JUNIPER NETWORKS

Network Configuration Example

Configuring Private VLANs on a QFX Switch Using Extended Functionality

Release
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CHAPTER 1

Introduction to Private VLANs

This document describes the private VLANs (PVLANs) features supported on the Juniper Networks QFabric™ family of products and provides step-by-step procedures for configuring PVLANs with secondary VLAN trunk ports and promiscuous access ports.

Private VLAN Solutions for Segregating Customer Traffic

Using private VLANs (PVLANs) can help you in many situations in which you need to segregate traffic from different customers or to segregate different types of traffic. For example, if your company provides web hosting services to its customers, you probably host collocated servers owned by your customers and connect those servers to the Internet through aggregation-layer switches. In this case, you need a mechanism to ensure that no customer has access to any traffic or assets assigned to another customer. Given that you might have a large number of customers and many virtual switches, it can be impractical to use standard VLANs to solve this problem. Your equipment might not support the number of VLANs required, and you might not have enough IP addresses to assign to all your customers. Either of these constraints can limit the number of customers that you can support and therefore limit the growth of your business.

Implementing PVLANs allows you to increase the number of VLANs that you can assign to customers without sacrificing any security or privacy. Because you can support more VLANs, you can also support more subnets (which you assign to VLANs), and this can allow you to use your IP addresses more efficiently—which saves your company money by getting more use out of a valuable asset.

When you configure PVLANs, you create primary VLANs and then create secondary VLANs inside the primary VLANs. The secondary VLANs are isolated from each other and can use their own subnets. Juniper Networks has extended the functionality of PVLANs by introducing the following features:

- Secondary VLAN trunk ports
- Promiscuous access ports

Secondary VLAN trunk ports are particularly useful when you want ports to carry multiple secondary VLANs—that is, you want trunk ports to carry secondary VLANs instead of standard VLANs. Configuring these ports can help you save money and reduce complexity because it reduces your need for physical ports and connections. Indeed, you might want

to connect a secondary VLAN trunk port to multiple virtual switches that support many secondary VLANs.

Promiscuous access ports can save you money and reduce complexity by allowing you connect systems that do not support VLAN trunking but do need to participate in a primary private VLAN. For example, some network file systems are deployed in this way. Without the functionality of promiscuous access ports, you would be forced to find alternative methods of providing these services.

Related Documentation

- Understanding Private VLANs on page 7
- Limitations of Private VLANs on page 12
- Understanding Secondary VLAN Trunk Ports and Promiscuous Access Ports on PVLANs on page 13
- Example: Configuring PVLANs with Secondary VLAN Trunk Ports and Promiscuous Access Ports on page 23
- Example: Configuring a Private VLAN on a Single Switch on page 35

CHAPTER 2

Understanding Private VLANs

VLANs limit broadcasts to specified users. Private VLANs (PVLANs) take this concept a step further by splitting the broadcast domain into multiple isolated broadcast subdomains and essentially putting secondary VLANs inside a primary VLAN. PVLANs restrict traffic flows through their member switch ports (called “private ports”) so that these ports communicate only with a specified uplink trunk port or with specified ports within the same VLAN. The uplink trunk port is usually connected to a router, firewall, server, or provider network. Each PVLAN typically contains many private ports that communicate only with a single uplink, thereby preventing the ports from communicating with each other.

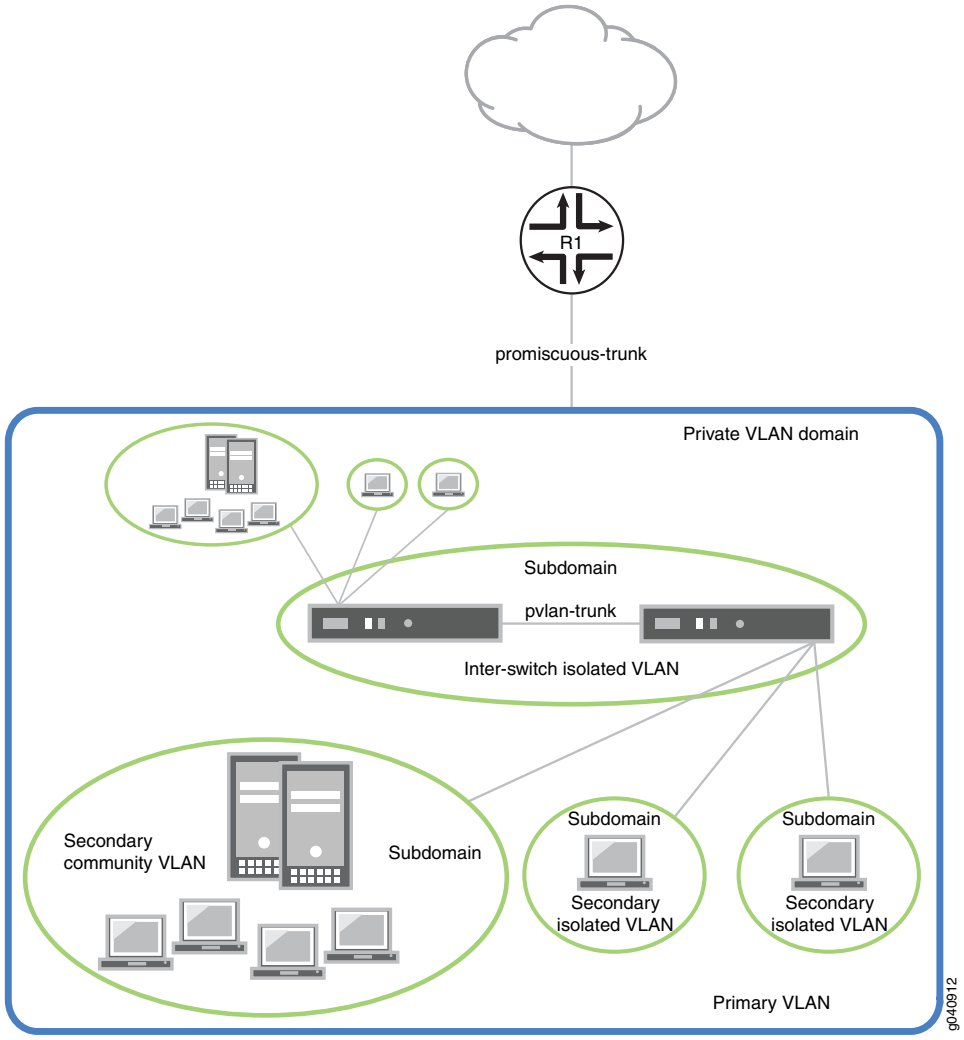
Just like regular VLANs, PVLANs are isolated on Layer 2 and require that a Layer 3 device be used to route traffic among them. PVLANs are useful for restricting the flow of broadcast and unknown unicast traffic and for limiting the communication between known hosts. Service providers use PVLANs to keep their customers isolated from one another.

This topic explains the following concepts regarding PVLANs on the QFX Series:

Typical Structure and Primary Application of PVLANs

A PVLAN can be created on a single switch or can be configured to span multiple switches. The PVLAN shown in Figure 1 on page 8 includes two switches, with a primary PVLAN domain and various subdomains.

Figure 1: Subdomains in a PVLAN



As shown in Figure 1 on page 8, a PVLAN has only one primary domain and multiple secondary domains. The types of domains are:

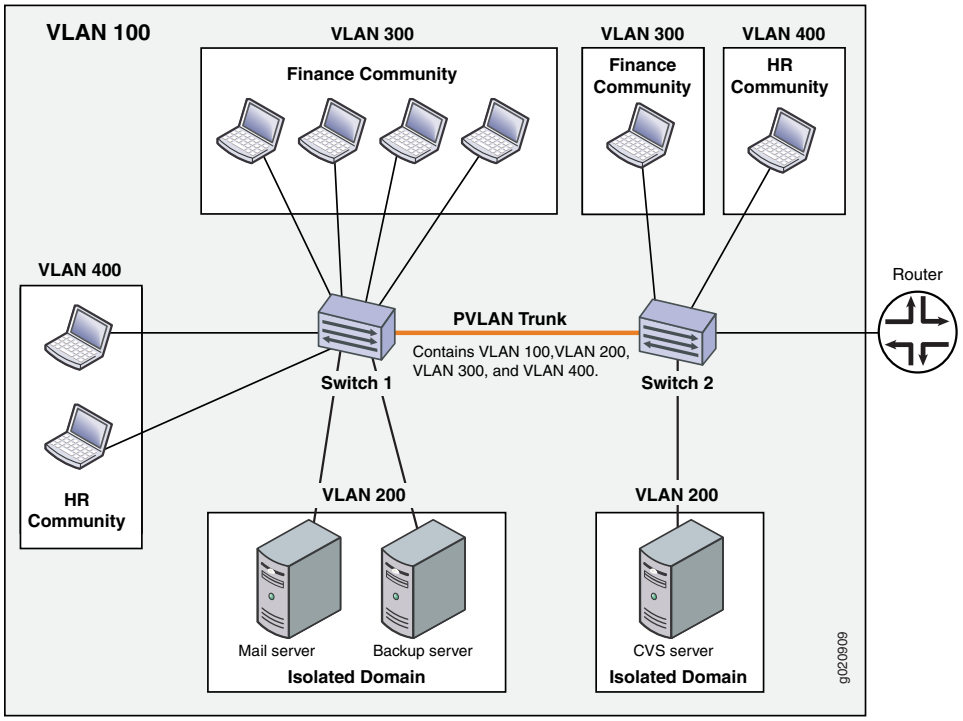
- Primary VLAN—VLAN used to forward frames downstream to isolated and community VLANs.
- Secondary isolated VLAN—VLAN that receives packets only from the primary VLAN and forwards frames upstream to the primary VLAN.
- Secondary interswitch isolated VLAN—VLAN used to forward isolated VLAN traffic from one switch to another through PVLAN trunk ports. 802.1Q tags are required for interswitch isolated VLANs because IEEE 802.1Q uses an internal tagging mechanism

by which a trunking device inserts a 4-byte VLAN frame identification tab into the packet header.

