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Junos® OS

Broadband Subscriber Management Wholesale User Guide

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JUNOS

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Junos® OS Broadband Subscriber Management Wholesale User Guide

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

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About This Guide

Use this guide to understand how wholesaling enables service providers to resell broadband services and enable other providers to deploy their own services over the incumbent network. This guide discusses Layer 3 wholesale networks (DHCP and PPPoE) and Layer 2 wholesale networks (including ANCP-triggered wholesale services).

1

PART

Configuring DHCP Layer 3 Wholesale Networks

CHAPTER 1

Subscriber Management DHCP Layer 3 Wholesale Overview

IN THIS CHAPTER

Layer 2 and Layer 3 Wholesale Overview

In general, wholesaling broadband services allows service providers to resell broadband services and allows other providers to deploy their own services over the incumbent network. There are different methods to partitioning an access network for resale. The two most common approaches are based on either Layer 2 or Layer 3 information. Wholesale access is the process by which the access network provider (the *wholesaler*) partitions the access network into separately manageable and accountable subscriber segments for resale to other network providers (or *retailers*).

In a Layer 3 wholesale configuration, you partition the wholesaler access network at the network layer or the subscriber IP component by associating the IP component with a distinct Layer 3 domain. In a Layer 2 wholesale configuration, you partition the access network at the subscriber circuit or customer VLAN (C-VLAN) by backhauling the connection through the service provider backbone network to the subscribing retailer network where the access traffic can be managed at higher layers.

In a Junos OS Dynamic Host Configuration Protocol (DHCP) or Point-to-Point Protocol over Ethernet (PPPoE) subscriber access configuration, wholesale partitioning is accomplished through the use of logical systems and routing instances within the router. Logical systems offer a stricter partitioning of routing resources than routing instances. The purpose behind the use of logical systems is to distinctly partition the physical router into separate administrative domains. This partitioning enables multiple providers to administer the router simultaneously, with each provider having access only to the portions

of the configuration relevant to their logical system. Junos OS supports up to 15 named logical systems in addition to the default logical system (that is, `inet.0`). Unless otherwise specified in configuration, all interfaces belong to the default logical system.

NOTE: This Junos OS release supports the use of only the default logical system. Partitioning currently occurs through the use of separate routing instances.

A logical system can have one or more routing instances. Typically used in Layer 3 VPN scenarios, a routing instance does not have the same level of administrative separation as a logical system because it does not offer administrative isolation. However, the routing instance defines a distinct routing table, set of routing policies, and set of interfaces.

RELATED DOCUMENTATION

Broadband Subscriber Management DHCPv4 Layer 3 Wholesale Topology and Configuration Elements | **8**

Broadband Subscriber Management PPPoE Layer 3 Wholesale Topology and Configuration Elements | **69**

Broadband Subscriber Management Layer 2 Wholesale Topology and Configuration Elements | **93**

Wholesale Network Configuration Options and Considerations

You can configure a wholesale network any number of ways using Juniper Networks hardware and Junos OS software. The general configuration options, and considerations for each, are provided in the following table:

Wholesale Configuration Options	Considerations
Fully Static (all interfaces, VLANs, and routing instances are configured statically)	Providing more control over retailer space and access, this option is more labor intensive and can require more detailed planning of the network, address allocation, and so on.

(Continued)

Wholesale Configuration Options	Considerations
Static VLANs and Dynamic Demux Interfaces	Service VLANS are created statically and must be managed. Demux interfaces are dynamically created over the service VLANs. This option uses more logical interfaces; one for each VLAN and one for each dynamic demux interface that runs over each VLAN.
Dynamic VLANs Only (dedicated customer VLANs for each subscriber)	Dynamic (auto-sensed) VLANs are authenticated and installed in the correct non-default routing instance before DHCP is instantiated. This method helps to conserve logical interfaces by avoiding the need for additional logical interfaces being created for each demux interface. **NOTE**: In a customer VLAN model, each VLAN functions on a 1:1 basis for each customer (in this case, per household).
Dynamic VLANs and Dynamic Demux Interfaces	Allows for the greatest ease of use and flexibility in configuring subscribers, by enabling access over a service VLAN and targetting more service levels over individual, dynamically-created demux interfaces over the service VLAN. This option uses more logical interfaces; one for each VLAN and one for each demux interface that runs over each VLAN.

DHCP Layer 3 Wholesale Configuration Interface Support

DHCP Layer 3 wholesale currently supports only the use of IP demux interfaces.

For general additional information about configuring IP demux interfaces, see the Junos OS Network Interfaces Library for Routing Devices.

RELATED DOCUMENTATION

- Junos OS Network Interfaces Library for Routing Devices
- *Subscriber Interfaces and Demultiplexing Overview*
- *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles*
- *Configuring a Subscriber Interface Using a Set of Static IP Demux Interfaces*

Layer 3 Wholesale Configuration DHCP Support

DHCP Layer 3 wholesale supports the following DHCP configuration options:

- DHCP Relay
- DHCP Relay Proxy
- DHCP Local Server

> **NOTE**: All routing instances within the same wholesale network must use the same DHCP configuration option.

For additional information about any of these DHCP options, see the *AAA Service Framework Overview*.

RELATED DOCUMENTATION

Extended DHCP Relay Agent Overview

DHCP Relay Proxy Overview

Understanding Differences Between Legacy DHCP and Extended DHCP

Subscriber to Logical System and Routing Instance Relationship

As subscriber sessions are established, subscriber to logical system/routing instance memberships are established by the AAA framework configured for the default logical system. When configuring Layer 3 wholesaling, you typically configure global (wholesale) information within the default (primary) logical system and default routing instance. Incoming subscribers must then be authenticated, but this authentication can be handled in one of two ways:

- Single (wholesaler only) authentication—Incoming subscribers are authenticated by the wholesaler RADIUS server. After authentication, the subscribers are assigned values specified by dynamic profiles (routing instances, interfaces, and any configuration values) specific to a particular retailer.
- Dual (wholesaler and retailer) authentication—Sometimes referred to as *double-dip authentication*. Incoming subscribers are initially authenticated by RADIUS using the wholesale configuration. Authenticated subscribers are then redirected to other routing instances associated with individual retailer network space. When you redirect subscribers, and those subscribers are to be authenticated by AAA servers owned by individual retailers, the subscribers must be authenticated again by the

AAA servers before they are provided an address and any dynamic profile values are assigned. After reauthentication, however, the subscribers are managed normally using any values specific to the retailer routing instance to which they are assigned.

RELATED DOCUMENTATION

Routing Instances Overview

RADIUS VSAs and Broadband Subscriber Management Wholesale Configuration Overview

You can use RADIUS to assign various values through the use of dynamic variables within dynamic profiles. However, the configuration of at least one of the two VSAs described in Table 1 on page 6 is required for a wholesale network to function.

Table 1: Required Juniper Networks VSAs for the Broadband Subscriber Management Wholesale Network Solution

Attribute Number	Attribute Name	Description	Value
26-1	LSRI-Name	Client logical system/ routing instance membership name. Allowed only from RADIUS server for “default” logical system/ routing instance membership.	string: logical system:routing instance
26-25	Redirect-LSRI-Name	Client logical system/ routing instance membership name indicating to which logical system/routing instance membership the request is redirected for user authentication.	string: logical system:routing instance

Specifying the `$junos-routing-instance` dynamic variable in a dynamic profile triggers a RADIUS access-accept response of either the LSRI-Name VSA or the Redirect-LSRI-Name VSA. Returning an LSRI-Name

attribute in the access-accept response provides the logical system and routing instance in which the *logical interface* is to be created and the router updates the session database with the specified routing instance value. Returning a Redirect-LSRI-Name attribute in the access-accept response results in the router immediately sending a second access-request message (sometimes referred to as a *double-dip*) to the RADIUS server specified by the logical system:routing instance attribute specified by the Redirect-LSRI-Name VSA.

NOTE: Attributes returned as a result of a second access-request message to the logical system/routing instance membership specified by the Redirect-LSRI-Name VSA override any prior attributes returned by initial access-accept responses to the default logical system/routing instance membership.

