Chapter 9

Configuring Bridged Ethernet

This chapter describes how to configure bridged Ethernet on E-series routers.

E-series routers also support bridged Ethernet on dynamic interfaces. See *Chapter 12, Configuring Dynamic Interfaces*, for details.

This chapter contains the following sections:

- Overview on page 297
- Platform Considerations on page 300
- References on page 301
- Configuring Bridged Ethernet on page 302
- Configuring VLANs over Bridged Ethernet on page 307
- Configuring S-VLANs over Bridged Ethernet on page 311
- Configuring the MTU Size for Bridged Ethernet on page 314
- Monitoring Bridged Ethernet on page 315

Overview

Bridged Ethernet allows multiple upper-layer interface types (IP and PPPoE) to be simultaneously multiplexed over the same interface. You can set up the router to either terminate interfaces and route data or to pass data transparently through the router to another terminating device. This capability supports multiple client devices that use both IP and Point-to-Point Protocol over Ethernet (PPPoE) encapsulation over an Ethernet LAN.

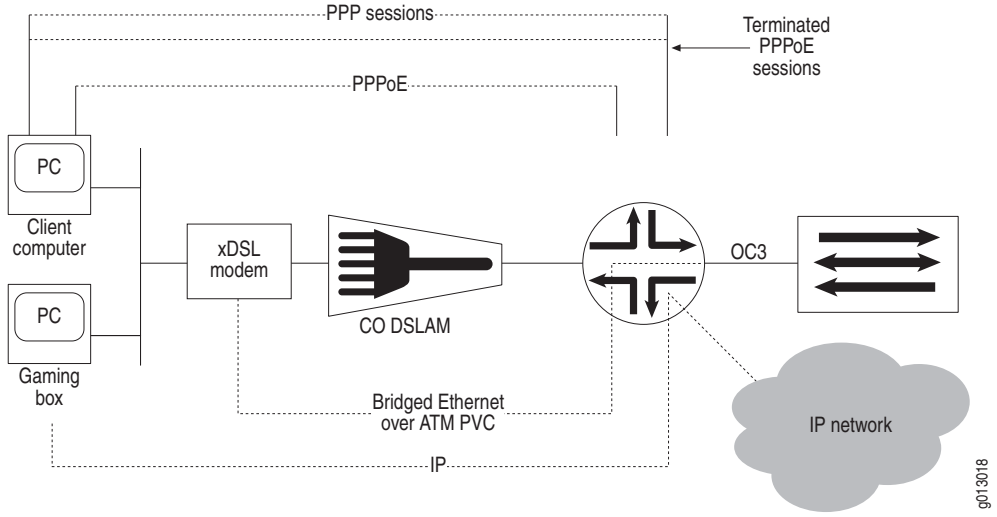
NOTE: Although connection-based forwarding is *not* supported on any E-series router, as an alternative, you can configure a local cross-connect, which uses layer 2 services over MPLS to transmit data between two layer 2 interfaces that reside on the same E-series router. Configuration of local cross-connects is supported on all E-series routers. For more information about configuring local cross-connects, see *JUNOSe BGP and MPLS Configuration Guide, Chapter 5, Configuring Layer 2 Services over MPLS*.

Bridged Ethernet Application

Figure 14 shows an example of a client computer using IP/PPP/PPPoE and an Internet gaming system running IP, connecting to the E-series router over the same ATM PVC. The client computer and gaming system can connect to an E-series router via an xDSL modem over a single ATM PVC, and the router can forward these two data streams independently. When the router receives the two data streams, it uses the Ethertype contained in the bridged Ethernet header to select which upper interface (IP or PPPoE) receives the frame.

In Figure 14, IP and PPPoE interfaces are configured so that the non-PPPoE IP traffic is received by the IP interface, and the IP/PPP/PPPoE traffic is received by the PPPoE interface. Since the router receives these data streams on different IP interfaces, they may be routed independently.

Figure 14: Bridged Ethernet Topology, Router Terminating and Routing Traffic



Assigning MAC Addresses

When you create a bridged Ethernet interface, the system media access control (MAC) address is assigned to the interface by default. However, you can assign a specific MAC address to each statically configured bridged Ethernet interface. For example, if multiple statically configured bridged Ethernet interfaces are connected to the same device, using specific MAC addresses enables the connected device to select the correct ATM port or VC to use.

You configure a specific MAC address when you create the bridged Ethernet interface. If you want to modify an existing MAC address, you must remove the interface and create it again. Also, you cannot configure multicast MAC addresses on bridged Ethernet interfaces.