- Secondary community VLAN—VLAN used to transport frames among members of a community (a subset of users within the VLAN) and to forward frames upstream to the primary VLAN.

Figure 2 on page 9 shows a PVLAN spanning multiple switches, where the primary VLAN (**100**) contains two community domains (**300** and **400**) and one interswitch isolated domain.

Figure 2: PVLAN Spanning Multiple Switches



NOTE: Primary and secondary VLANs count against the limit of 4089 VLANs supported on the QFX Series. For example, each VLAN in Figure 2 on page 9 counts against this limit.

Using 802.1Q Tags to Identify Packets

When packets are marked with a customer-specific 802.1Q tag, that tag identifies ownership of the packets for any switch or router in the network. Sometimes, 802.1Q tags are needed within PVLANs to keep track of packets from different subdomains. Table 1 on page 10 indicates when a VLAN 802.1Q tag is needed on the primary VLAN or on secondary VLANs.

Table 1: PVLAN Requirements for 802.1Q Tags

	On a Single Switch	On Multiple Switches
Primary VLAN	Specify an 802.1Q tag by setting a VLAN ID.	Specify an 802.1Q tag by setting a VLAN ID.
Secondary VLAN	No tag needed on VLANs.	VLANs need 802.1Q tags: • Specify an 802.1Q tag for each community VLAN by setting a VLAN ID. • Specify the 802.1Q tag for an isolation VLAN ID by setting an isolation ID.

Efficient Use of IP Addresses

PVLANs provide IP address conservation and efficient allocation of IP addresses. In a typical network, VLANs usually correspond to a single IP subnet. In PVLANs, the hosts in all secondary VLANs belong to the same IP subnet because the subnet is allocated to the primary VLAN. Hosts within the secondary VLAN are assigned IP addresses based on IP subnets associated with the primary VLAN, and their IP subnet masking information reflects that of the primary VLAN subnet. However, each secondary VLAN is a separate broadcast domain.

PVLAN Port Types

PVLANs can use six different port types. The network depicted in Figure 2 on page 9 uses a promiscuous port to transport information to the router, community ports to connect the finance and HR communities to their respective switches, isolated ports to connect the servers, and a PVLAN trunk port to connect the two switches. PVLAN ports have different restrictions:

- Promiscuous trunk port—A promiscuous port is an upstream trunk port connected to a router, firewall, server, or provider network. A promiscuous trunk port can communicate with all interfaces, including the isolated and community ports within a PVLAN.
- PVLAN trunk port—A PVLAN trunk port is required in multiswitch PVLAN configurations to span the switches. The PVLAN trunk port is a member of all VLANs within the PVLAN (that is, the primary VLAN, the community VLANs, and the interswitch isolated VLAN), and it carries traffic from the primary VLAN and all secondary VLANs. It can communicate with all ports.

  Communication between a PVLAN trunk port and an isolated port is usually unidirectional. A PVLAN trunk port's membership in the interswitch isolated VLAN is egress-only, meaning that an isolated port can forward packets to a PVLAN trunk port, but a PVLAN trunk port does not forward packets to an isolated port (unless the packets ingressed on a promiscuous access port and are therefore being forwarded to all the secondary VLANs in the same primary VLAN as the promiscuous port).
- Secondary VLAN trunk port (not shown)—Secondary trunk ports carry secondary VLAN traffic. For a given private VLAN, a secondary VLAN trunk port can carry traffic for only one secondary VLAN. However, a secondary VLAN trunk port can carry traffic for

multiple secondary VLANs as long as each secondary VLAN is a member of a different primary VLAN. For example, a secondary VLAN trunk port can carry traffic for a community VLAN that is part of primary VLAN pvlan100 and also carry traffic for an isolated VLAN that is part of primary VLAN pvlan400.

- Community port—Community ports communicate among themselves and with their promiscuous ports. Community ports serve only a select group of users. These interfaces are separated at Layer 2 from all other interfaces in other communities or isolated ports within their PVLAN.
- Isolated access port—Isolated ports have Layer 2 connectivity only with promiscuous ports and PVLAN trunk ports—an isolated port cannot communicate with another isolated port even if these two ports are members of the same isolated VLAN (or interswitch isolated VLAN) domain. Typically, a server, such as a mail server or a backup server, is connected on an isolated port. In a hotel, each room would typically be connected on an isolated port, meaning that room-to-room communication is not possible, but each room can access the Internet on the promiscuous port.
- Promiscuous access port (not shown)—These ports carry untagged traffic. Traffic that ingresses on a promiscuous access port is forwarded to all secondary VLAN ports on the device. If traffic ingresses into the device on a VLAN-enabled port and egresses on a promiscuous access port, the traffic is untagged on egress. If tagged traffic ingresses on a promiscuous access port, the traffic is discarded.

Table 2 on page 11 summarizes whether Layer 2 connectivity exists between the different types of ports.

Table 2: PVLAN Ports and Layer 2 Connectivity

Port Type	Promiscuous Trunk	PVLAN Trunk	Secondary Trunk	Community	Isolated Access	Promiscuous access
Promiscuous trunk	Yes	Yes	Yes	Yes	Yes	Yes
PVLAN trunk	Yes	Yes	Yes	Yes—same community only	Yes	Yes
Secondary trunk	Yes	Yes	No	Yes	No	Yes
Community	Yes	Yes	Yes	Yes—same community only	No	Yes
Isolated access	Yes	Yes—unidirectional only	No	No	No	Yes
Promiscuous access	Yes	Yes	Yes	Yes	Yes	No

NOTE: If you enable the **no-mac-learning** statement on a primary VLAN, all isolated VLANs in the PVLAN inherit that setting. However, if you want to disable MAC address learning on any community VLANs, you must configure the **no-mac-learning** statement on each of those VLANs.

Limitations of Private VLANs

The following constraints apply to private VLAN configurations:

- IGMP snooping is not supported with private VLANs.
- Routed VLAN interfaces are not supported on private VLANs
- Routing between secondary VLANs in the same primary VLAN is not supported.

Related Documentation

- Understanding Secondary VLAN Trunk Ports and Promiscuous Access Ports on PVLANs on page 13
- Creating a Private VLAN on a Single Switch
- Creating a Private VLAN Spanning Multiple Switches

CHAPTER 3

Understanding Secondary VLAN Trunk Ports and Promiscuous Access Ports on PVLANs

VLANs limit broadcasts to specified users. Private VLANs (PVLANs) take this concept a step further by splitting a VLAN into multiple broadcast subdomains and essentially putting secondary VLANs inside a primary VLAN. PVLANs restrict traffic flows through their member ports so that these ports communicate only with a specified uplink trunk port or with specified ports within the same VLAN. The uplink trunk port is usually connected to a router, firewall, server, or provider network. A PVLAN typically contains many private ports that communicate only with a single uplink, thereby preventing the ports from communicating with each other.

Secondary trunk ports and promiscuous access ports extend the functionality of PVLANs for use in complex deployments, such as:

- Enterprise VMWare Infrastructure environments
- Multitenant cloud services with VM management
- Web hosting services for multiple customers

For example, you can use secondary VLAN trunk ports to connect QFX devices to VMware servers that are configured with private VLANs. You can use promiscuous access ports to connect QFX devices to systems that do not support trunk ports but do need to participate in private VLANs.

This topic explains the following concepts regarding PVLANs on the QFX Series:

PVLAN Port Types

PVLANs can use the following different port types:

- Promiscuous trunk port—A promiscuous port is an upstream trunk port connected to a router, firewall, server, or provider network. A promiscuous trunk port can communicate with all interfaces, including the isolated and community ports within a PVLAN.
- PVLAN trunk port—A PVLAN trunk port is required in multiswitch PVLAN configurations to span the switches. The PVLAN trunk port is a member of all VLANs within the PVLAN (that is, the primary VLAN, the community VLANs, and the interswitch isolated VLAN), and it carries traffic from the primary VLAN and all secondary VLANs. It can communicate with all ports.

  Communication between a PVLAN trunk port and an isolated port is usually unidirectional. A PVLAN trunk port's membership in the interswitch isolated VLAN is egress-only, meaning that an isolated port can forward packets to a PVLAN trunk port, but a PVLAN trunk port does not forward packets to an isolated port (unless the packets ingressed on a promiscuous access port and are therefore being forwarded to all the secondary VLANs in the same primary VLAN as the promiscuous port).
- Secondary VLAN trunk port—Secondary VLAN trunk ports carry secondary VLAN traffic. For a given private (primary) VLAN, a secondary VLAN trunk port can carry traffic for only one secondary VLAN. However, a secondary VLAN trunk port can carry traffic for multiple secondary VLANs as long as each secondary VLAN is a member of a different primary VLAN. For example, a secondary VLAN trunk port can carry traffic for a community VLAN that is part of primary VLAN pvlan100 and also carry traffic for an isolated VLAN that is part of primary VLAN pvlan400.