RELATED DOCUMENTATION

Juniper Networks VSAs Supported by the AAA Service Framework

CHAPTER 2

Configuring DHCPv4 Layer 3 Wholesale Networks

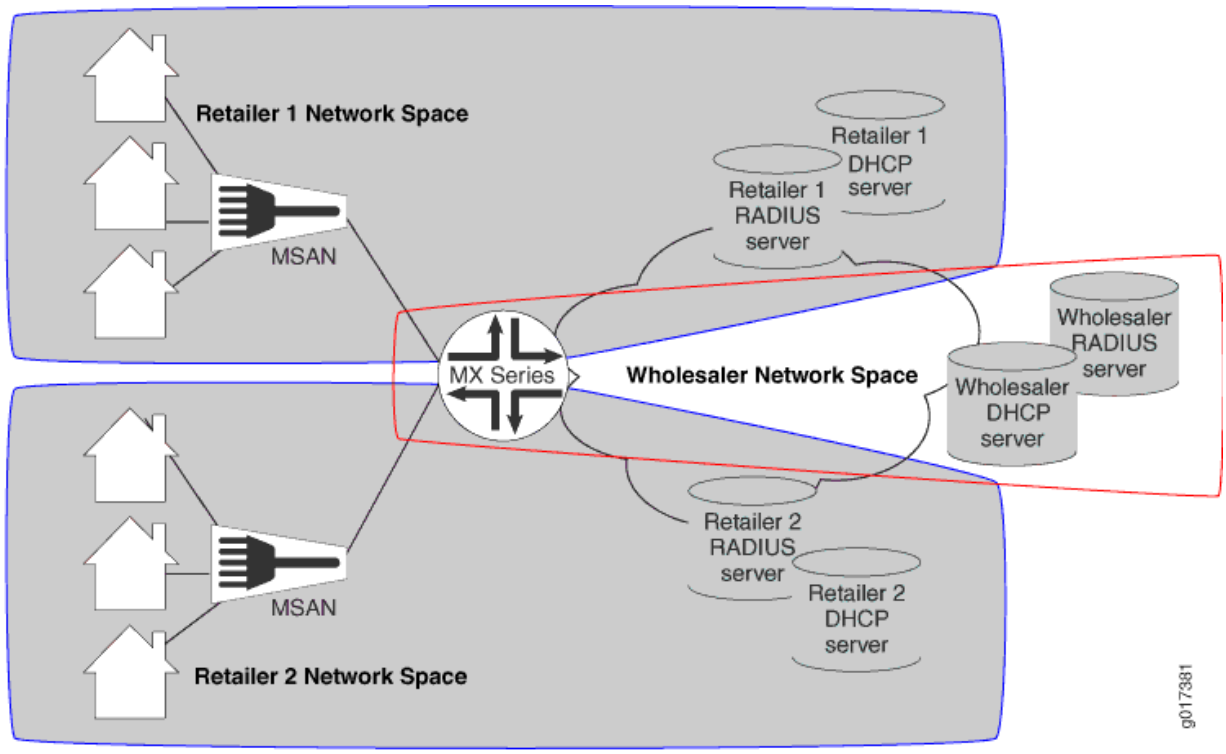
IN THIS CHAPTER

Broadband Subscriber Management DHCPv4 Layer 3 Wholesale Topology and Configuration Elements

The network topology for the subscriber management DHCPv4 Layer 3 wholesale solution includes configuring separate routing instances for individual retailers that use a portion of the router. This solution uses a DHCPv4 relay configuration. However, you can also implement DHCPv4 Relay Proxy or DHCPv4 Local Server configuration.

To explain the concept, but to limit complexity, this solution provides a configuration with one wholesaler and only two retailers. Figure 1 on page 9 illustrates a basic Layer 3 wholesale topology model from which you can expand.

Figure 1: Basic Subscriber Management Layer 3 Wholesale Solution Topology



A DHCP Layer 3 wholesale network solution can use various combinations of the following configuration elements:

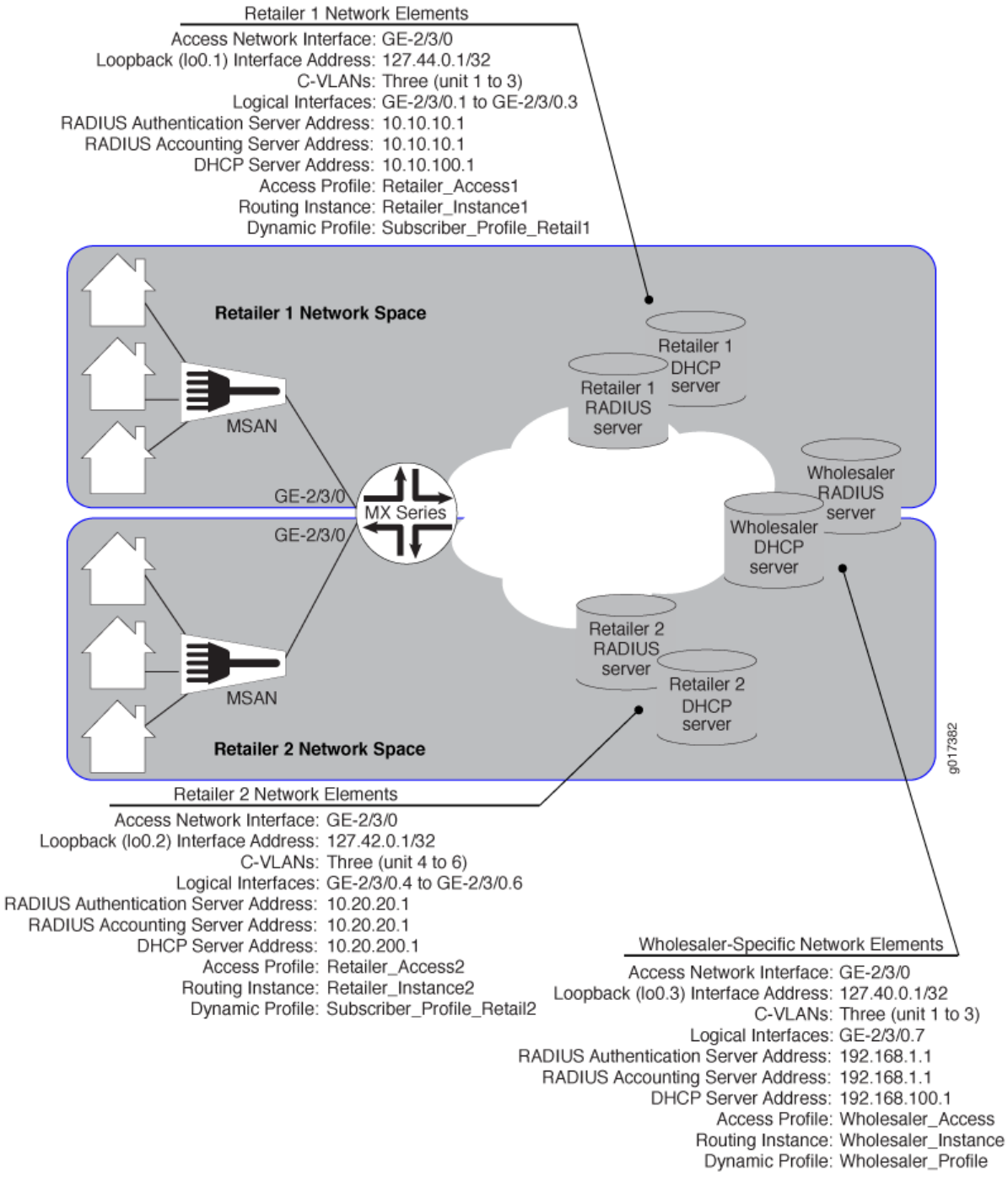
- Subscriber network VLAN configuration
- DHCPv4 configuration (DHCPv4 Relay, DHCPv4 Relay Proxy, or DHCPv4 Local Server)
- Addressing server or addressing server access configuration (if not using DHCPv4 Local Server)
- RADIUS server access configuration
- Dynamic profile configuration for default (wholesaler) access
- Dynamic profile configuration for retailer access (following subscriber redirection, if applicable)
- Routing instance configuration for individual retailers
- Group configuration and forwarding options for the network
- Core network configuration

RELATED DOCUMENTATION

DHCPv4 Layer 3 Wholesale Network Topology Overview

This configuration explains how to configure a simple DHCPv4 Layer 3 wholesale subscriber access network. This solution incorporates two retailers sharing resources on a wholesaler router. Figure 2 on page 11 provides the reference topology for this configuration example.