VLAN and S-VLAN Configurations

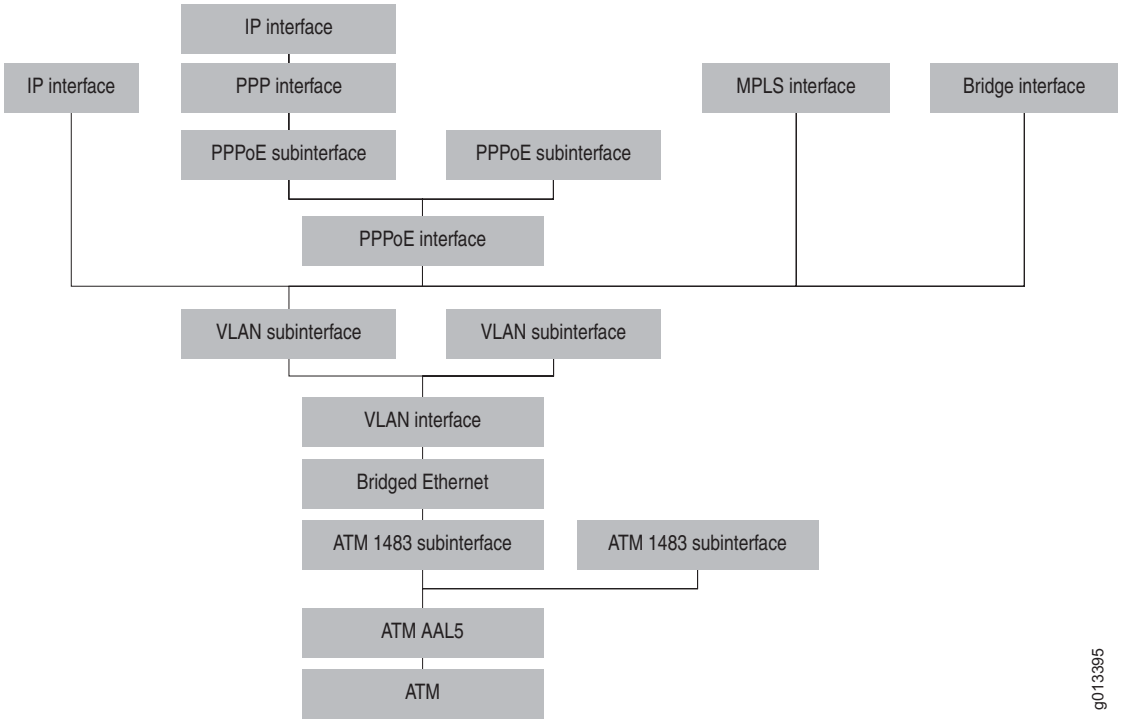
Bridged Ethernet interfaces on E-series routers support the configuration of virtual local area networks (VLANs) and stacked virtual local area networks (S-VLANs). A VLAN permits multiplexing multiple higher-level protocols over a single physical port. An S-VLAN provides a two-level VLAN tag structure, which extends the VLAN ID space to more than 16 million VLAN tags.

Specifically, you can statically configure the following higher-level protocols over a VLAN or an S-VLAN subinterface that is stacked above a bridged Ethernet interface:

- IP
- MPLS
- PPPoE
- Transparent bridging

Figure 15 illustrates the interface stacking supported on E-series routers for VLANs over bridged Ethernet.

Figure 15: Interface Stacking for VLANs over Bridged Ethernet



VLANs and S-VLANs configured over bridged Ethernet interfaces provide the same basic capabilities as VLANs and S-VLANs configured over Ethernet interfaces, with the following exception:

- S-VLAN oversubscription is not supported on bridged Ethernet interfaces.

After you configure the bridged Ethernet interface, you configure the VLANs, S-VLANs, and the supported higher-level protocols in the same way that you configure them over Ethernet interfaces.

For more information, see:

- *JUNOSe Physical Layer Configuration Guide, Chapter 5, Configuring Ethernet Interfaces* for introductory information about VLANs and S-VLANs.
- *Configuring VLANs over Bridged Ethernet* on page 307 and *Configuring S-VLANs over Bridged Ethernet* on page 311 for examples that illustrate VLAN and S-VLAN configurations over bridged Ethernet.

Platform Considerations

You can configure bridged Ethernet on the following E-series routers:

- E120 router
- E320 router
- ERX-1440 router
- ERX-1410 router
- ERX-710 router
- ERX-705 router
- ERX-310 router

Module Requirements

For information about the modules that support bridged Ethernet on ERX-14xx models, ERX-7xx models, and the ERX-310 router:

- See *ERX Module Guide, Table 1, Module Combinations* for detailed module specifications.
- See *ERX Module Guide, Appendix A, Module Protocol Support* for information about the modules that support bridged Ethernet.

For information about the modules that support bridged Ethernet on the E120 router and the E320 router:

- See *E120 and E320 Module Guide, Table 1, Modules and IOAs* for detailed module specifications.
- See *E120 and E320 Module Guide, Appendix A, IOA Protocol Support* for information about the modules that support bridged Ethernet.

Interface Specifiers

The configuration task examples in this chapter use the *slot*/*port*[.*subinterface*] format to specify the ATM physical interface on which you want to configure bridged Ethernet. However, the interface specifier format that you use depends on the router that you are using.