  NOTE: When traffic egresses from a secondary VLAN trunk port, it normally carries the tag of the primary VLAN that the secondary port is a member of. If you want traffic that egresses from a secondary VLAN trunk port to retain its secondary VLAN tag, use the extend-secondary-vlan-id statement.
- Community port—Community ports communicate among themselves and with their promiscuous ports. Community ports serve only a select group of users. These interfaces are separated at Layer 2 from all other interfaces in other communities or isolated ports within their PVLAN.
- Isolated access port—Isolated ports have Layer 2 connectivity only with promiscuous ports and PVLAN trunk ports. An isolated access port cannot communicate with another isolated port even if these two ports are members of the same isolated VLAN.
- Promiscuous access port—These ports carry untagged traffic and can be a member of only one primary VLAN. Traffic that ingresses on a promiscuous access port is forwarded to the ports of the secondary VLANs that are members of the primary VLAN that the promiscuous access port is a member of. In this case, the traffic carries the appropriate secondary VLAN tag when it egresses from the secondary VLAN port if the secondary VLAN port is a trunk port. If traffic ingresses on a secondary VLAN port and egresses on a promiscuous access port, the traffic is untagged on egress. If tagged traffic ingresses on a promiscuous access port, the traffic is discarded.

Secondary VLAN Trunk Port Details

When using a secondary VLAN trunk port, be aware of the following:

- You must configure an isolation VLAN ID for each primary VLAN that the secondary VLAN trunk port will participate in. This is true even if the secondary VLANs that the secondary VLAN trunk port will carry are confined to a single device.
- If you configure a port to be a secondary VLAN trunk port for a given primary VLAN, you can also configure the same physical port to be any of the following:
  - Secondary VLAN trunk port for another primary VLAN
  - PVLAN trunk for another primary VLAN
  - Promiscuous trunk port
  - Access port for a non-private VLAN
- Traffic that ingresses on a secondary VLAN trunk port (with a secondary VLAN tag) and egresses on a PVLAN trunk port retains the secondary VLAN tag on egress.
- Traffic that ingresses on a secondary VLAN trunk port and egresses on a promiscuous trunk port has the appropriate primary VLAN tag on egress.
- Traffic that ingresses on a secondary VLAN trunk port and egresses on a promiscuous access port is untagged on egress.
- Traffic that ingresses on a promiscuous trunk port with a primary VLAN tag and egresses on a secondary VLAN trunk port carries the appropriate secondary VLAN tag on egress. For example, assume that you have configured the following on a switch:
  - Primary VLAN 100
  - Community VLAN 200 as part of the primary VLAN
  - Promiscuous trunk port
  - Secondary trunk port that carries community VLAN 200

  If a packet ingresses on the promiscuous trunk port with primary VLAN tag 100 and egresses on the secondary VLAN trunk port, it carries tag 200 on egress.

Use Cases

On the same physical interface, you can configure multiple secondary VLAN trunk ports (in different primary VLANs) or combine a secondary VLAN trunk port with other types of VLAN ports. The following use cases provide examples of doing this and show how traffic would flow in each case:

- Secondary VLAN Trunks In Two Primary VLANS on page 16
- Secondary VLAN Trunk and Promiscuous Trunk on page 18
- Secondary VLAN Trunk and PVLAN Trunk on page 19

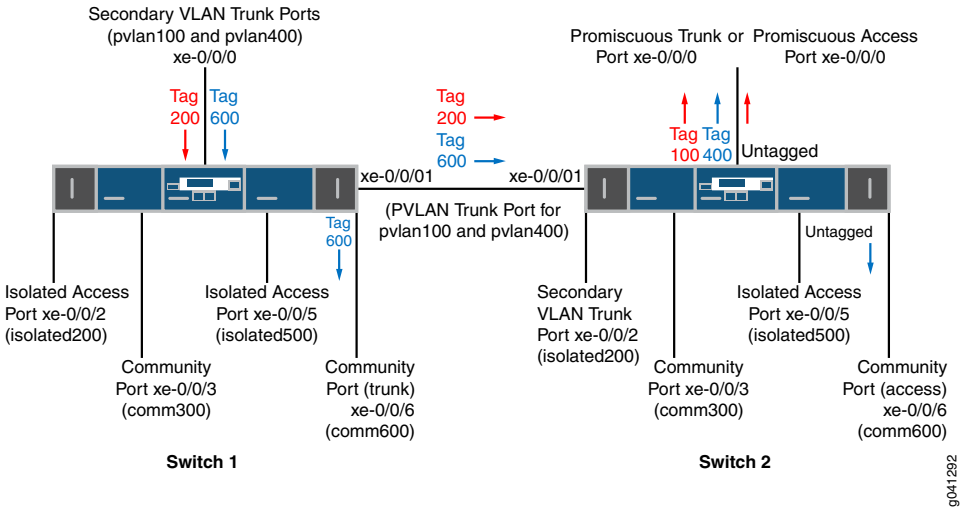
Secondary VLAN Trunks In Two Primary VLANS

For this use case, assume you have two switches with the following configuration:

- Primary VLAN pvlan100 with tag 100.
  - Isolated VLAN isolated200 with tag 200 is a member of pvlan100.
  - Community VLAN comm300 with tag 300 is a member of pvlan100.
- Primary VLAN pvlan400 with tag 400.
  - Isolated VLAN isolated500 with tag 500 is a member of pvlan400.
  - Community VLAN comm600 with tag 600 is a member of pvlan400.
- Interface xe-0/0/0 on Switch 1 connects to a VMware server (not shown) that is configured with the private VLANs used in this example. This interface is configured with secondary VLAN trunk ports to carry traffic for secondary VLAN comm600 and the isolated VLAN (tag 200) that is a member of pvlan100.
- Interface xe-0/0/0 on Switch 2 is shown configured as a promiscuous trunk port or promiscuous access port. In the latter case, you can assume that it connects to a system (not shown) that does not support trunk ports but is configured with the private VLANs used in this example.
- On Switch 1, xe-0/0/6 is a member of comm600 and is configured as a trunk port.
- On Switch 2, xe-0/0/6 is a member of comm600 and is configured as an access port.

Figure 3 on page 17 shows this topology and how traffic for isolated200 and comm600 would flow after ingressing on xe-0/0/0 on Switch 1. Note that traffic would flow only where the arrows indicate. For example, there are no arrows for interfaces xe-0/0/2, xe-0/0/3, and xe-0/0/5 on Switch 1 because no packets would egress on those interfaces.

Figure 3: Two Secondary VLAN Trunk Ports on One Interface



Here is the traffic flow for VLAN isolated200:

1. After traffic for isolated200 ingresses on the secondary VLAN trunk port on Switch 1, it egresses on the PVLAN trunk port because the PVLAN trunk port is a member of all the VLANs. The packets keep the secondary VLAN tag (200) when egressing.
2. After traffic for isolated200 ingresses on the secondary VLAN trunk port on Switch 2, it egresses on xe-0/0/0, which is configured as a promiscuous trunk port or promiscuous access port.
   - If xe-0/0/0 on Switch 2 is configured as a promiscuous trunk port, the packets egress on this port with the primary VLAN tag (100).
   - If xe-0/0/0 on Switch 2 is configured as a promiscuous access port, the packets egress on this port untagged.

Note that traffic for VLAN isolated200 does not egress on isolated access port xe-0/0/2 on Switch 1 or secondary VLAN trunk port xe-0/0/2 on Switch 2 even though these two ports are members of the same isolated VLAN.

Here is the traffic flow for VLAN comm600:

1. After traffic for comm600 ingresses on the secondary VLAN trunk port on Switch 1, it egresses on the PVLAN trunk port because the PVLAN trunk port is a member of all the VLANs. The packets keep the secondary VLAN tag (600) when egressing.
2. Traffic for comm600 also egresses on community port xe-0/0/6 on Switch 1. The traffic is tagged because the port is configured as a trunk.
3. After traffic for comm600 ingresses on the PVLAN trunk port on Switch 2, it egresses on xe-0/0/0, if this interface is configured as a promiscuous trunk port.