Figure 2: DHCPv4 Layer 3 Wholesale Network Reference Topology



RELATED DOCUMENTATION

Layer 2 and Layer 3 Wholesale Overview | 2

Broadband Subscriber Management DHCPv4 Layer 3 Wholesale Topology and Configuration Elements | 8

Configuring Loopback Interfaces for the DHCPv4 Layer 3 Wholesale Solution

You must configure loopback interfaces for use in the subscriber management access network. The loopback interfaces are automatically used for unnumbered interfaces.

To configure loopback interfaces:

1. Edit the loopback interface.

```
[edit]
user@host# edit interfaces lo0
```

2. Edit the unit for the wholesale loopback interface.

```
[edit interfaces lo0]
user@host# edit unit 3
```

3. Edit the loopback interface family that belongs to the wholesaler.

```
[edit interfaces lo0 unit 3]
user@host# edit family inet
```

4. Specify the loopback interface address that belongs to the wholesaler.

```
[edit interfaces lo0 unit 3]
user@host# set address 127.40.0.1/32
```

5. Edit the unit for a retail loopback interface to be assigned to the retailer.

```
[edit interfaces lo0]
user@host# edit unit 1
```

6. Edit the loopback interface family that will be assigned to the retailer.

```
[edit interfaces lo0 unit 1]
user@host# edit family inet
```

7. Specify the loopback interface address that will be assigned to the retailer.

```
[edit interfaces lo0 unit 1]
user@host# set address 127.42.0.1/32
```

8. Repeat steps 5 through 7 for additional retailers, making sure to use unique unit and address values for each retailer loopback interface.

RELATED DOCUMENTATION

- Junos OS Network Interfaces Library for Routing Devices

Configuring VLANs for the DHCPv4 Layer 3 Wholesale Network Solution

IN THIS SECTION

You can configure either static or dynamic customer VLANs for use in the DHCPv4 wholesale network solution.

Configuring Static Customer VLANs for the DHCPv4 Layer 3 Wholesale Network Solution

In this example configuration, the access interface (`ge-2/3/0`) connects to a device (that is, a DSLAM) on the access side of the network. You can define static VLANs for use by the access network subscribers.

To configure the static VLANs:

1. Edit the access side interface.

```
[edit]
user@host# edit interfaces ge-2/3/0
```

2. Specify the use of stacked VLAN tagging.

```
[edit interfaces ge-2/3/0]
user@host# set stacked-vlan-tagging
```

3. Edit the interface unit for the first VLAN.

```
[edit interfaces ge-2/3/0]
user@host# edit unit 1
```

4. Define the VLAN tags for the first VLAN.

```
[edit interfaces ge-2/3/0 unit 1]
user@host# set vlan-tags outer 3 inner 1
```

5. Specify that you want to create IPv4 demux interfaces.

```
[edit interfaces ge-2/3/0 unit 1]
user@host# set demux-source inet
```

6. Edit the family for the first VLAN.

```
[edit interfaces ge-2/3/0 unit 1]
user@host# edit family inet
```

7. (Optional) Define the unnumbered address and the preferred source address for the first VLAN.

```
[edit interfaces ge-2/3/0 unit 1 family inet]
user@host# set unnumbered-address lo0.1 preferred-source-address 127.44.0.1
```

8. Repeat steps 2 through 7 for additional VLAN interface units.

Configuring Dynamic VLANs for the DHCPv4 Layer 3 Wholesale Network Solution

To configure dynamic VLANs for the solution:

1. Configure a dynamic profile for dynamic VLAN creation.

   a. Name the profile.

   ```
   [edit]
   user@host# edit dynamic-profiles VLAN-PROF
   ```

   b. Define the `interfaces` statement with the internal `$junos-interface-ifd-name` variable used by the router to match the interface name of the receiving interface.

   ```
   [edit dynamic-profiles VLAN-PROF]
   user@host# edit interfaces $junos-interface-ifd-name
   ```

   c. Define the `unit` statement with the predefined `$junos-interface-unit` variable:

   ```
   [edit dynamic-profiles VLAN-PROF interfaces “$junos-interface-ifd-name”]
   user@host# edit unit $junos-interface-unit
   ```

   d. (Optional) To configure the router to respond to any ARP request, specify the `proxy-arp` statement.

   ```
   [edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
   interface-unit"]
   user@host# set proxy-arp
   ```

   e. Specify that you want to create IPv4 demux interfaces.

   ```
   [edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
   interface-unit"]
   user@host# set demux-source inet
   ```

f. Specify the VLAN ID variable.

```
[edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
interface-unit"]
user@host# set vlan-tags outer $junos-stacked-vlan-id
```

The variable is dynamically replaced with an outer VLAN ID within the VLAN range specified at the `[interfaces]` hierarchy level.

g. Specify the inner VLAN ID variable.

```
[edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
interface-unit"]
user@host# set vlan-tags inner $junos-vlan-id
```

The variable is dynamically replaced with an inner VLAN ID within the VLAN range specified at the `[interfaces]` hierarchy level.

h. Access the family type.

```
[edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
interface-unit"]
user@host# edit family inet
```

i. (Optional) Enable IP and MAC address validation for dynamic IP demux interfaces in a dynamic profile.

```
[edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
interface-unit" family inet]
user@host# set mac-validate strict
```

j. (Optional) Specify the unnumbered address and preferred source address.

```
[edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
interface-unit" family inet]
user@host# set unnumbered-address lo.0 preferred-source-address 127.33.0.1
```

2. Associate the dynamic profile with the interface on which the dynamic VLANs will be created.

a. Access the interface that you want to use for creating VLANs.

```
[edit interfaces]
user@host# edit interfaces ge-2/3/0
```

b. Specify the use of stacked VLAN tagging.

```
[edit interfaces ge-2/3/0]
user@host# set stacked-vlan-tagging
```

c. Specify that you want to automatically configure VLAN interfaces.

```
[edit interfaces ge-2/3/0]
user@host# edit auto-configure
```

d. Specify that you want to configure stacked VLANs.

```
[edit interfaces ge-2/3/0 auto-configure]
user@host# edit stacked-vlan-ranges
```

e. Specify the dynamic VLAN profile that you want the interface to use.

```
[edit interfaces ge-2/3/0 auto-configure stacked-vlan-ranges]
user@host# set dynamic-profile VLAN-PROF
```

f. Repeat steps a through e for any other interfaces that you want to use for creating VLANs.

3. Specify the Ethernet packet type that the VLAN dynamic profile can accept.

```
[edit interfaces ge-2/3/0 auto-configure stacked-vlan-ranges dynamic-profile VLAN-PROF]
user@host# set accept inet
```

4. Define VLAN ranges for use by the dynamic profile when dynamically creating VLAN IDs. For this solution, specify the outer and inner stacked VLAN ranges that you want the dynamic profile to use. The following example specifies an outer stacked VLAN ID range of 3-3 (enabling only the outer

range of 3) and an inner stacked VLAN ID range of `1-3` (enabling a range from 1 through 3 for the inner stacked VLAN ID).

```
[edit interfaces ge-0/0/0 auto-configure stacked-vlan-ranges dynamic-profile VLAN-PROF]
user@host# set stacked-vlan-ranges 3-3,1-3
```

Configuring Access Components for the DHCP Layer 3 Wholesale Network Solution

IN THIS SECTION

When configuring a wholesale network, you must configure several components globally. This configuration provides access to RADIUS servers that you want the wholesaler and any configured retailers to use globally. The access configuration includes the following general steps:

Configuring RADIUS Server Access

You can globally define any RADIUS servers in your network that either the wholesale access profile or retailer access profile can use. After you define the global RADIUS servers, you can specify specific RADIUS servers within individual access profiles.

