLAN must exist and be configured as either an isolated or community VLAN.

Note Use the **show vlan private-vlan** command to verify that the association is operational. The switch does not display an error message when the association is nonoperational.

If you delete either the primary or secondary VLAN, the ports that are associated with the VLAN become inactive. Use the **no private-vlan** command to return the VLAN to the normal mode. All primary and secondary associations on that VLAN are suspended, but the interfaces remain in PVLAN mode. When you convert the VLAN back to PVLAN mode, the original associations are reinstated.

If you enter the **no vlan** command for the primary VLAN, all PVLAN associations with that VLAN are deleted. However, if you enter the **no vlan** command for a secondary VLAN, the PVLAN associations with that VLAN are suspended and are restored when you recreate the specified VLAN and configure it as the previous secondary VLAN.

In order to change the association between a secondary and primary VLAN, you must first remove the current association and then add the desired association.

Private VLAN Promiscuous Trunks

A promiscuous trunk port can carry traffic for several primary VLANs. Multiple secondary VLANs under a given primary VLAN can be mapped to a promiscuous trunk port. Traffic on the promiscuous port is received and transmitted with a primary VLAN tag.

Private VLAN Isolated Trunks

An isolated trunk port can carry traffic for multiple isolated PVLANs. Traffic for a community VLAN is not carried by isolated trunk ports. Traffic on isolated trunk ports is received and transmitted with an isolated VLAN tag. Isolated trunk ports are intended to be connected to host servers.

To support isolated PVLAN ports on a Cisco Nexus Fabric Extender, the Cisco Nexus device must prevent communication between the isolated ports on the FEX; all forwarding occurs through the switch.

Caution You must disable all the FEX isolated trunk ports before configuring PVLANs on the FEX trunk ports. If the FEX isolated trunk ports and the FEX trunk ports are both enabled, unwanted network traffic might occur.

For unicast traffic, you can prevent such a communication without any side effects.

For multicast traffic, the FEX provides replication of the frames. To prevent communication between isolated PVLAN ports on the FEX, the switch prevents multicast frames from being sent back through the fabric ports. This restriction prevents communication between an isolated VLAN and a promiscuous port on the FEX. However, as host interfaces are not intended to be connected to another switch or router, you cannot enable a promiscuous port on a FEX.

Broadcast Traffic in Private VLANs

Broadcast traffic from ports in a private VLAN flows in the following ways:

- The broadcast traffic flows from a promiscuous port to all ports in the primary VLAN (which includes all the ports in the community and isolated VLANs). This broadcast traffic is distributed to all ports within the primary VLAN, including those ports that are not configured with private VLAN parameters.
- The broadcast traffic from an isolated port is distributed only to those promiscuous ports in the primary VLAN that are associated to that isolated port.
- The broadcast traffic from community ports is distributed to all ports within the port's community and to all promiscuous ports that are associated to the community port. The broadcast packets are not distributed to any other communities within the primary VLAN or to any isolated ports.

Private VLAN Port Isolation

You can use PVLANs to control access to end stations as follows:

- Configure selected interfaces connected to end stations as isolated ports to prevent any communication. For example, if the end stations are servers, this configuration prevents communication between the servers.
- Configure interfaces connected to default gateways and selected end stations (for example, backup servers) as promiscuous ports to allow all end stations access to a default gateway.

Guidelines and Limitations for Private VLANs

When configuring PVLANs, follow these guidelines:

- You must create a VLAN before you can assign the specified VLAN as a private VLAN.
- You must enable PVLANs before the switch can apply the PVLAN functionality.
- You cannot disable PVLANs if the switch has any operational ports in a PVLAN mode.
- Enter the **private-vlan synchronize** command from within the Multiple Spanning Tree (MST) region definition to map the secondary VLANs to the same MST instance as the primary VLAN.
- You must disable all the FEX isolated trunk ports before configuring FEX trunk ports.
- The number of mappings on a PVLAN trunk port is limited to 128.
- You cannot connect a second switch to a promiscuous or isolated PVLAN trunk. The promiscuous or isolated PVLAN trunk is supported only on host-switch.
- You cannot configure promiscuous ports and promiscuous trunk ports on the FEX interfaces (HIF) ports.
- If you configure a **private-vlan association** under a VLAN, but do not configure the **private-vlan type** as primary, this association will reappear in the running configuration under the same VLAN when the VLAN is deleted and re-created. Note that this earlier association cannot be removed by using the **no private-vlan association** command. It can be removed only by performing either of the following tasks:
  - Disable the PVLAN feature.