NOTE: If xe-0/0/0 on Switch 2 is configured as a promiscuous access port, the port can participate in only one primary VLAN. In this case, the promiscuous access port is part of pvlan100, so traffic for comm600 does not egress from it

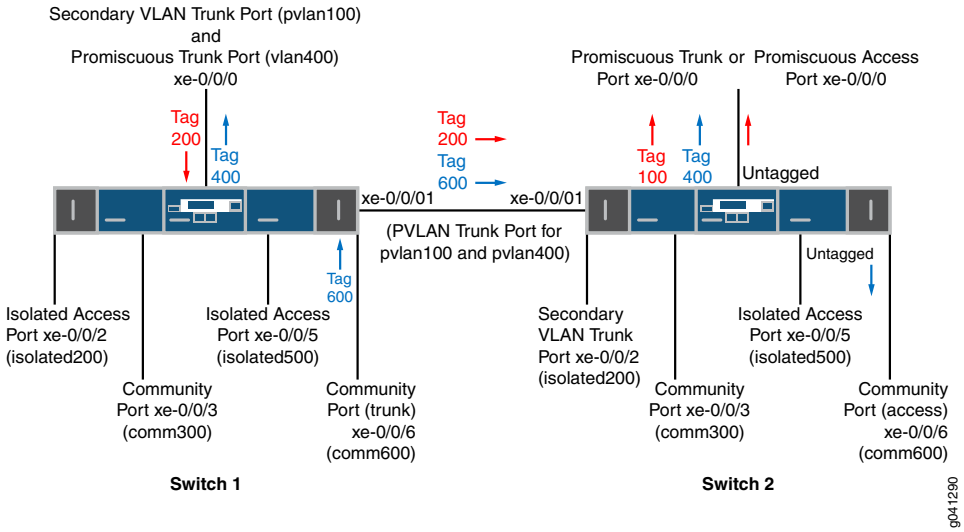
4. Traffic for comm600 also egresses on community port xe-0/0/6 on Switch 2. In this case, the traffic is untagged because the port mode is access.

Secondary VLAN Trunk and Promiscuous Trunk

For this use case, assume you have two switches configured with the same ports and VLANs as in the previous use case, with one exception: In this case, xe-0/0/0 on Switch 1 is configured as a secondary VLAN trunk port for VLAN pvlan100 and is also configured as a promiscuous trunk port for pvlan400.

Figure 4 on page 18 shows this topology and how traffic for isolated200 (member of pvlan100) and comm600 (member of pvlan400) would flow after ingressing on Switch 1.

Figure 4: Secondary VLAN Trunk and Promiscuous Trunk on One Interface



The traffic flow for VLAN isolated200 is the same as in the previous use case, but the flow for comm600 is different. Here is the traffic flow for VLAN comm600:

1. After traffic for comm600 ingresses on community VLAN port xe-0/0/6 on Switch 1, it egresses on promiscuous trunk port xe-0/0/0 on Switch 1. In this case it carries the primary VLAN tag (400).
2. Traffic for comm600 also egresses on the PVLAN trunk port because the PVLAN trunk port is a member of all the VLANs. The packets keep the secondary VLAN tag (600) when egressing.

3. After traffic for comm600 ingresses on the PVLAN trunk port on Switch 2, it egresses on xe-0/0/0, if this interface is configured as a promiscuous trunk port.

   It does not egress on xe-0/0/0 if this interface is configured as a promiscuous access port because the port can participate only in pvlan100.

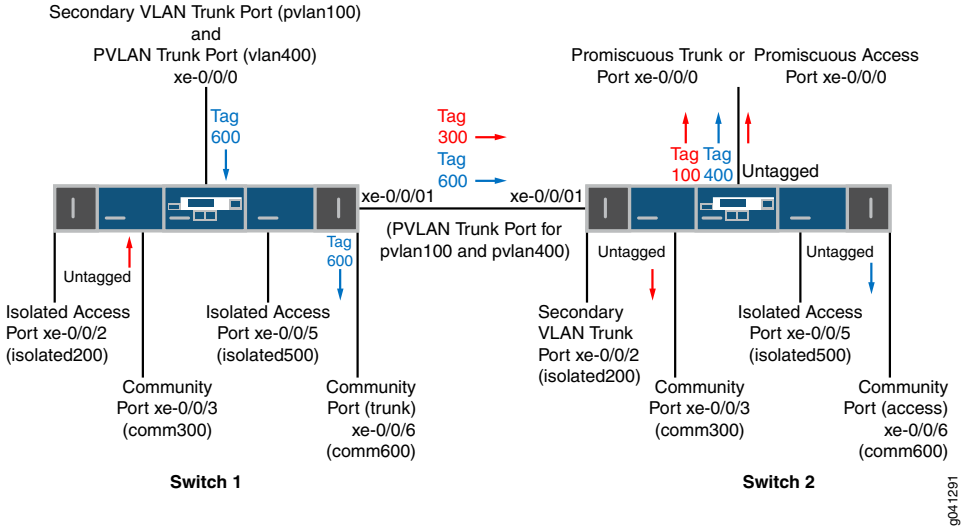
4. Traffic for comm600 also egresses on community port xe-0/0/6 on Switch 2.

Secondary VLAN Trunk and PVLAN Trunk

For this use case, assume you have two switches configured with the same ports and VLANs as in the previous use cases except that xe-0/0/0 on Switch 1 is configured as a secondary VLAN trunk port for VLAN pvlan100 and is also configured as a PVLAN trunk port for pvlan400.

Figure 5 on page 19 shows this topology and how traffic for comm300 (member of pvlan100) and comm600 (member of pvlan400) would flow after ingressing on Switch 1.

Figure 5: Secondary VLAN Trunk and PVLAN Trunk on One Interface



Here is the traffic flow for VLAN comm300:

1. After traffic for comm300 ingresses on community port xe-0/0/3 on Switch 1, it egresses on PVLAN trunk port xe-0/0/1 because that PVLAN trunk port is a member of all the VLANs. The packets keep the secondary VLAN tag (300) when egressing.

   NOTE: **Traffic for comm300 does not egress on xe-0/0/0 because the secondary VLAN trunk port on this interface carries isolated200, not comm300.**

2. After traffic for comm300 ingresses on the PVLAN trunk port on Switch 2, it egresses on xe-0/0/0, which is configured as a promiscuous trunk port or promiscuous access port.

- If xe-0/0/0 on Switch 2 is configured as a promiscuous trunk port, the packets egress on this port with the primary VLAN tag (100).
- If xe-0/0/0 on Switch 2 is configured as a promiscuous access port, the packets egress on this port untagged.

3. Traffic for comm300 also egresses on community port xe-0/0/3 on Switch 2.

Here is the traffic flow for VLAN comm600:

1. After traffic for comm600 ingresses on the PVLAN port xe-0/0/0 on Switch 1, it egresses on the community port xe-0/0/6 on Switch 1. The packets keep the secondary VLAN tag (600) when egressing because xe-0/0/6 is a trunk port.
2. Traffic for comm600 also egresses on PVLAN trunk port xe-0/0/1 because that PVLAN trunk port is a member of all the VLANs. The packets keep the secondary VLAN tag (600) when egressing.
3. After traffic for comm600 ingresses on the PVLAN trunk port on Switch 2, it egresses on xe-0/0/0, if this interface is configured as a promiscuous trunk port.

   It does not egress on xe-0/0/0 if this interface is configured as a promiscuous access port because the port can participate only in pvlan100.
4. Traffic for comm600 also egresses on community port xe-0/0/6 on Switch 2. This traffic is untagged on egress because xe-0/0/6 is an access port.

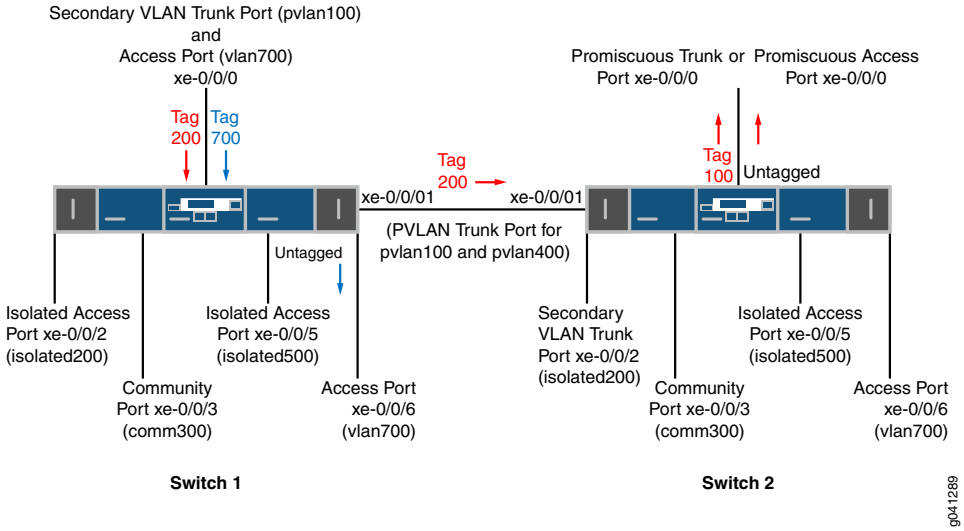
Secondary VLAN Trunk and Non-Private VLAN Interface

For this use case, assume you have two switches configured with the same ports and VLANs as in the previous use cases except for these differences:

- Configuration for xe-0/0/0 on Switch 1:
  - Secondary VLAN trunk port for VLAN pvlan100
  - Access port for vlan700
- Port xe-0/0/6 on both switches is an access port for vlan700.

Figure 6 on page 21 shows this topology and how traffic for isolated200 (member of pvlan100) and vlan700 would flow after ingressing on Switch 1.