For ERX-7xx models, ERX-14xx models, and ERX-310 routers, use the *slot*/*port*[.*subinterface*] format. For example, the following command specifies ATM 1483 subinterface 10 on slot 0, port 1 of an ERX-7xx model, ERX-14xx model, or ERX-310 router.

```
host1(config)#interface atm 0/1.10
```

For E120 and E320 routers, use the *slot*/*adapter*/*port*[.*subinterface*] format, which includes an identifier for the bay in which the I/O adapter (IOA) resides. In the software, adapter 0 identifies the right IOA bay (E120 router) and the upper IOA bay (E320 router); adapter 1 identifies the left IOA bay (E120 router) and the lower IOA bay (E320 router). For example, the following command specifies ATM 1483 subinterface 20 on slot 5, adapter 0, port 0 of an E320 router.

```
host1(config)#interface atm 5/0/0.20
```

For more information about supported interface types and specifiers on E-series routers, see *Interface Types and Specifiers* in *JUNOSe Command Reference Guide, About This Guide*.

References

For more information about bridged Ethernet, consult the following resources:

- RFC 826—An Ethernet Address Resolution Protocol (November 1982)
- RFC 2684—Multiprotocol Encapsulation over ATM Adaptation Layer 5 (September 1999)

Configuring Bridged Ethernet

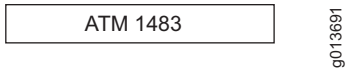
This section shows how to configure IP with PPPoE terminated at the E-series router. With each step, an illustration shows how the router is building the interface columns.

Configuring IP with PPPoE Terminated at the Router

This section shows how to create IP with PPPoE interfaces that terminate the connection and route the data received on the PVC, as shown in the example in Figure 14 on page 298. To create a terminated PVC:

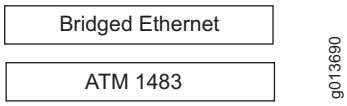
1. Create an ATM 1483 subinterface and associated PVC.

   host1(config)#**interface atm 9/1.1 point-to-point**
   host1(config-subif)#**atm pvc 1 0 32 aal5snap 0 0 0**

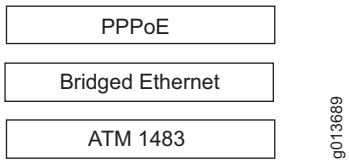
2. Encapsulate the ATM 1483 subinterface with bridged Ethernet. The use of the **encapsulation** keyword implies that the bridged Ethernet interface is the only interface stacked directly above the ATM 1483 subinterface. As a result, the bridged Ethernet interface cannot have a peer interface stacked above the same lower-layer interface.

   host1(config-subif)#**encapsulation bridge1483**

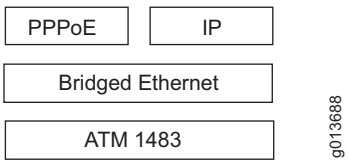
3. Create a PPPoE major interface over the bridged Ethernet interface. This command does not use the **encapsulation** keyword.

   host1(config-subif)#**pppoe**

4. Create an IP interface over the bridged Ethernet interface as a peer to the PPPoE interface.

   host1(config-subif)#**ip address 160.1.0.1 255.255.255.0**

5. (Optional) Set up the router to validate MAC addresses on the IP interface.

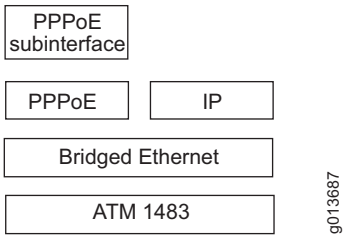
   host1(config-subif)#**ip mac-validate strict**

6. Exit the subinterface context.

   host1(config-subif)#**exit**

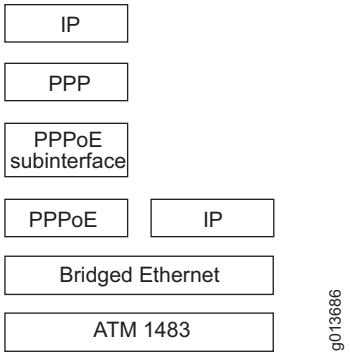
7. Create a PPPoE subinterface over the major interface.

   host1(config)#**pppoe subinterface atm 9/1.1.1**



8. Configure PPP encapsulation over the PPPoE subinterface, and the IP interface over the PPP interface.

   host1(config-subif)#**encapsulation ppp**
   host1(config-subif)#**ip address 160.1.1.1 255.255.255.0**



atm pvc

- Use to configure a PVC on an ATM interface. Specify one of the following encapsulation types:
  - **aal5snap**—Specifies a logical link control (LLC) encapsulated circuit; LLC/Subnetwork Access Protocol (LLC/SNAP) header precedes the protocol datagram.
  - **aal5mux ip**—Specifies a VC multiplexed circuit. This option is used for IP only.
- Example

  host1(config-subif)#**atm pvc 1 0 32 aal5snap 0 0 0**

- Use the **no** version to remove the specified PVC.

encapsulation bridge1483

- Use to configure bridged Ethernet as the encapsulation method on an interface, and to optionally assign the MAC address to the interface.
- Use the **mac-address** keyword to configure a specific MAC address for the interface. Otherwise, the system MAC address is used. The same MAC address can be used on multiple interfaces.
- If the MAC address is configured, you must use the same MAC address whenever you reenter the **encapsulation bridge1483** command for the interface.
- The MAC address can be configured only when the interface is created. To change a MAC address, you must remove the interface and create it again.
- Example

  host1(config-subif)#**encapsulation bridge1483 mac-address 0090.1a01.1234**

- Use the **no** version, without the MAC address, to remove bridged Ethernet as the encapsulation method on the interface.