To define RADIUS servers for profile access:

1. Access the `[edit access radius-server]` hierarchy level.

```
[edit ]
user@host# edit access radius-server
```

2. Specify the address and secret for any RADIUS servers in the network.

```
[edit access radius-server]
user@host# set 192.168.10.1 secret $ABC123$ABC123$ABC123
user@host# set 10.10.10.1 secret $ABC123$ABC123
```

SEE ALSO

> *RADIUS Servers and Parameters for Subscriber Access*

Configuring a DHCP Wholesaler Access Profile

You must define the network and interface over which you want subscribers to initially access the network with a wholesale access profile. When a subscriber attempts to access the network, the access profile provides initial access information including authentication and accounting values that the router uses for the accessing subscriber.

To define a wholesale access profile:

1. Create the wholesale access profile.

```
[edit]
user@host# edit access-profile Wholesaler_Access
```

2. Specify the authentication methods for the profile and the order in which they are used.

```
[edit access profile Wholesaler1]
user@host# set authentication-order radius password
```

3. Specify that you want to configure RADIUS support.

```
[edit access profile Wholesaler1]
user@host# edit radius
```

4. Specify the IP address of the RADIUS server used for authentication.

```
[edit access profile Wholesaler1 radius]
user@host# set authentication-server 192.168.10.1
```

5. Specify the IP address of the RADIUS server used for accounting.

```
[edit access profile Wholesaler1 radius]
user@host# set accounting-server 192.168.10.1
```

6. Configure any desired options for the RADIUS server.

   See *RADIUS Servers and Parameters for Subscriber Access*.

7. Configure subscriber accounting (RADIUS accounting).

   See *Configuring Per-Subscriber Session Accounting*.

SEE ALSO

> *Configuring Authentication and Accounting Parameters for Subscriber Access*
>
> *Specifying the Authentication and Accounting Methods for Subscriber Access*
>
> *RADIUS Servers and Parameters for Subscriber Access*
>
> *Configuring Per-Subscriber Session Accounting*

Configuring DHCP Retailer Access Profiles

In this solution, subscribers are redirected to a networking space used by a specific retailer and defined by a unique routing instance. This method requires that you define the network and interface over which you want subscribers to access the network after being redirected by the wholesale access profile.

To define a retailer access profile:

1. Create the retailer access profile.

```
[edit]
user@host# edit access-profile Retailer_Access1
```

2. Specify the authentication methods for the profile and the order in which they are used.

```
[edit access profile Retailer1]
user@host# set authentication-order radius password
```

3. Specify that you want to configure RADIUS support.

```
[edit access profile Retailer1]
user@host# edit radius
```

4. Specify the IP address of the RADIUS server used for authentication.

```
[edit access profile Retailer1 radius]
user@host# set authentication-server 10.10.10.1
```

5. Specify the IP address of the RADIUS server used for accounting.

```
[edit access profile Retailer1 radius]
user@host# set accounting-server 10.10.10.1
```

6. Configure any desired options for the RADIUS server.

   See *RADIUS Servers and Parameters for Subscriber Access*.

7. Configure subscriber accounting (RADIUS accounting).

   See *Configuring Per-Subscriber Session Accounting*.

SEE ALSO

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *Specifying the Authentication and Accounting Methods for Subscriber Access*
- *RADIUS Servers and Parameters for Subscriber Access*
- *Configuring Per-Subscriber Session Accounting*

Configuring Dynamic Profiles for the DHCPv4 Layer 3 Wholesale Network Solution

IN THIS SECTION

A dynamic profile is a set of characteristics, defined in a type of template, that you can use to provide services for broadband applications. These services are assigned dynamically to interfaces as they access the network. When configuring dynamic profiles for the DHCPv4 Layer 3 wholesale network, you can choose to configure one dynamic profile to address all incoming subscribers or you can configure individual dynamic profiles for use by the different network management groups (that is, the wholesaler and any retailers). In fact, you can create multiple dynamic profiles that you can use to roll out different services and selectively apply those dynamic profiles to different subscriber groups as necessary.

In this solution example, one dynamic profile is created for use by the wholesaler when subscribers initially access the network. Other dynamic profiles are created for the subscribers for each individual retailer to use after they are redirected to that retailer network space.

Configuring a Wholesale Dynamic Profile for use in the DHCPv4 Solution

You can configure a basic access profile to initially manage subscribers that access the network.

To configure a dynamic profile for use by the wholesaler:

1. Create a wholesale dynamic profile.

```
[edit]
user@host# edit dynamic-profiles Wholesaler_Profile
```

2. Specify that you want to configure the `demux0` interface in the dynamic profile.

```
[edit dynamic-profiles Subscriber_Profile_Retail1]
user@host#  edit interfaces demux0
```

3. Configure the unit for the `demux0` interface.
   a. Configure the variable for the unit number of the `demux0` interface.

      The variable is dynamically replaced with the unit number that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 demux0]
user@host# edit unit $junos-interface-unit
```

   b. Configure the variable for the underlying interface of the demux interfaces and specify the `$junos-underlying-interface` variable.

The variable is dynamically replaced with the underlying interface that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces demux0 unit “$junos-interface-unit”]
user@host# set demux-options underlying-interface $junos-underlying-interface
```

4. Configure the family for the demux interfaces.

   a. Specify that you want to configure the family.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces demux0 unit “$junos-interface-unit”]
user@host# edit family inet
```

   b. Configure the unnumbered address for the family.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 demux0 unit “$junos-interface-unit” family inet6]
user@host#  set unnumbered-address lo0.0
```

   c. Configure the variable for the IPv4 address of the demux interface.

      The variable is dynamically replaced with the IPv4 address that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles business-profile interfaces demu0 unit “$junos-interface-unit”]
user@host# set demux-source $junos-subscriber-ip-address
```

Configuring a Dynamic Profile for use by a Retailer in the DHCPv4 Solution

To configure a dynamic profile for use with retailer access:

1. Create a retail dynamic profile.

```
[edit]
user@host# edit dynamic-profiles Subscriber_Profile_Retail1
```

2. Define the dynamic routing instance variable in the dynamic profile.

```
[edit dynamic-profiles Subscriber_Profile_Retail1]
user@host# edit routing-instances $junos-routing-instance
```

3. Set the dynamic interface variable for the dynamic routing instance.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 routing-instances “$junos-routing-instance”]
user@host# set interface $junos-interface-name
```

4. Specify that you want to configure the `demux0` interface in the dynamic profile.

```
[edit dynamic-profiles Subscriber_Profile_Retail1]
user@host#  edit interfaces demux0
```

5. Configure the unit for the `demux0` interface.

   a. Configure the variable for the unit number of the `demux0` interface.

      The variable is dynamically replaced with the unit number that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 demux0]
user@host# edit unit $junos-interface-unit
```

   b. Configure the variable for the underlying interface of the demux interfaces and specify the `$junos-underlying-interface` variable.

      The variable is dynamically replaced with the underlying interface that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces demux0 unit “$junos-interface-unit”]
user@host# set demux-options underlying-interface $junos-underlying-interface
```

6. Configure the family for the demux interfaces.

a. Specify that you want to configure the family.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces demux0 unit “$junos-interface-unit”]
user@host# edit family inet
```

b. Configure the unnumbered address for the family.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 demux0 unit “$junos-interface-unit” family inet6]
user@host#  set unnumbered-address lo0.0
```

c. Configure the variable for the IPv6 address of the demux interface.