Figure 6: Secondary VLAN Trunk and Non-Private VLAN Port on One Interface



Here is the traffic flow for VLAN isolated200:

1. After traffic for isolated200 ingresses on the secondary VLAN trunk port on Switch 1, it egresses on the PVLAN trunk port. The packets keep the secondary VLAN tag (200) when egressing.
2. After traffic for isolated200 ingresses on the PVLAN trunk port on Switch 2, it egresses on xe-0/0/0, which is configured as a promiscuous trunk port or promiscuous access port.
   - If xe-0/0/0 on Switch 2 is configured as a promiscuous trunk port, the packets egress on this port with the primary VLAN tag (100).
   - If xe-0/0/0 on Switch 2 is configured as a promiscuous access port, the packets egress on this port untagged.

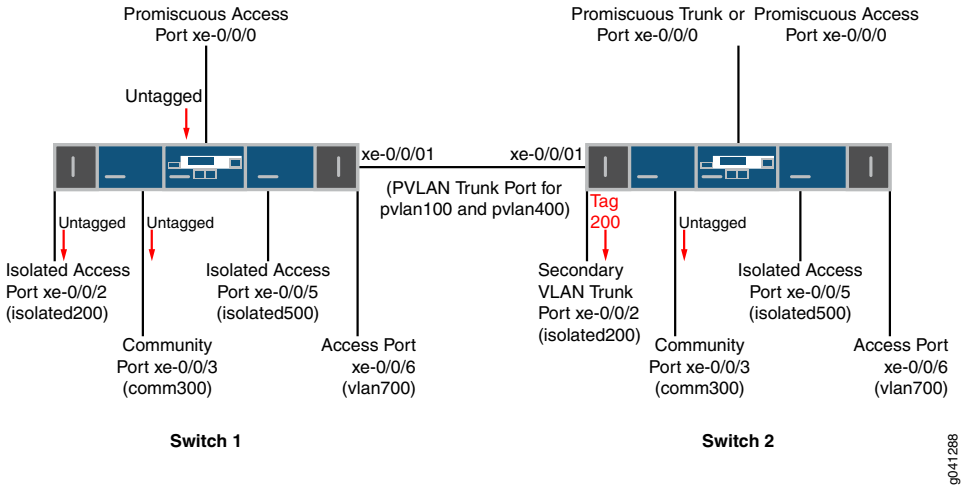
Note that traffic for VLAN isolated200 does not egress on isolated access port xe-0/0/2 on Switch 1 or secondary VLAN trunk port xe-0/0/2 on Switch 2 even though these two ports are members of the same isolated VLAN.

After traffic for vlan700 ingresses on the access port configured on xe-0/0/0 on Switch 1, it egresses on access port xe-0/0/6 because that port is a member of the same VLAN. Traffic for vlan700 is not forwarded to Switch 2 (even though xe-0/0/6 on Switch 2 is a member of vlan700) because the PVLAN trunk on xe-0/0/1 does not carry this VLAN.

Traffic Ingressing on Promiscuous Access Port

For this use case, assume you have two switches configured with the same ports and VLANs as in the previous use case except that xe-0/0/0 on Switch 1 is configured as a promiscuous access port and is a member of pvlan100. Figure 7 on page 22 shows this topology and how untagged traffic would flow after ingressing through this interface on Switch 1.

Figure 7: Traffic Ingressing on Promiscuous Access Port



As the figure shows, untagged traffic that ingresses on a promiscuous access port is forwarded to all the secondary VLAN ports that are members of the same primary VLAN that the promiscuous access port is a member of. The traffic is untagged when it egresses from access ports and tagged on egress from a trunk port (xe-0/0/2 on Switch 2).

Related Documentation

- Understanding Private VLANs on page 7
- Example: Configuring PVLANs with Secondary VLAN Trunk Ports and Promiscuous Access Ports on page 23
- Creating a Private VLAN on a Single Switch
- Creating a Private VLAN Spanning Multiple Switches
- Understanding Egress Firewall Filters with PVLANs
- Troubleshooting Private VLANs

CHAPTER 4

Configuring Private VLAN Examples

This chapter presents examples of how to configure private VLANs (PVLANs) with secondary VLAN trunk ports and promiscuous access ports and how to configure a private VLAN on a single Juniper Networks QFabric™ Series switch.

Example: Configuring PVLANs with Secondary VLAN Trunk Ports and Promiscuous Access Ports

This example shows how to configure secondary VLAN trunk ports and promiscuous access ports as part of a private VLAN configuration. Secondary VLAN trunk ports carry secondary VLAN traffic.

For a given private VLAN, a secondary VLAN trunk port can carry traffic for only one secondary VLAN. However, a secondary VLAN trunk port can carry traffic for multiple secondary VLANs as long as each secondary VLAN is a member of a different private (primary) VLAN. For example, a secondary VLAN trunk port can carry traffic for a community VLAN that is part of primary VLAN pvlan100 and also carry traffic for an isolated VLAN that is part of primary VLAN pvlan400.

To configure a trunk port to carry secondary VLAN traffic, use the isolated and **interface** statements, as shown in steps 12 and 13 of the example configuration for Switch 1.

NOTE: **When traffic egresses from a secondary VLAN trunk port, it normally carries the tag of the primary VLAN that the secondary port is a member of. If you want traffic that egresses from a secondary VLAN trunk port to retain its secondary VLAN tag, use the extend-secondary-vlan-id statement.**

A promiscuous access port carries untagged traffic and can be a member of only one primary VLAN. Traffic that ingresses on a promiscuous access port is forwarded to the ports of the secondary VLANs that are members of the primary VLAN that the promiscuous access port is a member of. This traffic carries the appropriate secondary VLAN tags when it egresses from the secondary VLAN ports if the secondary VLAN port is a trunk port.

To configure an access port to be promiscuous, use the promiscuous statement, as shown in step Figure 7 on page 22 of the example configuration for Switch 2.

If traffic ingresses on a secondary VLAN port and egresses on a promiscuous access port, the traffic is untagged on egress. If tagged traffic ingresses on a promiscuous access port, the traffic is discarded.

Requirements

This example uses the following hardware and software components:

- Two QFX devices
- Junos OS Release 12.2 or later for the QFX Series

Overview and Topology

Figure 8 on page 25 shows the topology used in this example. Switch 1 includes several primary and secondary private VLANs and also includes two secondary VLAN trunk ports configured to carry secondary VLANs that are members of primary VLANs pvlan100 and pvlan400.

Switch 2 includes the same private VLANs. The figure shows xe-0/0/0 on Switch 2 as configured with promiscuous access ports or promiscuous trunk ports. The example configuration included here configures this port as a promiscuous access port.

The figure also shows how traffic would flow after ingressing on the secondary VLAN trunk ports on Switch 1.

Figure 8: PVLAN Topology with Secondary VLAN Trunk Ports and Promiscuous Access Port

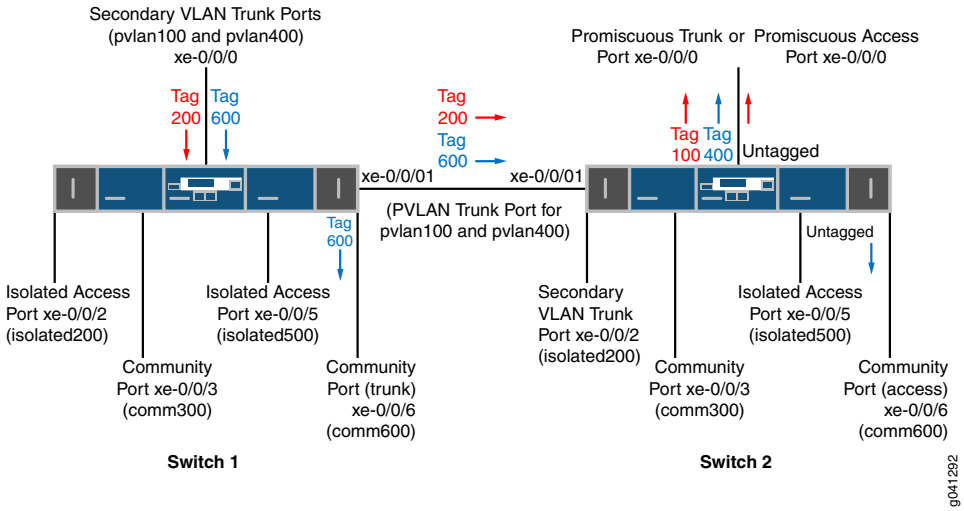


Table 3 on page 25 and Table 4 on page 26 list the settings for the example topology on both switches.