encapsulation ppp

- Use to configure PPP as the encapsulation method for an interface.
- Example

  host1(config-subif)#**encapsulation ppp**

- Use the **no** version to remove PPP as the encapsulation method on the interface.

interface atm

- Use to configure an ATM interface or subinterface type.
- To specify an ATM interface for ERX-7xx models, ERX-14xx models, and ERX-310 routers, use the *slot*/*port*.[*subinterface*] format.
  - *slot*—Number of the chassis slot
  - *port*—Port number on the I/O module
  - *subinterface*—Number of the subinterface in the range 1–2147483647
- To specify an ATM interface for E120 and E320 routers, use the *slot*/*adapter*/*port*[.*subinterface*] format.
  - *slot*—Number of the chassis slot
  - *adapter*—Identifier for the IOA within the E320 chassis, either 0 or 1, where:
    - 0 indicates that the IOA is installed in the right IOA bay (E120 router) or the upper IOA bay (E320 router).
    - 1 indicates that the IOA is installed in the left IOA bay (E120 router) or the lower IOA bay (E320 router).
  - *port*—Port number on the IOA
  - *subinterface*—Number of the subinterface in the range 1–2147483647

- For more information, see *Creating a Basic Configuration* in *Chapter 1, Configuring ATM*.
- Examples

  host1(config)#**interface atm 9/1.1 point-to-point**
  host1(config)#**interface atm 5/0/1.1 point-to-point**

- Use the **no** version to remove the interface or subinterface.

ip address

- Use to set an IP address for the interface.
- Note that you cannot add more than one IP address to bridged Ethernet interfaces.
- Example

  host1(config-subif)#**ip address 160.1.0.1 255.255.255.0**

- Use the **no** version to remove the IP address.

ip mac-validate

- Use to enable or disable MAC address validation on a per interface basis.
- When MAC address validation is enabled, the router checks the entry in the MAC validation table that corresponds to the IP source address of an incoming packet. The MAC source address of the packet must match the MAC source address of the table entry for the router to forward the packet.
- Use the **strict** keyword to prevent transmission of IP packets that do not reside in the validation table.
- Use the **loose** keyword to allow IP packets to pass through even though the packets do not have entries in the validation table. Only packets that have matching IP–MAC pair entries in the table are validated.
- The default behavior is not to perform MAC address validation.
- Example

  host1(config-subif)#**ip mac-validate strict**

- Use the **no** version to disable the command.

NOTE: For more information, see *MAC Address Validation* in *JUNOSe IP, IPv6, and IGP Configuration Guide, Chapter 1, Configuring IP*.

pppoe

- Use to create a PPPoE major interface.
- Example

  host1(config-subif)#**pppoe**

- Use the **no** version to remove the PPPoE major interface.

pppoe subinterface atm

- Use to create a PPPoE subinterface on an ATM interface.
- On ERX-7xx models, ERX-14xx models, and the ERX-310 router, use the *slot/port.atmSubinterface.pppoeSubinterface* format.
- On the E120 and E320 routers, use the *slot/adapter/port.atmSubinterface.pppoeSubinterface* format.
- Examples

  host1(config)#**pppoe subinterface atm 9/1.1.1**
  host1(config)#**pppoe subinterface atm 5/0/1.1.1**

- Use the **no** version to remove the PPPoE subinterface.

Alternative Configuration

In previous releases, you could configure a PPPoE major interface directly over ATM 1483 only. The router still supports this stacking and configuration method for PPPoE. Although the older and newer interface stacks are different, they behave the same in terms of frame encapsulation and handling. As a result, an interface created using the older stacking will interoperate with an interface using the new stacking. Note, however, that the previous command syntax (**encapsulation pppoe**) cannot be used when a bridged Ethernet interface already exists, because it is intended to produce the old stacking for PPPoE over ATM 1483.

1. Create the ATM 1483 subinterface and associated PVC:

   host1(config)#**interface atm 9/1.1 point-to-point**
   host1(config-subif)#**atm pvc 1 0 32 aal5snap 0 0 0**

2. Create a PPPoE major interface over the ATM 1483 subinterface. Note that since this command uses the **encapsulation** keyword, it will fail if a bridged Ethernet interface was already created over the ATM 1483 subinterface using the new syntax.

   host1(config-subif)#**encapsulation pppoe**

3. Create a PPPoE subinterface over the major interface. Because PPPoE is the only top layer protocol in the stack, there is no need to use **pppoe** to identify the subinterface type (it is implied).

   host1(config)#**interface atm 9/1.1.1**

4. Configure the PPP encapsulation over the PPPoE subinterface, and the IP interface over the PPP interface.

   host1(config-subif)#**encapsulation ppp**
   host1(config-subif)#**ip address 160.1.1.1 255.255.255.0**

Configuring VLANs over Bridged Ethernet

This section describes how to create the following common static VLAN over bridged Ethernet configurations:

- IP over VLAN over bridged Ethernet
- PPPoE over VLAN over bridged Ethernet
- MPLS over VLAN over bridged Ethernet

You can also configure transparent bridging over VLANs over bridged Ethernet. For information about configuring transparent bridging, see *Chapter 10, Configuring Transparent Bridging*.