The variable is dynamically replaced with the IPv6 address that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles business-profile interfaces demu0 unit “$junos-interface-unit”]
user@host# set demux-source $junos-subscriber-ip-address
```

Configuring Separate Routing Instances for DHCPv4 Service Retailers

As the owner of the system, the wholesaler typically uses the default routing instance. You must create separate routing instances for each individual retailer to keep routing information for individual retailers separate and to define any servers and forwarding options specific to each retailer.

To define a retailer routing instance:

1. Create the retailer routing instance.

```
[edit]
user@host# edit routing-instances RetailerInstance1
```

2. Specify the routing instance type for the retailer.

```
[edit routing-instances “RetailerInstance1”]
user@host# set instance-type vrf
```

3. Specify the access profile that you want the routing instance to use.

```
[edit routing-instances “RetailerInstance1”]
user@host# set access-profile Retailer1
```

4. Specify the interface that faces the Retailer1 RADIUS server.

```
[edit routing-instances “RetailerInstance1”]
user@host# set interface ge-11/1/9.10
```

5. Specify the interface that faces the Retailer1 DHCP server.

```
[edit routing-instances “RetailerInstance1”]
user@host# set interface ge-11/1/10.100
```

6. Specify the loopback interface unit for this routing instance.

```
[edit routing-instances “RetailerInstance1”]
user@host# set interface lo0.1
```

NOTE: Loopback interfaces must be unique for each routing instance.

7. Access the DHCP Relay forwarding options hierarchy for the routing instance.

```
[edit routing-instances “RetailerInstance1”]
user@host# edit forwarding-options dhcp-relay
```

NOTE: The configuration for this wholesale solution uses DHCP Relay. However, you can also configure DHCP Proxy Relay or DHCP Local Server for the DHCP Layer 3 wholesale network.

8. Specify that you want to configure authentication options and use external AAA authentication services.

```
[edit routing-instances “RetailerInstance1” forwarding-options dhcp-relay]
user@host# edit authentication
```

9. (Optional) Configure a password that authenticates the username to the external authentication service.

   See *Example-Configuring DHCP with External Authentication Server*.

10. (Optional) Configure optional features to create a unique username.

    See *Creating Unique Usernames for DHCP Clients*.

11. Specify the default dynamic profile that you want to attach to DHCP subscriber for this retailer.

```
[edit routing-instances “RetailerInstance1” forwarding-options dhcp-relay]
user@host# set dynamic-profile Subscriber_Profile_Retail1
```

12. Specify any overrides for the default DHCP Relay configuration.

    See *Overriding the Default DHCP Relay Configuration Settings*.

13. Configure a named server group for the retailer.

```
[edit routing-instances “RetailerInstance1” forwarding-options dhcp-relay]
user@host# edit server-group Retailer1_Group
```

14. Specify the DHCP server address for the retailer group.

```
[edit routing-instances “RetailerInstance1” forwarding-options dhcp-relay server-group
“Retailer1_Group”]
user@host# set 10.10.100.1
```

15. Specify the retailer group as the active server group for this routing instance.

```
[edit routing-instances “RetailerInstance1” forwarding-options dhcp-relay]
user@host# set active-server-group Retailer1_Group
```

16. Configure a group you can use to define the retailer dynamic profile and DHCP access interface.

```
[edit routing-instances “RetailerInstance1” forwarding-options dhcp-relay]
user@host# edit group Retailer1_Group
```

17. Specify the dynamic profile that the retailer DHCP subscribers use.

```
[edit routing-instances “RetailerInstance1” forwarding-options dhcp-relay group
“Retailer1_Group”]
user@host# set dynamic-profile Subscriber_Profile_Retailer1
```

18. Specify the retailer interface that the retailer DHCP subscribers use.

```
[edit routing-instances “RetailerInstance1” forwarding-options dhcp-relay group
“Retailer1_Group”]
user@host# set interface ge-2/3/0.2
```

19. (Optional) Configure any passwords that authenticate the username to the external authentication service for the retailer groups that you created.

    See *Example-Configuring DHCP with External Authentication Server*.

20. (Optional) Configure any unique username values for the retailer groups that you created.

    See *Creating Unique Usernames for DHCP Clients*.

21. (Optional) Specify any overrides for any of the DHCP Relay group configurations that you created.

    See *Overriding the Default DHCP Relay Configuration Settings*.

22. Repeat this procedure for other retailers.

Configure Default Forwarding Options for the DHCPv4 Wholesale Network Solution

You can use DHCP Relay, DHCP Relay Proxy, or DHCP Local Server configuration in a DHCP wholesale network. DHCP configuration is defined at the `[edit forwarding-options]` hierarchy level.

NOTE: The configuration for this wholesale solution uses DHCP Relay.

To configure DHCPv4 Relay forwarding options:

1. Access the `[edit forwarding-options dhcp-relay]` hierarchy.

```
[edit]
user@host# edit forwarding-options dhcp-relay
```

2. Specify that you want to configure authentication options and use external AAA authentication services.

```
[edit forwarding-options dhcp-relay]
user@host# edit authentication
```

3. (Optional) Configure a password that authenticates the username to the external authentication service.

   See *Example-Configuring DHCP with External Authentication Server*.

4. (Optional) Configure optional features to create a unique username.

   See *Creating Unique Usernames for DHCP Clients*.

5. Specify the default dynamic profile that you want to attach to all DHCP subscriber that access the router.

```
[edit forwarding-options dhcp-relay]
user@host# set dynamic-profile Wholesaler_Profile
```

6. Specify any overrides for the default DHCP Relay configuration.

   See *Overriding the Default DHCP Relay Configuration Settings*.

7. Configure a named server group for default (wholesaler) DHCP server access.

```
[edit forwarding-options dhcp-relay]
user@host# edit server-group Wholesaler_Group
```

8. Specify the DHCP server address for the default (wholesale) group.

```
[edit forwarding-options dhcp-relay server-group “Wholesaler_Group”]
user@host# set 192.168.100.1
```

9. Specify the default (wholesale) group as the active server group.

```
[edit forwarding-options dhcp-relay]
user@host# set active-server-group Wholesaler_Group
```

10. Configure a group you can use to define the wholesale DHCP access interface.

```
[edit forwarding-options dhcp-relay]
user@host# edit group Wholesaler_Group
```

11. Specify the default (wholesale) interface that all DHCP subscribers use when first accessing the router.

```
[edit forwarding-options dhcp-relay group “Wholesaler_Group”]
user@host# set interface ge-2/3/0.1
```

12. Configure a group you can use to define a retail DHCP interface.

```
[edit forwarding-options dhcp-relay]
user@host# edit group Retailer1_Group
```

13. Specify the logical interface the DHCP subscribers use once redirected.

```
[edit forwarding-options dhcp-relay group “Retailer1_Group”]
user@host# set interface ge-2/3/0.2
```

14. Repeat steps 12 and 13 for other retailer groups.

    In this solution example, you configure another group name of “Retailer2_Group” and specify `ge-2/3/0.3` for the logical interface.

15. (Optional) Configure any passwords that authenticate the username to the external authentication service for any of the groups that you created.

    See *Example-Configuring DHCP with External Authentication Server*.

16. (Optional) Configure optional features to create a unique username for any of the groups that you created.

    See *Creating Unique Usernames for DHCP Clients*.

17. (Optional) Specify any overrides for any of the DHCP Relay group configurations that you created.

    See *Overriding the Default DHCP Relay Configuration Settings*.

RELATED DOCUMENTATION

- *Extended DHCP Relay Agent Overview*
- *DHCP Relay Proxy Overview*
- *Example-Configuring DHCP with External Authentication Server*
- *Creating Unique Usernames for DHCP Clients*
- *Overriding the Default DHCP Relay Configuration Settings*

Example: Wholesaler Dynamic Profile for a DHCPv4 Wholesale Network

This example specifies a dynamic profile name of *Wholesaler_Profile*, uses dynamic IP demux interfaces, and references the predefined input firewall filter.