Table 3: Components of the Topology for Configuring a Secondary VLAN Trunk on Switch 1

Component	Description
pvlan100, ID 100	Primary VLAN
pvlan400, ID 400	Primary VLAN
comm300, ID 300	Community VLAN, member of pvlan100
comm600, ID 600	Community VLAN, member of pvlan400
isolation-vlan-id 200	VLAN ID for isolated VLAN, member of pvlan100
isolation–vlan-id 500	VLAN ID for isolated VLAN, member of pvlan400
xe-0/0/0.0	Secondary VLAN trunk port for primary VLANs pvlan100 and pvlan400
xe-0/0/1.0	PVLAN trunk port for primary VLANs pvlan100 and pvlan400
xe-0/0/2.0	Isolated access port for pvlan100
xe-0/0/3.0	Community access port for comm300
xe-0/0/5.0	Isolated access port for pvlan400
xe-0/0/6.0	Community trunk port for comm600

Table 4: Components of the Topology for Configuring a Secondary VLAN Trunk on Switch 2

Component	Description
pvlan100, ID 100	Primary VLAN
pvlan400, ID 400	Primary VLAN
comm300, ID 300	Community VLAN, member of pvlan100
comm600, ID 600	Community VLAN, member of pvlan400
isolation-vlan-id 200	VLAN ID for isolated VLAN, member of pvlan100
isolation–vlan-id 500	VLAN ID for isolated VLAN, member of pvlan400
xe-0/0/0.0	Promiscuous access port for primary VLANs pvlan100
xe-0/0/1.0	PVLAN trunk port for primary VLANs pvlan100 and pvlan400
xe-0/0/2.0	Secondary trunk port for isolated VLAN, member of pvlan100
xe-0/0/3.0	Community access port for comm300
xe-0/0/5.0	Isolated access port for pvlan400
xe-0/0/6.0	Community access port for comm600

Configuring the PVLANs on Switch 1

CLI Quick Configuration

To quickly create and configure the PVLANs on Switch 1, copy the following commands and paste them into a switch terminal window:

```
[edit]
set interfaces xe-0/0/0 unit 0 family ethernet-switching port-mode trunk
set interfaces xe-0/0/1 unit 0 family ethernet-switching port-mode trunk
set interfaces xe-0/0/1 unit 0 family ethernet-switching vlan members pvlan100
set interfacesxe-0/0/1 unit 0 family ethernet-switching vlan members pvlan400
set interfaces xe-0/0/2 unit 0 family ethernet-switching port-mode access
set interfaces xe-0/0/3 unit 0 family ethernet-switching port-mode access
set interfaces xe-0/0/5 unit 0 family ethernet-switching port-mode access
set interfaces xe-0/0/6 unit 0 family ethernet-switching port-mode trunk
set vlans pvlan100 vlan-id 100
set vlans pvlan400 vlan-id 400
set vlans pvlan100 pvlan
set vlans pvlan400 pvlan
set vlans pvlan100 interface xe-0/0/1.0 pvlan-trunk
set vlans pvlan400 interface xe-0/0/1.0 pvlan-trunk
set vlans comm300 vlan-id 300
set vlans comm300 primary-vlan pvlan100
set vlans comm300 interface xe-0/0/3.0
set vlans comm600 vlan-id 600
set vlans comm600 primary-vlan pvlan400
set vlans comm600 interface xe-0/0/6.0
set vlans pvlan100 pvlan isolation-vlan-id 200
```

```
set vlans pvlan400 pvlan isolation-vlan-id 500
set vlans pvlan100 interface xe-0/0/0.0 isolated
set vlans pvlan400 interface xe-0/0/0.0 isolated
set vlans comm600 interface xe-0/0/0.0
set vlans pvlan100 interface xe-0/0/2.0 isolated
set vlans pvlan400 interface xe-0/0/5.0 isolated
```

Step-by-Step Procedure

To configure the private VLANs and secondary VLAN trunk ports:

1. Configure the interfaces and port modes:

```
[edit interfaces]
user@switch# set xe-0/0/0 unit 0 family ethernet-switching port-mode trunk
user@switch# set xe-0/0/1 unit 0 family ethernet-switching port-mode trunk
user@switch# set xe-0/0/1 unit 0 family ethernet-switching vlan members pvlan100
user@switch# set xe-0/0/1 unit 0 family ethernet-switching vlan members pvlan400
user@switch# set xe-0/0/2 unit 0 family ethernet-switching port-mode access
user@switch# set xe-0/0/3 unit 0 family ethernet-switching port-mode access
user@switch# set xe-0/0/5 unit 0 family ethernet-switching port-mode access
user@switch# set xe-0/0/6 unit 0 family ethernet-switching port-mode access
```

2. Create the primary VLANs:

```
[edit vlans]
user@switch# set pvlan100 vlan-id 100
user@switch# set pvlan400 vlan-id 400
```

NOTE: Primary VLANs must always be tagged VLANs, even if they exist on only one device.

3. Configure the primary VLANs to be private:

```
[edit vlans]
user@switch# set pvlan100 pvlan
user@switch# set pvlan400 pvlan
```

4. Configure the PVLAN trunk port to carry the private VLAN traffic between the switches:

```
[edit vlans]
user@switch# set pvlan100 interface xe-0/0/1.0 pvlan-trunk
user@switch# set pvlan400 interface xe-0/0/1.0 pvlan-trunk
```

5. Create secondary VLAN comm300 with VLAN ID 300:

```
[edit vlans]
user@switch# set comm300 vlan-id 300
```

6. Configure the primary VLAN for comm300:

```
[edit vlans]
user@switch# set comm300 primary-vlan pvlan100
```

7. Configure the interface for comm300:

```
[edit vlans]
user@switch# set comm300 interface xe-0/0/3.0
```

8. Create secondary VLAN comm600 with VLAN ID 600:

```
[edit vlans]
user@switch# set comm600 vlan-id 600
```

9. Configure the primary VLAN for comm600:

```
[edit vlans]
user@switch# set comm600 primary-vlan pvlan400
```

10. Configure the interface for comm600:

```
[edit vlans]
user@switch# set comm600 interface xe-0/0/6.0
```

11. Configure the interswitch isolated VLANs:

```
[edit vlans]
user@switch# set pvlan100 pvlan isolation-vlan-id 200
user@switch# set pvlan400 pvlan isolation-vlan-id 500
```

NOTE: When you configure a secondary VLAN trunk port to carry an isolated VLAN, you must also configure an isolation-vlan-id. This is true even if the isolated VLAN exists only on one switch.

12. Enable trunk port xe-0/0/0 to carry secondary VLANs for the primary VLANs:

```
[edit vlans]
user@switch# set pvlan100 interface xe-0/0/0.0 isolated
user@switch# set pvlan400 interface xe-0/0/0.0 isolated
```

13. Configure trunk port xe-0/0/0 to carry comm600 (member of pvlan400):

```
[edit vlans]
user@switch# set comm600 interface xe-0/0/0.0
```

NOTE: You do not need to explicitly configure xe-0/0/0 to carry the isolated VLAN traffic (tags 200 and 500) because all the isolated ports in pvlan100 and pvlan400—including xe-0/0/0.0—are automatically included in the isolated VLANs created when you configured **isolation-vlan-id 200** and **isolation-vlan-id 500**.

14. Configure xe-0/0/2 and xe-0/0/6 to be isolated:

```
[edit vlans]
user@switch# set pvlan100 interface xe-0/0/2.0 isolated
user@switch# set pvlan400 interface xe-0/0/5.0 isolated
```

Check the results of the configuration on Switch 1:

```
[edit]
user@switch# show
interfaces {
   xe-0/0/0 {
      unit 0 {
         family ethernet-switching {
            port-mode trunk;
            vlan {
               members pvlan100;
               members pvlan400;
            }
         }
```

```
        }
      }
      xe-0/0/1 {
        unit 0 {
          family ethernet-switching {
            port-mode trunk;
            vlan {
              members pvlan100;
              members pvlan400;
            }
          }
        }
      }
      xe-0/0/2 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
      xe-0/0/3 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
      xe-0/0/5 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
      xe-0/0/6 {
        unit 0 {
          family ethernet-switching {
            port-mode trunk;
          }
        }
      }
    }
    vlans {
      comm300 {
        vlan-id 300;
          interface {
          xe-0/0/3.0;
        }
        primary-vlan pvlan100;
      }
      comm600 {
        vlan-id 600;
          interface {
          xe-0/0/6.0;
        }
        primary-vlan pvlan400;
```

```
    }
    pvlan100 {
      vlan-id 100;
      interface {
        xe-0/0/0.0;
        xe-0/0/2.0;
        xe-0/0/3.0;
        xe-0/0/1.0 {
          pvlan-trunk;
        }
      }
      no-local-switching;
      isolation-id 200;
    }
    pvlan400 {
      vlan-id 400;
      interface {
        xe-0/0/0.0;
        xe-0/0/5.0;
        xe-0/0/6.0;
        xe-0/0/1.0 {
          pvlan-trunk;
        }
      }
      no-local-switching;
      isolation-id 500;
    }
  }
```

Configuring the PVLANs on Switch 2

The configuration for Switch 2 is almost identical to the configuration for Switch 1. The most significant difference is that xe-0/0/0 on Switch 2 is configured as a promiscuous trunk port or a promiscuous access port, as Figure 8 on page 25 shows. In the following configuration, xe-0/0/0 is configured as a promiscuous access port for primary VLAN pvlan100.

If traffic ingresses on VLAN-enabled port and egresses on a promiscuous access port, the VLAN tags are dropped on egress and the traffic is untagged at that point. For example, traffic for comm600 ingresses on the secondary VLAN trunk port configured on xe-0/0/0.0 on Switch 1 and carries tag 600 as it is forwarded through the secondary VLAN. When it egresses from xe-0/0/0.0 on Switch 2, it will be untagged if you configure xe-0/0/0.0 as a promiscuous access port as shown in this example. If you instead configure xe-0/0/0.0 as a promiscuous trunk port (port-mode trunk), the traffic for comm600 carries its primary VLAN tag (400) when it egresses.