Configuring VLANs over bridged Ethernet interfaces consists of two basic tasks:

1. Configure the layers up to and including the VLAN subinterface. The steps for this task are common to all configurations.
2. Configure the higher-level protocols above the VLAN subinterface.

The following sections describe how to configure VLANs over bridged Ethernet. For more information about the commands used in these procedures, see the command descriptions listed in alphabetical order at the end of *Configuring Higher-Level Protocols over VLANs* on page 308.

NOTE: Before you can remove a VLAN subinterface, you must remove the upper-layer interface stack.

NOTE: For more information about specifying ATM interfaces and subinterfaces, see *Interface Types and Specifiers* in *JUNOSe Command Reference Guide, About This Guide*.

Configuring VLAN Subinterfaces over Bridged Ethernet

To configure a VLAN subinterface over bridged Ethernet:

1. Create an ATM 1483 subinterface and associated PVC.

   ```
   host1(config)#interface atm 4/0.101
   host1(config-subif)#atm pvc 1 0 32 aal5snap 0 0 0
   ```

2. Specify bridged Ethernet as the encapsulation method for the ATM 1483 subinterface.

   ```
   host1(config-subif)#encapsulation bridge1483
   ```

3. Create a VLAN major interface by specifying VLAN as the encapsulation method for the bridged Ethernet interface.

   ```
   host1(config-subif)#encapsulation vlan
   ```

4. Create a VLAN subinterface to carry the higher-level protocols by adding a subinterface number to the interface identification command.

   host1(config-subif)#**interface atm 4/0.101.1**

5. Assign a VLAN ID for the subinterface.

   host1(config-subif)#**vlan id 10**

6. (Optional) Configure additional VLAN subinterfaces by repeating Steps 4 and 5, using unique values.

   host1(config-subif)#**interface atm 4/0.101.2**
   host1(config-subif)#**vlan id 11**

Proceed to the next section for instructions on configuring higher-level protocols over the VLAN subinterfaces.

Configuring Higher-Level Protocols over VLANs

This section provides examples for configuring IP, PPPoE, and MPLS interfaces over VLAN subinterfaces configured on bridged Ethernet. These procedures assume that you have already configured one or more VLAN subinterfaces over the bridged Ethernet interface to carry the higher-level protocols.

Configuring IP over VLAN

To configure IP over VLAN over a bridged Ethernet interface:

1. Follow the steps in *Configuring VLAN Subinterfaces over Bridged Ethernet* on page 307 to configure the VLAN subinterface.

2. Assign an IP address and mask to the VLAN subinterface.

   host1(config-subif)#**ip address 10.1.1.1 255.255.255.0**

Configuring PPPoE over VLAN

To configure PPPoE over VLAN over a bridged Ethernet interface:

1. Follow the steps in *Configuring VLAN Subinterfaces over Bridged Ethernet* on page 307 to configure the VLAN subinterface.

2. Create a PPPoE major interface on the VLAN subinterface.

   host1(config-subif)#**pppoe**

3. Exit the subinterface context.

   host1(config-subif)#**exit**

4. Create a PPPoE subinterface by adding a subinterface number to the interface identification command.

   host1(config)#**pppoe subinterface atm 4/0.101.2.1**

5. Specify PPP as the encapsulation method on the interface.

   host1(config-subif)#**encapsulation ppp**

6. Assign an IP address and mask to the interface.

   host1(config-subif)#**ip address 10.1.1.2 255.255.255.0**

Configuring MPLS over VLAN

To configure MPLS over VLAN over a bridged Ethernet interface:

1. Follow the steps in *Configuring VLAN Subinterfaces over Bridged Ethernet* on page 307 to configure the VLAN subinterface.

2. Enable MPLS on the VLAN subinterface.

   host1(config-subif)#**mpls**

atm pvc

- Use to configure a PVC on an ATM interface. Specify one of the following encapsulation types:
  - **aal5snap**—Specifies a logical link control (LLC) encapsulated circuit; LLC/Subnetwork Access Protocol (LLC/SNAP) header precedes the protocol datagram.
  - **aal5mux ip**—Specifies a VC multiplexed circuit. This option is used for IP only.
- Example

  host1(config-subif)#**atm pvc 1 5 50 aal5snap 0 0 0**

- Use the **no** version to remove the specified PVC.

encapsulation bridge1483

- Use to configure bridged Ethernet as the encapsulation method on an ATM 1483 subinterface.
- Example

  host1(config-subif)#**encapsulation bridge1483**

- Use the **no** version to remove bridged Ethernet as the encapsulation method on the interface.

encapsulation ppp

- Use to configure PPP as the encapsulation method on an interface.
- Example

  host1(config-subif)#**encapsulation ppp**

- Use the **no** version to remove PPP as the encapsulation method on the interface.

encapsulation vlan

- Use to configure VLAN as the encapsulation method on an interface.
- Example

  host1(config-subif)#**encapsulation vlan**

- Use the **no** version to remove VLAN as the encapsulation method on the interface.