```
dynamic-profiles {
    Wholesaler_Profile {
        interfaces {
            demux0 {
                unit "$junos-interface-unit" {
                    demux-options {
                        underlying-interface "$junos-underlying-interface";
                    }
                    family inet {
                        demux-source {
                            $junos-subscriber-ip-address;
                        }
                        filter {
                            input "$junos-input-filter";
                        }
                        unnumbered-address "$junos-loopback-interface" preferred-source-address
$junos-preferred-source-address;
                    }
                }
            }
        }
    }
```

RELATED DOCUMENTATION

Configuring Dynamic Profiles for the DHCPv4 Layer 3 Wholesale Network Solution | 21

Example: Retailer Dynamic Profile for a DHCPv4 Wholesale Network

```
dynamic-profiles {
    Subscriber_Profile_Retailer1 {
        routing-instances {
```

```
            "$junos-routing-instance" {
                interface "$junos-interface-name";
            }
        }
        interfaces {
            demux0 {
                unit "$junos-interface-unit" {
                    demux-options {
                        underlying-interface "$junos-underlying-interface";
                    }
                    family inet {
                        demux-source {
                            "$junos-subscriber-ip-address";
                        }
                        unnumbered-address "$junos-loopback-interface" preferred-source-address
"$junos-preferred-source-address";
                    }
                }
            }
        }
    }
```

RELATED DOCUMENTATION

Configuring Dynamic Profiles for the DHCPv4 Layer 3 Wholesale Network Solution | 21

Example: Default Forwarding Options Configuration for the DHCPv4 Wholesale Network

```
forwarding-options {
    dhcp-relay {
        traceoptions {
            file size 1g;
            inactive: flag all;
        }
        authentication {
            password $ABC123;
            username-include {
```

```
            user-prefix WholesaleNetwork;
        }
    }
    dynamic-profile Wholesaler_Profile;
    overrides {
        always-write-giaddr;
        always-write-option-82;
        layer2-unicast-replies;
        trust-option-82;
        client-discover-match;
    }
    server-group {
        Wholesaler-Server-Group {
            192.168.100.1;
        }
    }
    active-server-group Wholesaler-Server Group;
    group Wholesaler-Group {
        authentication {
            password $ABC123;
            username-include {
                user-prefix WholesaleNetwork;
            }
        }
        interface ge-2/3/0.1;
    }
    group Retailer1-Group {
        authentication {
            password $ABC123$ABC123;
            username-include {
                user-prefix WholesaleNetwork_Retailer1;
            }
        }
        interface ge-2/3/0.2;
    }
    group Retailer2-Group {
        authentication {
            password $ABC123$ABC123$ABC123;
            username-include {
                user-prefix WholesaleNetwork_Retailer1;
            }
        }
        interface ge-2/3/0.3;
```

```
        }
    }
}
```

RELATED DOCUMENTATION

Configure Default Forwarding Options for the DHCPv4 Wholesale Network Solution | 28

Example: Retailer Routing Instances for a DHCPv4 Wholesale Network

```
routing-instances {
    Retailer_Instance1 {
        instance-type vrf;
        access-profile Retailer_Access1;
        interface ge-11/1/9.10;
        interface ge-11/1/10.100;
        interface lo0.1;
        route-distinguisher 1:1;
        forwarding-options {
            dhcp-relay {
                authentication {
                    password $ABC123$ABC123;
                    username-include {
                        user-prefix WholesaleNetwork_Retailer1;
                    }
                }
                dynamic-profile Subscriber_Profile_Retailer1;
                overrides {
                    always-write-giaddr;
                    always-write-option-82;
                    layer2-unicast-replies;
                    trust-option-82;
                    client-discover-match;
                }
                server-group {
                    Retailer1-Server-Group {
                        10.10.100.1;
                    }
```

```
                }
                active-server-group Retailer1-Server-Group;
                group Retailer1-Group {
                    authentication {
                        password $ABC123$ABC123;
                        username-include {
                            user-prefix WholesaleNetwork_Retailer1;
                        }
                    }
                    dynamic-profile Subscriber_Profile_Retailer1;
                    overrides {
                        always-write-giaddr;
                        trust-option-82;
                        client-discover-match;
                    }
                    interface ge-2/3/0.2;
                }
            }
        }
    }
    Retailer_Instance2 {
        instance-type vrf;
        access-profile  Retailer_Access2;
        interface ge-7/1/9.10;
        interface ge-7/1/9.100;
        interface lo0.2;
        route-distinguisher 2:2;
        forwarding-options {
            dhcp-relay {
                authentication {
                    password $ABC123$ABC123$ABC123;
                    username-include {
                        user-prefix WholesaleNetwork_Retailer2;
                    }
                }
                dynamic-profile Subscriber_Profile_Retailer2;
                overrides {
                    always-write-giaddr;
                    trust-option-82;
                    client-discover-match;
                }
                server-group {
                    Retailer2-Group {
```