CLI Quick Configuration

To quickly create and configure the PVLANs on Switch 2, copy the following commands and paste them into a switch terminal window:

```
[edit]
set interfaces xe-0/0/0 unit 0 family ethernet-switching port-mode access
set interfaces xe-0/0/1 unit 0 family ethernet-switching port-mode trunk
set interfaces xe-0/0/1 unit 0 family ethernet-switching vlan members pvlan100
set interfaces xe-0/0/1 unit 0 family ethernet-switching vlan members pvlan400
set interfaces xe-0/0/2 unit 0 family ethernet-switching port-mode trunk
```

```
set interfaces xe-0/0/3 unit 0 family ethernet-switching port-mode access
set interfaces xe-0/0/5 unit 0 family ethernet-switching port-mode access
set interfaces xe-0/0/6 unit 0 family ethernet-switching port-mode access
set vlans pvlan100 vlan-id 100
set vlans pvlan400 vlan-id 400
set vlans pvlan100 pvlan
set vlans pvlan400 pvlan
set vlans pvlan100 interface xe-0/0/1.0 pvlan-trunk
set vlans pvlan400 interface xe-0/0/1.0 pvlan-trunk
set vlans comm300 vlan-id 300
set vlans comm300 primary-vlan pvlan100
set vlans comm300 interface xe-0/0/3.0
set vlans comm600 vlan-id 600
set vlans comm600 primary-vlan pvlan400
set vlans comm600 interface xe-0/0/6.0
set vlans pvlan100 pvlan isolation-vlan-id 200
set vlans pvlan400 pvlan isolation-vlan-id 500
set vlans pvlan100 interface xe-0/0/0.0 promiscuous
set vlans pvlan100 interface xe-0/0/2.0 isolated
set vlans pvlan400 interface xe-0/0/5.0 isolated
```

Step-by-Step Procedure

To configure the private VLANs and secondary VLAN trunk ports:

1. Configure the interfaces and port modes:

```
[edit interfaces]
user@switch# set xe-0/0/0 unit 0 family ethernet-switching port-mode access
user@switch# set xe-0/0/1 unit 0 family ethernet-switching port-mode trunk
user@switch# set xe-0/0/1 unit 0 family ethernet-switching vlan members pvlan100
user@switch# set xe-0/0/1 unit 0 family ethernet-switching vlan members pvlan400
user@switch# set xe-0/0/2 unit 0 family ethernet-switching port-mode trunk
user@switch# set xe-0/0/3 unit 0 family ethernet-switching port-mode access
user@switch# set xe-0/0/5 unit 0 family ethernet-switching port-mode access
user@switch# set xe-0/0/6 unit 0 family ethernet-switching port-mode access
```

2. Create the primary VLANs:

```
[edit vlans]
user@switch# set pvlan100 vlan-id 100
user@switch# set pvlan400 vlan-id 400
```

3. Configure the primary VLANs to be private:

```
[edit vlans]
user@switch# set pvlan100 pvlan
user@switch# set pvlan400 pvlan
```

4. Configure the PVLAN trunk port to carry the private VLAN traffic between the switches:

```
[edit vlans]
user@switch# set pvlan100 interface xe-0/0/1.0 pvlan-trunk
user@switch# set pvlan400 interface xe-0/0/1.0 pvlan-trunk
```

5. Create secondary VLAN comm300 with VLAN ID 300:

```
[edit vlans]
user@switch# set comm300 vlan-id 300
```

6. Configure the primary VLAN for comm300:

```
[edit vlans]
user@switch# set comm300 primary-vlan pvlan100
```

7. Configure the interface for comm300:

```
[edit vlans]
```

```
user@switch# set comm300 interface xe-0/0/3.0
```

8. Create secondary VLAN comm600 with VLAN ID 600:

```
[edit vlans]
user@switch# set comm600 vlan-id 600
```

9. Configure the primary VLAN for comm600:

```
[edit vlans]
user@switch# set comm600 primary-vlan pvlan400
```

10. Configure the interface for comm600:

```
[edit vlans]
user@switch# set comm600 interface xe-0/0/6.0
```

11. Configure the interswitch isolated VLANs:

```
[edit vlans]
user@switch# set pvlan100 pvlan isolation-vlan-id 200
user@switch# set pvlan400 pvlan isolation-vlan-id 500
```

12. Configure access port xe-0/0/0 to be promiscuous for pvlan100:

```
[edit vlans]
user@switch# set pvlan100 interface xe-0/0/0.0 promiscuous
```

NOTE: A promiscuous access port can be a member of only one primary VLAN.

13. Configure xe-0/0/2 and xe-0/0/6 to be isolated:

```
[edit vlans]
user@switch# set pvlan100 interface xe-0/0/2.0 isolated
user@switch# set pvlan400 interface xe-0/0/5.0 isolated
```

Check the results of the configuration on Switch 2:

```
[edit]
user@switch# show
interfaces {
  xe-0/0/0 {
    unit 0 {
      family ethernet-switching {
        port-mode access;
        vlan {
          members pvlan100;
        }
      }
    }
  }
    xe-0/0/1 {
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
        vlan {
          members pvlan100;
          members pvlan400;
        }
      }
```

```
        }
      }
      xe-0/0/2 {
        unit 0 {
          family ethernet-switching {
            port-mode trunk;
          }
        }
      }
      xe-0/0/3 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
      xe-0/0/5 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
      xe-0/0/6 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
    vlans {
      comm300 {
        vlan-id 300;
          interface {
          xe-0/0/3.0;
        }
        primary-vlan pvlan100;
      }
      comm600 {
        vlan-id 600;
          interface {
          xe-0/0/6.0;
        }
        primary-vlan pvlan400;
      }
      pvlan100 {
        vlan-id 100;
        interface {
          xe-0/0/0.0;
          xe-0/0/2.0;
          xe-0/0/3.0;
          xe-0/0/1.0 {
            pvlan-trunk;
          }
        }
        no-local-switching;
```

```
    isolation-id 200;
  }
  pvlan400 {
    vlan-id 400;
    interface {
      xe-0/0/5.0;
      xe-0/0/6.0;
      xe-0/0/1.0 {
        pvlan-trunk;
      }
    }
    no-local-switching;
    isolation-id 500;
  }
}
```

Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying That the Private VLAN and Secondary VLANs Were Created on page 34
- Verifying The Ethernet Switching Table Entries on page 34

Verifying That the Private VLAN and Secondary VLANs Were Created

Purpose Verify that the primary VLAN and secondary VLANs were properly created on Switch 1.

Action Use the **show vlans** command:

```
user@switch> show vlans private-vlan

Name               Role        Tag      Interfaces
pvlan100           Primary     100      xe-0/0/0.0, xe-0/0/1.0, xe-0/0/2.0,
xe-0/0/3.0
__iso_pvlan100__   Isolated    200      xe-0/0/2.0
comm300            Community   300      xe-0/0/3.0

pvlan400           Primary     400      xe-0/0/0.0, xe-0/0/1.0, xe-0/0/5.0,
xe-0/0/6.0
__iso_pvlan400__   Isolated    500      xe-0/0/5.0
comm600            Community   600     xe-0/0/6.0
```

Meaning The output shows that the private VLANs were created and identifies the interfaces and secondary VLANs associated with them.

Verifying The Ethernet Switching Table Entries

Purpose Verify that the Ethernet switching table entries were created for primary VLAN pvlan100.

Action Show the Ethernet switching table entries for pvlan100.

```
user@switch> show ethernet-switching table vlan pvlan100 private-vlan
Ethernet-switching table: 0 unicast entries
  pvlan100             *                 Flood          - All-members
  pvlan100             00:10:94:00:00:02 Learn            xe-0/0/2.0
```

```
__iso_pvlan100__     *                 Flood          - All-members
__iso_pvlan100__     00:10:94:00:00:02 Replicated      - xe-0/0/2.0
```

Related Documentation

- Understanding Secondary VLAN Trunk Ports and Promiscuous Access Ports on PVLANs on page 13
- Understanding Private VLANs on page 7
- Understanding PVLAN Traffic Flows Across Multiple Switches
- Creating a Private VLAN on a Single Switch
- Understanding Egress Firewall Filters with PVLANs
- Troubleshooting Private VLANs

Example: Configuring a Private VLAN on a Single Switch

For security reasons, it is often useful to restrict the flow of broadcast and unknown unicast traffic and even to limit the communication between known hosts. The private VLAN (PVLAN) feature allows an administrator to split a broadcast domain into multiple isolated broadcast subdomains, essentially putting a VLAN inside a VLAN.

This example describes how to create a PVLAN on a single switch:

Requirements

This example uses the following hardware and software components:

- One QFX3500 device
- Junos OS Release 12.1 or later for the QFX Series

Before you begin configuring a PVLAN, make sure you have created and configured the necessary VLANs. See Configuring VLANs.

Overview and Topology

In a large office with multiple buildings and VLANs, you might need to isolate some workgroups or other endpoints for security reasons or to partition the broadcast domain. This configuration example shows a simple topology to illustrate how to create a PVLAN with one primary VLAN and two community VLANs, one for HR and one for finance, as well as two isolated ports—one for the mail server and the other for the backup server.

Table 5 on page 36 lists the settings for the sample topology.