interface atm

- Use to configure an ATM interface, ATM 1483 subinterface, or VLAN subinterface.
- On ERX-7xx models, ERX-14xx models, and the ERX-310 router, use the *slot/port.subinterface.vlanSubinterface* format.
- On E120 and E320 routers, use the *slot/adapter/port.subinterface.vlanSubinterface* format.
- For more information, see *Creating a Basic Configuration* in *Chapter 1, Configuring ATM*.
- Example 1—Configures a VLAN subinterface over bridged Ethernet on ERX-7xx models, ERX-14xx models, and the ERX-310 router

  host1(config)#**interface atm 4/2.2 point-to-point**
  host1(config-subif)#**interface atm 4/2.2.3**

- Example 2—Configures a VLAN subinterface over bridged Ethernet on the E320 router

  host1(config)#**interface atm 4/0/2.2 point-to-point**
  host1(config-subif)#**interface atm 4/0/2.2.3**

- Use the **no** version to remove the interface or subinterface.

ip address

- Use to set an IP address for the interface.
- Note that you cannot add more than one IP address to bridged Ethernet interfaces.
- Example

  host1(config-subif)#**ip address 10.1.2.3 255.255.255.255**

- Use the **no** version to remove the IP address.

mpls

- Use to enable, disable, or delete MPLS on an interface. MPLS is disabled by default.
- Example

  host1(config)#**mpls**

- Use the **no** version to halt MPLS on the interface and delete the MPLS interface configuration.

pppoe

- Use to create a PPPoE major interface.
- Example

  host1(config-subif)#**pppoe**

- Use the **no** version to remove the PPPoE major interface.

pppoe subinterface atm

- Use to create a PPPoE subinterface over a VLAN subinterface configured on a bridged Ethernet interface.
- On ERX-7xx models, ERX-14xx models, and the ERX-310 router, use the *slot/port.atmSubinterface.vlanSubinterface.pppoeSubinterface* format.
- On E120 and E320 routers, use the *slot/adapter/port.atmSubinterface.vlanSubinterface.pppoeSubinterface* format.
- Examples

  host1(config)#**pppoe subinterface atm 4/0.1.2.1**
  host1(config)#**pppoe subinterface atm 4/1/0.1.2.1**

- Use the **no** version to remove the PPPoE subinterface.

vlan id

- Use to specify the VLAN ID.
- Use a VLAN ID that is in the range 0–4095 and is unique within the interface.
- Issue the **vlan id** command before any upper bindings are made, such as IP or PPPoE.
- Use the optional keyword **untagged** to specify that frames be sent untagged. The keyword is valid only for VLAN ID 0. It allows tagged frames to be received, but sends out untagged frames.
- Example

  host1(config-subif)#**vlan id 400**

- There is no **no** version.

Configuring S-VLANs over Bridged Ethernet

S-VLANs over bridged Ethernet support the same set of higher-level protocols as VLANs over bridged Ethernet. You configure S-VLANs over bridged Ethernet in the same way that you configure VLANs over bridged Ethernet, with the addition of certain commands.

Like VLANs, configuring S-VLANs over bridged Ethernet interfaces consists of two basic tasks:

1. Configure the layers up to and including the S-VLAN subinterface.
2. Configure the higher-level protocols above the S-VLAN subinterface.

Before you can remove an S-VLAN subinterface, you must remove the upper-layer interface stack.

NOTE: S-VLAN oversubscription is not supported on bridged Ethernet interfaces.

NOTE: For more information about specifying ATM interfaces and subinterfaces, see *Interface Types and Specifiers* in *JUNOSe Command Reference Guide, About This Guide*.

Configuring S-VLAN Subinterfaces over Bridged Ethernet

To configure an S-VLAN subinterface over bridged Ethernet:

1. Create an ATM 1483 subinterface and associated PVC.

   host1(config)#**interface atm 3/1.1**
   host1(config-subif)#**atm pvc 1 5 33 aal5snap 0 0 0**

2. Specify bridged Ethernet as the encapsulation method for the ATM 1483 subinterface.

   host1(config-subif)#**encapsulation bridge1483**

3. Create a VLAN major interface by specifying VLAN as the encapsulation method for the bridged Ethernet interface.

   host1(config-subif)#**encapsulation vlan**

4. Create a VLAN subinterface to carry the higher-level protocols by adding a subinterface number to the interface identification command.

   host1(config-subif)#**interface atm 3/1.1.1**

5. Assign an S-VLAN ID and a VLAN ID for the subinterface.

   host1(config-subif)#**svlan id 4 255**

6. Assign an S-VLAN Ethertype.

   host1(config-subif)#**svlan ethertype 9200**

Proceed to *Configuring Higher-Level Protocols over S-VLANs* on page 313 for information about configuring higher-level protocols over the S-VLAN subinterfaces.

svlan ethertype

- Use to assign an Ethertype value for the S-VLAN subinterface.
- Choose one of the following Ethertype values:
  - 8100—Specifies Ethertype value 0x8100, as defined in IEEE Standard 802.1q
  - 9100—Specifies Ethertype value 0x9100, which is the default
  - 9200—Specifies Ethertype value 0x9200

- Use an Ethertype value that matches the Ethertype value set on the customer premises equipment (CPE) to which your router connects.
- Example

  host1(config-if)#**svlan ethertype 8100**

- Use the **no** version to restore the default value, 9100.

svlan id

- Use to assign S-VLAN IDs and VLAN IDs to VLAN subinterfaces.
- Use S-VLAN ID and VLAN ID numbers that are in the range 0–4095 and that are unique within the Ethernet interface.
- Issue the **svlan id** command before any upper bindings are made, such as IP or PPPoE.
- Example

  host1(config-if)#**svlan id 4 255**

- There is no **no** version.