    Or
  - Configure the **private-vlan type** as primary, configure the same **private-vlan association** under that VLAN, and then remove the association using the **no private-vlan association** command.

Limitations with Other Features

Consider the following configuration limitations with other features when configuring private VLANs:

- IGMP snooping runs only on the primary VLAN and uses the configuration of the primary VLAN for all secondary VLANs.

  Any IGMP snooping join request in the secondary VLAN is treated as if it is received in the primary VLAN.

Configuring a Private VLAN

Enabling Private VLANs

You must enable PVLANs on the switch to use the PVLAN functionality.

Note The PVLAN commands do not appear until you enable the PVLAN feature.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **feature private-vlan**	Enables the PVLAN feature on the switch.
Step 3	(Optional) switch(config)# **no feature private-vlan**	Disables the PVLAN feature on the switch. **Note** You cannot disable PVLANs if there are operational ports on the switch that are in PVLAN mode.

Example

This example shows how to enable the PVLAN feature on the switch:

```
switch# configure terminal
switch(config)# feature private-vlan
```

Configuring a VLAN as a Private VLAN

To create a PVLAN, you must first create a VLAN, and then configure that VLAN to be a PVLAN.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **vlan** {*vlan-id* | *vlan-range*}	Enters VLAN configuration submode.
Step 3	switch(config-vlan)# **private-vlan** {**community** | **isolated** | **primary**}	Configures the VLAN as either a community, isolated, or primary PVLAN. In a PVLAN, you must have one primary VLAN. You can have multiple community and isolated VLANs.
Step 4	(Optional) switch(config-vlan)# **no private-vlan** {**community** | **isolated** | **primary**}	Removes the PVLAN configuration from the specified VLAN(s) and returns it to normal VLAN mode. If you delete either the primary or secondary VLAN, the ports that are associated with the VLAN become inactive.

Example

The following example shows how to assign VLAN 5 to a PVLAN as the primary VLAN:

```
switch# configure terminal
switch(config)# vlan 5
switch(config-vlan)# private-vlan primary
```

The following example shows how to assign VLAN 100 to a PVLAN as a community VLAN:

```
switch# configure terminal
switch(config)# vlan 100
switch(config-vlan)# private-vlan community
```

The following example shows how to assign VLAN 200 to a PVLAN as an isolated VLAN:

```
switch# configure terminal
switch(config)# vlan 200
switch(config-vlan)# private-vlan isolated
```

Associating Secondary VLANs with a Primary Private VLAN

When you associate secondary VLANs with a primary VLAN, follow these guidelines:

- The *secondary-vlan-list* parameter cannot contain spaces. It can contain multiple comma-separated items. Each item can be a single secondary VLAN ID or a hyphenated range of secondary VLAN IDs.
- The *secondary-vlan-list* parameter can contain multiple community VLAN IDs and 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.
- You can change the association between a secondary and primary VLAN by removing the existing association, and then adding the desired association.

If you delete either the primary or secondary VLAN, the VLAN becomes inactive on the port where the association is configured. When you enter the **no private-vlan** command, the VLAN returns to the normal VLAN mode. All primary and secondary associations on that VLAN are suspended, but the interfaces remain in PVLAN mode. If you convert the specified VLAN to PVLAN mode again, the original associations are reinstated.

If you enter the **no vlan** command for the primary VLAN, all the PVLAN associations with that VLAN are lost. However, if you enter the **no vlan** command for a secondary VLAN, the PVLAN associations with that VLAN are suspended and are reinstated when you recreate the specified VLAN and configure it as the previous secondary VLAN.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.

	Command or Action	Purpose
Step 2	switch(config)# **vlan** *primary-vlan-id*	Enters the number of the primary VLAN that you are working in for the PVLAN configuration.
Step 3	switch(config-vlan)# **private-vlan association** {[**add**] *secondary-vlan-list* | **remove** *secondary-vlan-list*}	Associates the secondary VLANs with the primary VLAN. Use the **remove** keyword with a *secondary-vlan-list* to clear the association between secondary VLANs and a primary VLAN.
Step 4	(Optional) switch(config-vlan)# **no private-vlan association**	Removes all associations from the primary VLAN and returns it to normal VLAN mode.

Example

The following example shows how to associate community VLANs 100 through 110 and isolated VLAN 200 with primary VLAN 5:

```
switch# configure terminal
switch(config)# vlan 5
switch(config-vlan)# private-vlan association 100-110, 200
```

Configuring an Interface as a Private VLAN Host Port

In PVLANs, host ports are part of the secondary VLANs, which are either community VLANs or isolated VLANs. Configuring a PVLAN host port involves two steps. First, you define the port as a PVLAN host port and then you configure a host association between the primary and secondary VLANs.