Table 5: Components of the Topology for Configuring a PVLAN

Interface	Description
ge-0/0/0.0	Primary VLAN (**pvlan100**) trunk interface
ge-0/0/11.0	User 1, HR Community (**hr-comm**)
ge-0/0/12.0	User 2, HR Community (**hr-comm**)
ge-0/0/13.0	User 3, Finance Community (**finance-comm**)
ge-0/0/14.0	User 4, Finance Community (**finance-comm**)
ge-0/0/15.0	Mail server, Isolated (**isolated**)
ge-0/0/16.0	Backup server, Isolated (**isolated**)
ge-1/0/0.0	Primary VLAN (**pvlan100**) trunk interface

Configuration

CLI Quick Configuration

To quickly create and configure a PVLAN, copy the following commands and paste them into the switch terminal window:

```
[edit]
set vlans pvlan100 vlan-id 100
set interfaces ge-0/0/0 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/0/0 unit 0 family ethernet-switching vlan members pvlan
set interfaces ge-1/0/0 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-1/0/0 unit 0 family ethernet-switching vlan members pvlan
set interfaces ge-0/0/11 unit 0 family ethernet-switching port-mode access
set interfaces ge-0/0/12 unit 0 family ethernet-switching port-mode access
set interfaces ge-0/0/13 unit 0 family ethernet-switching port-mode access
set interfaces ge-0/0/14 unit 0 family ethernet-switching port-mode access
set interfaces ge-0/0/15 unit 0 family ethernet-switching port-mode access
set interfaces ge-0/0/16 unit 0 family ethernet-switching port-mode access
set vlans pvlan100 pvlan
set vlans pvlan100 interface ge-0/0/0.0
set vlans pvlan100 interface ge-1/0/0.0
set vlans hr-comm interface ge-0/0/11.0
set vlans hr-comm interface ge-0/0/12.0
set vlans finance-comm interface ge-0/0/13.0
set vlans finance-comm interface ge-0/0/14.0
set vlans hr-comm primary-vlan pvlan100
set vlans finance-comm primary-vlan pvlan100
set pvlan100 interface ge-0/0/15.0 isolated
set pvlan100 interface ge-0/0/16.0 isolated
```

Step-by-Step Procedure

To configure the PVLAN:

1. Set the VLAN ID for the primary VLAN:

   ```
   [edit vlans]
   user@switch# set pvlan vlan-id 100
   ```

2. Set the interfaces and port modes:

   ```
   [edit interfaces]
   ```

```
user@switch# set ge-0/0/0 unit 0 family ethernet-switching port-mode trunk
user@switch# set ge-0/0/0 unit 0 family ethernet-switching vlan members pvlan
user@switch# set ge-1/0/0 unit 0 family ethernet-switching port-mode trunk
user@switch# set ge-1/0/0 unit 0 family ethernet-switching vlan members pvlan
user@switch# set ge-0/0/11 unit 0 family ethernet-switching port-mode access
user@switch# set ge-0/0/12 unit 0 family ethernet-switching port-mode access
user@switch# set ge-0/0/13 unit 0 family ethernet-switching port-mode access
user@switch# set ge-0/0/14 unit 0 family ethernet-switching port-mode access
user@switch# set ge-0/0/15 unit 0 family ethernet-switching port-mode access
user@switch# set ge-0/0/16 unit 0 family ethernet-switching port-mode access
```

3. Set the primary VLAN to have no local switching:

NOTE: The primary VLAN must be a tagged VLAN.

```
[edit vlans]
user@switch# set pvlan100 pvlan
```

4. Add the trunk interfaces to the primary VLAN:

```
[edit vlans]
user@switch# set pvlan100 interface ge-0/0/0.0
user@switch# set pvlan100 interface ge-1/0/0.0
```

5. For each secondary VLAN, configure access interfaces:

NOTE: We recommend that the secondary VLANs be untagged VLANs. It does not impair functioning if you tag the secondary VLANS. However, the tags are not used when a secondary VLAN is configured on a single switch.

```
[edit vlans]
user@switch# set hr-comm interface ge-0/0/11.0
user@switch# set hr-comm interface ge-0/0/12.0
user@switch# set finance-comm interface ge-0/0/13.0
user@switch# set finance-comm interface ge-0/0/14.0
```

6. For each community VLAN, set the primary VLAN:

```
[edit vlans]
user@switch# set hr-comm primary-vlan pvlan100
user@switch# set finance-comm primary-vlan pvlan100
```

7. Configure the isolated interfaces in the primary VLAN:

```
[edit vlans]
user@switch# set pvlan100 interface ge-0/0/15.0 isolated
user@switch# set pvlan100 interface ge-0/0/16.0 isolated
```

Check the results of the configuration:

```
[edit]
user@switch# show
interfaces {
  ge-0/0/0 {
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
```

```
            vlan {
              members pvlan100;
            }
          }
        }
      }
      ge-1/0/0 {
        unit 0 {
          family ethernet-switching;
        }
      }
      ge-0/0/11 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
      ge-0/0/12 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
      ge-0/0/13 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
      ge-0/0/14 {
        unit 0 {
          family ethernet-switching {
            port-mode access;
          }
        }
      }
    }
    vlans {
      finance-comm {
      interface {
        ge-0/0/13.0;
        ge-0/0/14.0;
      }
      primary-vlan pvlan100;
      }
      hr-comm {
        interface {
          ge-0/0/11.0;
          ge-0/0/12.0;
        }
        primary-vlan pvlan100;
      }
      pvlan100 {
        vlan-id 100;
```

```
    interface {
      ge-0/0/15.0;
      ge-0/0/16.0;
      ge-0/0/0.0;
      ge-1/0/0.0;
    }
    pvlan;
  }
}
```

Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying That the Private VLAN and Secondary VLANs Were Created on page 39

Verifying That the Private VLAN and Secondary VLANs Were Created

Purpose Verify that the primary VLAN and secondary VLANs were properly created on the switch.

Action Use the **show vlans** command:

```
user@switch> show vlans pvlan100 extensive
VLAN: pvlan100, Created at: Tue Sep 16 17:59:47 2008
802.1Q Tag: 100, Internal index: 18, Admin State: Enabled, Origin: Static
Private VLAN Mode: Primary
Protocol: Port Mode
Number of interfaces: Tagged 2 (Active = 0), Untagged  6 (Active = 0)
      ge-0/0/0.0, tagged, trunk
      ge-0/0/11.0, untagged, access
      ge-0/0/12.0, untagged, access
      ge-0/0/13.0, untagged, access
      ge-0/0/14.0, untagged, access
      ge-0/0/15.0, untagged, access
      ge-0/0/16.0, untagged, access
      ge-1/0/0.0, tagged, trunk
Secondary VLANs: Isolated 2, Community  2
  Isolated VLANs :
      __pvlan_pvlan_ge-0/0/15.0__
      __pvlan_pvlan_ge-0/0/16.0__
  Community VLANs :
      finance-comm
      hr-comm
```

```
user@switch> show vlans hr-comm extensive
VLAN: hr-comm, Created at: Tue Sep 16 17:59:47 2008
Internal index: 22, Admin State: Enabled, Origin: Static
Private VLAN Mode: Community, Primary VLAN: pvlan100
Protocol: Port Mode
Number of interfaces: Tagged 2 (Active = 0), Untagged  2 (Active = 0)
      ge-0/0/0.0, tagged, trunk
      ge-0/0/11.0, untagged, access
      ge-0/0/12.0, untagged, access
      ge-1/0/0.0, tagged, trunk
```

```
user@switch> show vlans finance-comm extensive
VLAN: finance-comm, Created at: Tue Sep 16 17:59:47 2008
Internal index: 21, Admin State: Enabled, Origin: Static
Private VLAN Mode: Community, Primary VLAN: pvlan100
Protocol: Port Mode
```

```
Number of interfaces: Tagged 2 (Active = 0), Untagged  2 (Active = 0)
      ge-0/0/0.0, tagged, trunk
      ge-0/0/13.0, untagged, access
      ge-0/0/14.0, untagged, access
      ge-1/0/0.0, tagged, trunk

user@switch> show vlans __pvlan_pvlan_ge-0/0/15.0__ extensive
VLAN: __pvlan_pvlan_ge-0/0/15.0__, Created at: Tue Sep 16 17:59:47 2008
Internal index: 19, Admin State: Enabled, Origin: Static
Private VLAN Mode: Isolated, Primary VLAN: pvlan100
Protocol: Port Mode
Number of interfaces: Tagged 2 (Active = 0), Untagged  1 (Active = 0)
      ge-0/0/0.0, tagged, trunk
      ge-0/0/15.0, untagged, access
      ge-1/0/0.0, tagged, trunk

user@switch> show vlans __pvlan_pvlan_ge-0/0/16.0__ extensive
VLAN: __pvlan_pvlan_ge-0/0/16.0__, Created at: Tue Sep 16 17:59:47 2008
Internal index: 20, Admin State: Enabled, Origin: Static
Private VLAN Mode: Isolated, Primary VLAN: pvlan100
Protocol: Port Mode
Number of interfaces: Tagged 2 (Active = 0), Untagged  1 (Active = 0)
      ge-0/0/0.0, tagged, trunk
      ge-0/0/16.0, untagged, access
      ge-1/0/0.0, tagged, trunk
```

Meaning The output shows that the primary VLAN was created and identifies the interfaces and secondary VLANs associated with it.

Related Documentation

- Understanding Private VLANs on page 7
- Understanding PVLAN Traffic Flows Across Multiple Switches
- Creating a Private VLAN on a Single Switch