Configuring Higher-Level Protocols over S-VLANs

The procedures for configuring IP, PPPoE, and MPLS protocols over S-VLANs on bridged Ethernet interfaces are identical to the procedures for configuring these protocols over VLANs on bridged Ethernet interfaces.

This section provides an example for configuring PPPoE interfaces over S-VLAN subinterfaces configured on bridged Ethernet. For descriptions of the commands used in this procedure, see *Configuring Higher-Level Protocols over VLANs* on page 308.

To configure PPPoE over S-VLAN over a bridged Ethernet interface:

1. Follow the steps in *Configuring S-VLAN Subinterfaces over Bridged Ethernet* on page 312 to configure the S-VLAN subinterface.
2. Create a PPPoE major interface on the S-VLAN subinterface.

   host1(config-subif)#**pppoe**

3. Exit the subinterface context.

   host1(config-subif)#**exit**

4. Create a PPPoE subinterface by adding a subinterface number to the interface identification command.

   host1(config)#**pppoe subinterface atm 3/1.1.1.1**

5. Specify PPP as the encapsulation method on the interface.

   host1(config-subif)#**encapsulation ppp**

6. Assign an IP address and mask to the interface.

   host1(config-subif)#**ip address 10.1.2.3 255.255.255.255**

Configuring the MTU Size for Bridged Ethernet

You can use the **bridge1483 mtu** command to configure a nondefault maximum transmission unit (MTU) size, in bytes, for a bridged Ethernet interface. The default MTU size for a bridged Ethernet interface is 1518 bytes.

Because you configure a bridged Ethernet interface over an ATM 1483 subinterface, the MTU size set with the **bridge1483 mtu** command is limited by the MTU set for the underlying ATM 1483 subinterface. As a result, the **bridge1483 mtu** command requires you to configure an MTU size for the bridged Ethernet interface that does not exceed the maximum allowable MTU size for the underlying ATM 1483 subinterface, 9180 bytes.

The configured MTU size for an interface is referred to as its *administrative MTU*, and the MTU size at which the interface actually operates is referred to as its *operational MTU*. For bridged Ethernet interfaces, the operational MTU is the lesser of the following two values:

- The administrative MTU of the bridged Ethernet interface
- The administrative MTU of the underlying ATM 1483 subinterface

You can also use the **bridge1483 mtu** command in a profile to configure a nondefault MTU size for a dynamic bridged Ethernet interface. For information, see *Configuring a Dynamic Interface from a Profile* in *Chapter 12, Configuring Dynamic Interfaces*.

bridge1483 mtu

- Use to set the maximum allowable size, in bytes, of the MTU for bridged Ethernet interfaces.
- Specify an MTU size in the range 64–9180 bytes.
- Example

  host1(config-subif)#**bridge1483 mtu 1684**

- Use the **no** version to restore the default MTU size for bridged Ethernet interfaces, 1518 bytes.

Monitoring Bridged Ethernet

You can:

- Display information about bridged Ethernet interfaces by using the **show bridge1483 interface** command.
- Monitor MAC address validation by using the **show ip mac-validate interface** command.
- Display information about VLANs configured on bridged Ethernet interfaces by using the **show vlan subinterface** command.

Bridged Ethernet interfaces are not bound to a specific virtual router (VR).

NOTE: The E120 router and E320 router output for **monitor** and **show** commands is identical to output from other E-series routers, except that the E120 and E320 router output also includes information about the adapter identifier in the interface specifier (*slot*/*adapter*/*port*).

show bridge1483 interface

- Use to display configuration and status information for all bridged Ethernet interfaces currently configured on the router.
- Use the **atm** keyword and an interface specifier to display information for a bridged Ethernet interface that is stacked over an ATM subinterface.
- Use the **summary** keyword to display only a count of all bridged Ethernet interfaces configured on the router.
- Field descriptions
  - Interface—Type and specifier of the lower-layer interface on which bridged Ethernet is configured
  - Status—Status of the bridged Ethernet interface: up, down, lowerLayerDown, notPresent
  - MAC Address—MAC address assigned to the bridged Ethernet interface, if configured
  - Type—Type of interface: static or dynamic
  - Oper/Admin MTU—Operational MTU, which is the MTU at which the interface actually operates, and administrative MTU, which is the MTU configured for the interface; the administrative MTU displays 1518 (the default value) if not configured
  - In—Analysis of inbound traffic on this interface
    - Bytes—Number of bytes received in error-free packets
    - Packets—Number of packets received
    - Multicast—Number of multicast packets received
    - Broadcast—Number of broadcast packets received