Note We recommend that you enable BPDU Guard on all interfaces configured as a host ports.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **interface** *type* [*chassis*/]*slot*/*port*	Selects the port to configure as a PVLAN host port. This port can be on a FEX (identified by the chassis option). **Note** If this is a QSFP+ GEM or a breakout port, the *port* syntax is *QSFP-module*/*port*.

	Command or Action	Purpose
Step 3	switch(config-if)# **switchport**	Configures the interface as a Layer 2 interface and deletes any configuration specific to Layer 3 on this interface.
Step 4	switch(config-if)# **switchport mode private-vlan host**	Configures the port as a host port for a PVLAN.
Step 5	switch(config-if)# **switchport private-vlan host-association** {*primary-vlan-id*} {*secondary-vlan-id*}	Associates the port with the primary and secondary VLANs of a PVLAN. The secondary VLAN can be either an isolated or community VLAN.
Step 6	(Optional) switch(config-if)# **no switchport private-vlan host-association**	Removes the PVLAN association from the port.

Example

This example shows how to configure Ethernet port 1/12 as a host port for a PVLAN and associate it to primary VLAN 5 and secondary VLAN 101:

```
switch# configure terminal
switch(config)# interface ethernet 1/12
switch(config-if)# switchport
switch(config-if)# switchport mode private-vlan host
switch(config-if)# switchport private-vlan host-association 5 101
```

Configuring an Interface as a Private VLAN Promiscuous Port

In a PVLAN domain, promiscuous ports are part of the primary VLAN. Configuring a promiscuous port involves two steps. First, you define the port as a promiscuous port and then you configure the mapping between a secondary VLAN and the primary VLAN.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **interface** *type slot*/*port*	Selects the port to configure as a PVLAN promiscuous port. A base-board interface is required. This port cannot be on a FEX interface (HIF interface). **Note** If this is a QSFP+ GEM or a breakout port, the *port* syntax is *QSFP-module*/*port*.

	Command or Action	Purpose
Step 3	switch(config-if)# **switchport**	Configures the interface as a Layer 2 interface and deletes any configuration specific to Layer 3 on this interface.
Step 4	switch(config-if)# **switchport mode private-vlan promiscuous**	Configures the port as a promiscuous port for a PVLAN. You can enable promiscuous ports and promiscuous trunk ports only on base-board ports (base-board ports are the ports on the switch). You cannot configure promiscuous ports on FEX (HIF) ports. **Note** If you try to configure promiscuous ports on FEX (HIF) ports, the device will display an error.
Step 5	switch(config-if)# **switchport private-vlan mapping** {*primary-vlan-id*} {*secondary-vlan-list* | **add** *secondary-vlan-list* | **remove** *secondary-vlan-list*}	Configures the port as a promiscuous port and associates the specified port with a primary VLAN and a selected list of secondary VLANs. The secondary VLAN can be either an isolated or community VLAN.
Step 6	(Optional) switch(config-if)# **no switchport private-vlan mapping**	Clears the mapping from the PVLAN.

Example

The following example shows how to configure Ethernet interface 1/4 as a promiscuous port associated with primary VLAN 5 and secondary VLAN 200:

```
switch# configure terminal
switch(config)# interface ethernet 1/4
switch(config-if)# switchport
switch(config-if)# switchport mode private-vlan promiscuous
switch(config-if)# switchport private-vlan mapping 5 200
```

Configuring a Promiscuous Trunk Port

In a PVLAN domain, promiscuous trunks are part of the primary VLAN. Promiscuous trunk ports can carry multiple primary VLANs. Multiple secondary VLANs under a given primary VLAN can be mapped to a promiscuous trunk port.

Configuring a promiscuous port involves two steps. First, you define the port as a promiscuous port and then you configure the mapping between a secondary VLAN and the primary VLAN. Multiple primary VLANs can be enabled by configuring multiple mappings.