```
                        10.20.200.1;
                    }
                }
                active-server-group Retailer2-Group;
                group Retailer2-Group {
                    authentication {
                        password $ABC123$ABC123$ABC123;
                        username-include {
                            user-prefix psswd2;
                        }
                    }
                    dynamic-profile Subscriber_Profile_Retailer2;
                    overrides {
                        always-write-giaddr;
                        trust-option-82;
                        client-discover-match;
                    }
                    interface ge-2/3/0.3;
                }
            }
        }
    }
}
```

RELATED DOCUMENTATION

Configuring Separate Routing Instances for DHCPv4 Service Retailers | 25

CHAPTER 3

Configuring DHCPv6 Layer 3 Wholesale Networks

IN THIS CHAPTER

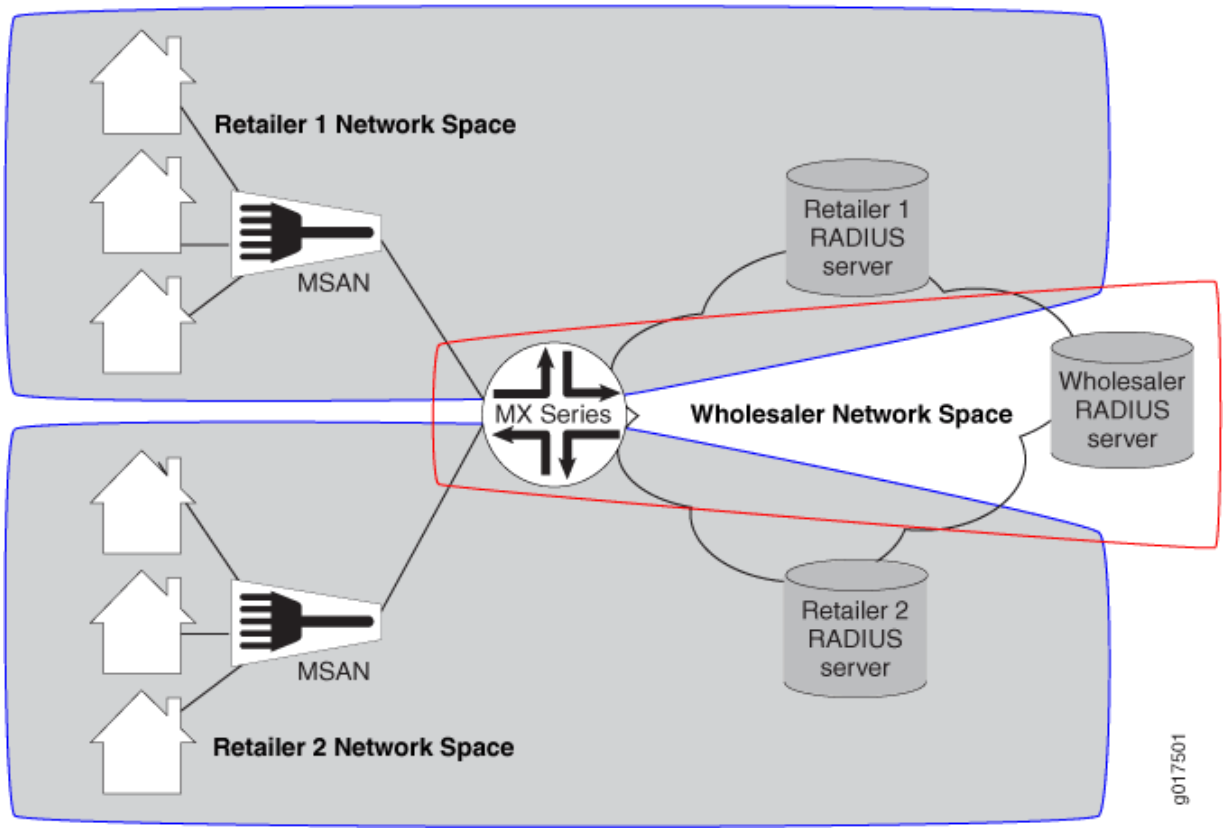
Broadband Subscriber Management DHCPv6 Layer 3 Wholesale Topology and Configuration Elements

The network topology for the subscriber management DHCPv6 Layer 3 wholesale solution includes configuring separate routing instances for individual retailers that use a portion of the router. This solution uses a DHCPv6 local server configuration.

NOTE: Only DHCPv6 local server is currently supported for DHCPv6 Layer 3 wholesale configuration.

To explain the concept, but to limit complexity, this solution provides a configuration with one wholesaler and only two retailers. Figure 3 on page 38 illustrates a basic Layer 3 wholesale topology model from which you can expand.

Figure 3: Basic Subscriber Management DHCPv6 Layer 3 Wholesale Solution Topology



A DHCPv6 Layer 3 wholesale network solution can use various combinations of the following configuration elements:

- Subscriber network VLAN configuration
- DHCPv6 configuration (local server only)
- RADIUS server access configuration
- Dynamic profile configuration for default (wholesaler) access

- Dynamic profile configuration for retailer access (following subscriber redirection, if applicable)
- Routing instance configuration for individual retailers
- Group configuration and forwarding options for the network
- Core network configuration

RELATED DOCUMENTATION

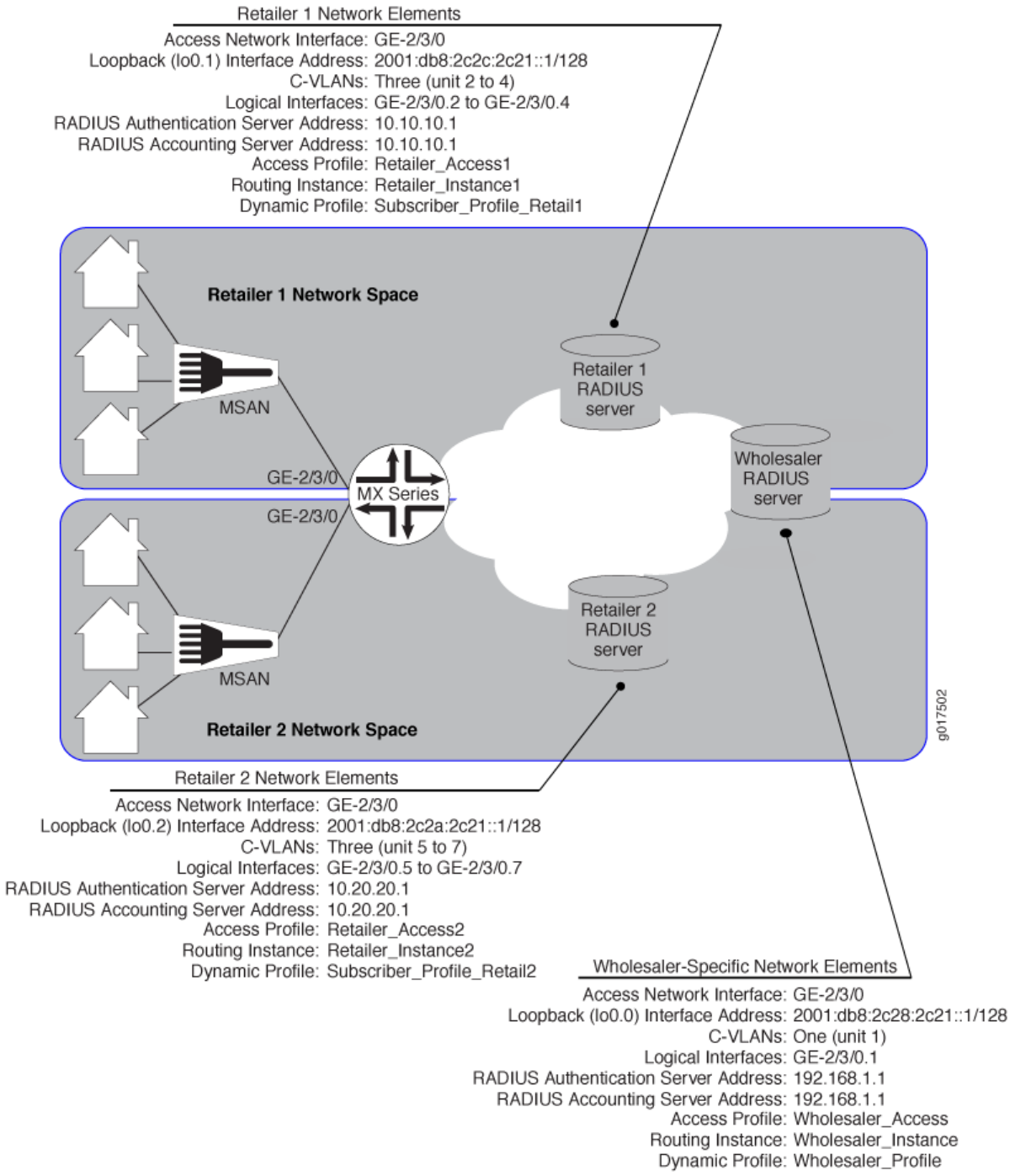
Layer 2 and Layer 3 Wholesale Overview | 2

DHCPv6 Layer 3 Wholesale Network Topology Overview | 39

DHCPv6 Layer 3 Wholesale Network Topology Overview

This configuration explains how to configure a simple DHCPv6 Layer 3 wholesale subscriber access network. This solution incorporates two retailers sharing resources on a wholesaler router. Figure 4 on page 40 provides the reference topology for this configuration example.

Figure 4: DHCPv6 Layer 3 Wholesale Network Reference Topology



RELATED DOCUMENTATION

Layer 2 and Layer 3 Wholesale Overview | 2

Broadband Subscriber Management DHCPv4 Layer 3 Wholesale Topology and Configuration Elements | 8

Configuring Loopback Interfaces for the DHCPv6 Layer 3 Wholesale Solution

You must configure loopback interfaces for use in the subscriber management access network. The loopback interfaces are automatically used for unnumbered interfaces.

To configure loopback interfaces:

1. Edit the loopback interface.

```
[edit]
user@host# edit interfaces lo0
```

2. Edit the unit for the loopback interface that you want to use for the wholesaler.

```
[edit interfaces lo0]
user@host# edit unit 0
```

3. Edit the loopback interface family that belongs to the wholesaler.

```
[edit interfaces lo0 unit 0]
user@host# edit family inet6
```

4. Specify the wholesale loopback interface address.

```
[edit interfaces lo0 unit 0]
user@host# set address 2001:db8:2c28:2c21::1/128
```

5. Edit the unit for a retail loopback interface.

```
[edit interfaces lo0]
user@host# edit unit 1
```

6. Edit the retail loopback interface family.

```
[edit interfaces lo0 unit 1]
user@host# edit family inet6
```

7. Specify the retail loopback interface address.

```
[edit interfaces lo0 unit 1]
user@host# set address 2001:db8:2c2c:2c21::1/128
```

8. Repeat steps 5 through 7 for additional retailers, making sure to use unique unit and address values for each retailer loopback interface.

Configuring VLANs for the DHCPv6 Layer 3 Wholesale Network Solution

IN THIS SECTION

You can configure either static or dynamic customer VLANs for use in the DHCPv6 wholesale network solution.

Configuring Static Customer VLANs for the DHCPv6 Layer 3 Wholesale Network Solution

In this example configuration, the access interface (`ge-2/3/0`) connects to a device (that is, a DSLAM) on the access side of the network. You can define static VLANs for use by access network subscribers.

To configure the static VLANs:

1. Edit the access side interface.