        - Errors—Total number of errors in all received packets; some packets might contain more than one error
        - Discards—Total number of discarded incoming packets
    - Out—Analysis of outbound traffic on this interface
        - Bytes—Number of bytes sent
        - Packets—Number of packets sent
        - Multicast—Number of multicast packets sent
        - Broadcast—Number of broadcast packets sent
        - Errors—Total number of errors in all transmitted packets; some packets might contain more than one error
        - Discards—Total number of discarded outgoing packets
    - ARP Statistics—Analysis of ARP traffic on this interface; In fields are for traffic received on the interface and Out fields are for traffic sent on the interface
        - ARP requests—Number of ARP requests
        - ARP responses—Number of ARP responses
        - Errors—Total number of errors in all ARP packets
        - Discards—Total number of discarded ARP packets
    - Total bridge1483 interfaces—Total number of bridged Ethernet interfaces configured on the router; this is the only information that appears when you specify the **summary** keyword

- Example 1—Displays full configuration and status information

```
host1#show bridge1483 interface
                                                                Oper/Admin
        Interface           Status    MAC Address    Type       MTU
------------------------- ---------- -------------- ------- ----------
ATM 5/1.1                 Up         ----.----.---- Static  1500/1684
ATM 5/1.2                 Up         ----.----.---- Static  8192/9188
2 bridge1483 interfaces found
```

- Example 2—Displays full status and configuration information for the specified bridge1483 interface

```
host1#show bridge1483 interface atm 12/0.1
                                                                Oper/Admin
        Interface           Status    MAC Address    Type       MTU
------------------------- ---------- -------------- ------- ----------
ATM 12/0.1                Up         ----.----.---- Static  1522/1522

  In: Bytes 0, Packets 0
   Multicast 0, Broadcast 0
   Errors 0, Discards 0
  Out: Bytes 0, Packets 0
   Multicast 0, Broadcast 0
   Errors 0, Discards 0
ARP Statistics:
  In: ARP requests 0, ARP responses 0
   Errors 0, Discards 0
  Out: ARP requests 0, ARP responses 0
   Errors 0, Discards 0
```

- Example 3—Displays only brief summary information

```
host1#show bridge1483 interface summary
Total bridge1483 interfaces: 3
```

show ip mac-validate interface

- Use to display the status of the MAC address validation on the physical interface.
- Field descriptions
  - *interfaceSpecifier*—Interface type slot/port
  - Keyword assigned to interface—Strict or Loose
  - Address—IP address of the entry
  - Hardware Addr—Physical (MAC) address of the entry
- Example

```
host1:vr1#show ip mac-validate interface atm 8/0.1
ATM8/0.1:  Strict

        Address     Hardware Addr
        180.1.0.2   0000.1111.2222
```

show vlan subinterface

- Use to display configuration and status information for a specified VLAN subinterface or for all VLAN subinterfaces configured on the router.
- Use the **summary** keyword to display only the counts of all VLAN subinterfaces and VLAN major interfaces configured on the router.
- Field descriptions
  - Interface—Type and specifier of the VLAN subinterface. For more information about specifying the ATM physical interface on which you want to configure the VLAN subinterface, see *Interface Types and Specifiers* in *JUNOSe Command Reference Guide, About This Guide*.
  - Status—Status of the VLAN subinterface: up, down, lowerLayerDown, notPresent
  - MTU—Maximum allowable size (in bytes) of the maximum transmission unit for the VLAN subinterface
  - Svlan Id—S-VLAN ID value, if configured
  - Vlan Id—VLAN ID value for the VLAN subinterface
  - Ethertype—S-VLAN Ethertype value, if configured
  - Total VLAN interfaces—Total numbers of VLAN subinterfaces and VLAN major interfaces configured on the router; this is the only field that appears when you specify the **summary** keyword

- Example 1—Displays full status and configuration information for all VLAN subinterfaces configured on the router

```
host1#show vlan subinterface
        Interface           Status   MTU  Svlan Id Vlan Id  Ethertype
------------------------ ---------- ---- -------- -------- ---------
ATM 3/0.1.2              Up         1522 ----     11       ----
ATM 3/0.1.3              Up         1522 ----     12       ----
ATM 3/1.1.1              Up         1522 ----     13       ----
ATM 3/1.1.2              Up         1522 ----     14       ----
ATM 3/2.1.1              Down       1526 4        255      0x9200
FastEthernet 4/5.1       Up         1522 ----     1        ----
6 vlan subinterfaces found
```

- Example 2—Displays full status and configuration information for the specified VLAN subinterface

```
host1#show vlan subinterface atm 3/0.1.2
        Interface           Status   MTU  Svlan Id Vlan Id  Ethertype
------------------------ ---------- ---- -------- -------- ---------
ATM 3/0.1.2              Up         1522 ----     11       ----
```

- Example 3—Displays only brief summary information for all VLAN subinterfaces configured on the router

```
host1#show vlan subinterface summary
Total VLAN interfaces: 6 subinterfaces, 3 major interfaces
```