Note The number of mappings on a PVLAN trunk port is limited to 128.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **interface** *type slot*/*port*	Selects the port to configure as a PVLAN promiscuous trunk port. A base-board interface is required. This port cannot be on a FEX interface (HIF interface). **Note** If this is a QSFP+ GEM or a breakout port, the *port* syntax is *QSFP-module*/*port*.
Step 3	switch(config-if)# **switchport**	Configures the interface as a Layer 2 interface and deletes any configuration specific to Layer 3 on this interface.
Step 4	switch(config-if)# **switchport mode private-vlan trunk promiscuous**	Configures the port as a promiscuous trunk port for a PVLAN. You can enable promiscuous trunk ports only on base-board ports (base-board ports are the ports on the switch). You cannot configure promiscuous trunk ports on FEX (HIF) ports. **Note** If you try to configure promiscuous trunk ports on FEX (HIF) ports, the device will display an error.
Step 5	switch(config-if)# **switchport private-vlan mapping trunk** {*primary-vlan-id*} {*secondary-vlan-id*}	Maps the trunk port with the primary and secondary VLANs of a PVLAN. The secondary VLAN can be either an isolated or community VLAN.
Step 6	(Optional) switch(config-if)# **no switchport private-vlan mapping trunk** [*primary-vlan-id*]	Removes the PVLAN mapping from the port. If the *primary-vlan-id* is not supplied, all PVLAN mappings are removed from the port.

Example

The following example shows how to configure Ethernet interface 1/1 as a promiscuous trunk port for a PVLAN and then map the secondary VLANs to the primary VLAN:

```
switch# configure terminal
switch(config)# interface ethernet 1/1
switch(config-if)# switchport
switch(config-if)# switchport mode private-vlan trunk promiscuous
switch(config-if)# switchport private-vlan mapping trunk 5 100
```

```
switch(config-if)# switchport private-vlan mapping trunk 5 200
switch(config-if)# switchport private-vlan mapping trunk 6 300
```

Configuring an Isolated Trunk Port

In a PVLAN domain, isolated trunks are part of a secondary VLAN. Isolated trunk ports can carry multiple isolated VLANs. Configuring an isolated trunk port involves two steps. First, you define the port as an isolated trunk port and then you configure the association between the isolated and primary VLANs. Multiple isolated VLANs can be enabled by configuring multiple associations.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **interface** *type* [*chassis*/]*slot*/*port*	Selects the port to configure as a PVLAN isolated trunk port. This port can be on a FEX (identified by the chassis option). The PVLAN isolated trunk port can be configured on a Ethernet port and on a FEX port. **Note** If this is a QSFP+ GEM or a breakout port, the *port* syntax is *QSFP-module*/*port*. **Note** If this is a QSFP+ GEM or a breakout port, the *port* syntax is *QSFP-module*/*port*.
Step 3	switch(config-if)# **switchport**	Configures the interface as a Layer 2 interface and deletes any configuration specific to Layer 3 on this interface.
Step 4	switch(config-if)# **switchport mode private-vlan trunk** [**secondary**]	Configures the port as a secondary trunk port for a PVLAN. **Note** The **secondary** keyword is assumed if it is not present.
Step 5	switch(config-if)# **switchport private-vlan association trunk** {*primary-vlan-id*} {*secondary-vlan-id*}	Associates the isolated trunk port with the primary and secondary VLANs of a PVLAN. The secondary VLAN should be an isolated VLAN. Only one isolated VLAN can be mapped under a given primary VLAN.

	Command or Action	Purpose
Step 6	(Optional) switch(config-if)# **no switchport private-vlan association trunk** [*primary-vlan-id*]	Removes the PVLAN association from the port. If the *primary-vlan-id* is not supplied, all PVLAN associations are removed from the port.

Example

The following example shows how to configure Ethernet interface 1/1 as an isolated trunk port for a PVLAN and then associate the secondary VLANs to the primary VLAN:

```
switch# configure terminal
switch(config)# interface ethernet 1/1
switch(config-if)# switchport
switch(config-if)# switchport mode private-vlan trunk secondary
switch(config-if)# switchport private-vlan association trunk 5 100
switch(config-if)# switchport private-vlan association trunk 6 200
```

Configuring Private VLANs on FEX Trunk Ports

To enable a FEX HIF configured as a normal dot1q trunk port, the **system private-vlan fex trunk** command must be enabled to allow this interface to forward both primary and secondary VLAN traffic. FEX trunk ports extend the PVLAN domain to all the hosts connected to it and when configured, globally affects all FEX ports connected to the Cisco Nexus device.

Note The FEX interface does not support configurations that include promiscuous ports. Also, the FEX interface does not support connections to devices that have promiscuous ports. When promiscuous functionally is required, the device, such as a Cisco Nexus 1000V, must connect to the base ports of the Cisco Nexus device.

Caution You must disable all the FEX isolated trunk ports and isolated host ports before configuring PVLANs on the FEX trunk ports. If the FEX isolated trunk ports and the FEX trunk ports are both enabled, unwanted network traffic might occur. If the **system private-vlan fex trunk** command and the FEX isolated trunk ports are both enabled, then traffic coming on primary VLAN is not translated to secondary VLAN, when the traffic goes out of the FEX isolated trunk port.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **system private-vlan fex trunk**	Enables PVLANs on FEX trunk ports.

	Command or Action	Purpose
Step 3	(Optional) switch(config)# **copy running-config startup-config**	Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

Example

The following example shows how to configure a PVLAN over a FEX trunk port:

```
switch# configure terminal
switch(config)# system private-vlan fex trunk
switch(config)# copy running-config startup-config
```

Configuring the Allowed VLANs for PVLAN Trunking Ports

Isolated trunk and promiscuous trunk ports can carry traffic from regular VLANs along with PVLANs.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **interface** *type* [*chassis*/]*slot*/*port*	Selects the port to configure as a PVLAN host port. This port can be on a FEX (identified by the chassis option). **Note** If this is a QSFP+ GEM or a breakout port, the *port* syntax is *QSFP-module*/*port*.
Step 3	switch(config-if)# **switchport**	Configures the interface as a Layer 2 interface and deletes any configuration specific to Layer 3 on this interface.
Step 4	switch(config-if)# **switchport private-vlan trunk allowed vlan** {*vlan-list* | **all** | **none** [**add** | **except** | **none** | **remove** {*vlan-list*}]}	Sets the allowed VLANs for the private trunk interface. The default is to allow only mapped/associated VLANs on the PVLAN trunk interface. **Note** The primary VLANs do not need to be explicitly added to the allowed VLAN list. They are added automatically once there is a mapping between primary and secondary VLANs.

Example

The following example shows how to add VLANs to the list of allowed VLANs on an Ethernet PVLAN trunk port:

```
switch# configure terminal
switch(config)# interface ethernet 1/3
switch(config-if)# switchport
switch(config-if)# switchport private-vlan trunk allowed vlan 15-20
```

Configuring Native 802.1Q VLANs on Private VLANs

Typically, you configure 802.1Q trunks with a native VLAN ID, which strips tagging from all packets on that VLAN. This configuration allows untagged traffic and control traffic to transit the Cisco Nexus device. Secondary VLANs cannot be configured with a native VLAN ID on promiscuous trunk ports. Primary VLANs cannot be configured with a native VLAN ID on isolated trunk ports.

Note A trunk can carry the traffic of multiple VLANs. Traffic that belongs to the native VLAN is not encapsulated to transit the trunk. Traffic for other VLANs is encapsulated with tags that identify the VLAN that the traffic belongs to.

Before you begin

Ensure that the PVLAN feature is enabled.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **interface** *type* [*chassis*/]*slot*/*port*	Selects the port to configure as a PVLAN host port. This port can be on a FEX (identified by the chassis option). **Note** If this is a QSFP+ GEM or a breakout port, the *port* syntax is *QSFP-module*/*port*.
Step 3	switch(config-if)# **switchport**	Configures the interface as a Layer 2 interface and deletes any configuration specific to Layer 3 on this interface.
Step 4	switch(config-if)# **switchport private-vlan trunk native** {**vlan** *vlan-id*}	Sets the native VLAN ID for the PVLAN trunk. The default is VLAN 1.
Step 5	(Optional) switch(config-if)# **no switchport private-vlan trunk native** {**vlan** *vlan-id*}	Removes the native VLAN ID from the PVLAN trunk.

Verifying the Private VLAN Configuration

Use the following commands to display PVLAN configuration information.

Command	Purpose
switch# **show feature**	Displays the features enabled on the switch.
switch# **show interface switchport**	Displays information on all interfaces configured as switch ports.
switch# **show vlan private-vlan** [**type**]	Displays the status of the PVLAN.

This example shows how to display the PVLAN configuration:

```
switch# show vlan private-vlan
Primary  Secondary  Type             Ports
-------  ---------  ---------------  ------------------------------------------
5        100        community
5        101        community        Eth1/12, Eth100/1/1
5        102        community
5        110        community
5        200        isolated         Eth1/2
switch# show vlan private-vlan type
Vlan Type
---- -----------------
5    primary
100  community
101  community
102  community
110  community
200  isolated
```

This example shows how to display enabled features (some of the output has been removed for brevity):

```
switch# show feature
Feature Name          Instance  State
--------------------  --------  --------
fcsp                  1         enabled
...
interface-vlan        1         enabled
private-vlan          1         enabled
udld                  1         disabled
...
```