```
[edit]
user@host# edit interfaces ge-2/3/0
```

2. Specify the use of stacked VLAN tagging.

```
[edit interfaces ge-2/3/0]
user@host# set stacked-vlan-tagging
```

3. Edit the interface unit for the first VLAN.

```
[edit interfaces ge-2/3/0]
user@host# edit unit 1
```

4. Define the VLAN tags for the first VLAN.

```
[edit interfaces ge-2/3/0 unit 1]
user@host# set vlan-tags outer 3 inner 1
```

5. Specify that you want to create IPv6 demux interfaces.

```
[edit interfaces ge-2/3/0 unit 1]
user@host# set demux-source inet6
```

6. Edit the family for the first VLAN.

```
[edit interfaces ge-2/3/0 unit 1]
user@host# edit family inet6
```

7. (Optional) Define the unnumbered address and the preferred source address for the first VLAN.

```
[edit interfaces ge-2/3/0 unit 1 family inet6]
user@host# set unnumbered-address lo0.1 preferred-source-address 2001:db8:2c28:2c21::1/128
```

8. Repeat steps 2 through 7 for additional VLAN interface units.

Configuring Dynamic Customer VLANs for the DHCPv6 Layer 3 Wholesale Network Solution

To configure dynamic VLANs for the solution:

1. Configure a dynamic profile for dynamic VLAN creation.

   a. Name the profile.

   ```
   [edit]
   user@host# edit dynamic-profiles VLAN-PROF
   ```

   b. Define the `interfaces` statement with the internal `$junos-interface-ifd-name` variable used by the router to match the interface name of the receiving interface.

   ```
   [edit dynamic-profiles VLAN-PROF]
   user@host# edit interfaces $junos-interface-ifd-name
   ```

   c. Define the `unit` statement with the predefined `$junos-interface-unit` variable:

   ```
   [edit dynamic-profiles VLAN-PROF interfaces “$junos-interface-ifd-name”]
   user@host# edit unit $junos-interface-unit
   ```

   d. Specify that you want to create IPv6 demux interfaces.

   ```
   [edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
   interface-unit"]
   user@host# set demux-source inet6
   ```

   e. Specify the VLAN ID variable.

   ```
   [edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
   interface-unit"]
   user@host# set vlan-tags outer $junos-stacked-vlan-id
   ```

   The variable is dynamically replaced with an outer VLAN ID within the VLAN range specified at the `[interfaces]` hierarchy level.

f. Specify the inner VLAN ID variable.

```
[edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
interface-unit"]
user@host# set vlan-tags inner $junos-vlan-id
```

The variable is dynamically replaced with an inner VLAN ID within the VLAN range specified at the `[interfaces]` hierarchy level.

g. Access the family type.

```
[edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
interface-unit"]
user@host# edit family inet6
```

h. (Optional) Specify the unnumbered address and preferred source address.

```
[edit dynamic-profiles VLAN-PROF interfaces "$junos-interface-ifd-name" unit "$junos-
interface-unit" family inet6]
user@host# set unnumbered-address lo.0 preferred-source-address 2001:db8:2c28:2c21::1/128
```

2. Associate the dynamic profile with the interface on which you want the VLANs created.

a. Access the interface that you want to use for creating VLANs.

```
[edit interfaces]
user@host# edit interfaces ge-2/3/0
```

b. Specify the use of stacked VLAN tagging.

```
[edit interfaces ge-2/3/0]
user@host# set stacked-vlan-tagging
```

c. Specify that you want to automatically configure VLAN interfaces.

```
[edit interfaces ge-2/3/0]
user@host# edit auto-configure
```

d. Specify that you want to configure stacked VLANs.

```
[edit interfaces ge-2/3/0 auto-configure]
user@host# edit stacked-vlan-ranges
```

e. Specify the dynamic VLAN profile that you want the interface to use.

```
[edit interfaces ge-2/3/0 auto-configure stacked-vlan-ranges]
user@host# set dynamic-profile VLAN-PROF
```

f. Repeat steps a through e for any other interfaces that you want to use for creating VLANs.

3. Specify the Ethernet packet type that the VLAN dynamic profile can accept.

```
[edit interfaces ge-2/3/0 auto-configure stacked-vlan-ranges dynamic-profile VLAN-PROF]
user@host# set accept inet6
```

4. Define VLAN ranges for use by the dynamic profile when dynamically creating VLAN IDs. For this solution, specify the outer and inner stacked VLAN ranges that you want the dynamic profile to use. The following example specifies an outer stacked VLAN ID range of `3-3` (enabling only the outer range of 3) and an inner stacked VLAN ID range of `1-3` (enabling a range from 1 through 3 for the inner stacked VLAN ID).

```
[edit interfaces ge-0/0/0 auto-configure stacked-vlan-ranges dynamic-profile VLAN-PROF]
user@host# set stacked-vlan-ranges 3-3,1-3
```

Configuring Access Components for the DHCP Layer 3 Wholesale Network Solution

IN THIS SECTION

When configuring a wholesale network, you must configure several components globally. This configuration provides access to RADIUS servers that you want the wholesaler and any configured retailers to use globally. The access configuration includes the following general steps:

Configuring RADIUS Server Access

You can globally define any RADIUS servers in your network that either the wholesale access profile or retailer access profile can use. After you define the global RADIUS servers, you can specify specific RADIUS servers within individual access profiles.

To define RADIUS servers for profile access:

1. Access the `[edit access radius-server]` hierarchy level.

```
[edit ]
user@host# edit access radius-server
```

2. Specify the address and secret for any RADIUS servers in the network.

```
[edit access radius-server]
user@host# set 192.168.10.1 secret $ABC123$ABC123$ABC123
user@host# set 10.10.10.1 secret $ABC123$ABC123
```

SEE ALSO

> *RADIUS Servers and Parameters for Subscriber Access*

Configuring a DHCP Wholesaler Access Profile

You must define the network and interface over which you want subscribers to initially access the network with a wholesale access profile. When a subscriber attempts to access the network, the access profile provides initial access information including authentication and accounting values that the router uses for the accessing subscriber.

To define a wholesale access profile:

1. Create the wholesale access profile.

```
[edit]
user@host# edit access-profile Wholesaler_Access
```

2. Specify the authentication methods for the profile and the order in which they are used.

```
[edit access profile Wholesaler1]
user@host# set authentication-order radius password
```

3. Specify that you want to configure RADIUS support.

```
[edit access profile Wholesaler1]
user@host# edit radius
```

4. Specify the IP address of the RADIUS server used for authentication.

```
[edit access profile Wholesaler1 radius]
user@host# set authentication-server 192.168.10.1
```

5. Specify the IP address of the RADIUS server used for accounting.

```
[edit access profile Wholesaler1 radius]
user@host# set accounting-server 192.168.10.1
```

6. Configure any desired options for the RADIUS server.

   See *RADIUS Servers and Parameters for Subscriber Access*.

7. Configure subscriber accounting (RADIUS accounting).

   See *Configuring Per-Subscriber Session Accounting*.

SEE ALSO

> *Configuring Authentication and Accounting Parameters for Subscriber Access*
>
> *Specifying the Authentication and Accounting Methods for Subscriber Access*
>
> *RADIUS Servers and Parameters for Subscriber Access*
>
> *Configuring Per-Subscriber Session Accounting*

Configuring DHCP Retailer Access Profiles

In this solution, subscribers are redirected to a networking space used by a specific retailer and defined by a unique routing instance. This method requires that you define the network and interface over which you want subscribers to access the network after being redirected by the wholesale access profile.

To define a retailer access profile:

1. Create the retailer access profile.

```
[edit]
user@host# edit access-profile Retailer_Access1
```

2. Specify the authentication methods for the profile and the order in which they are used.

```
[edit access profile Retailer1]
user@host# set authentication-order radius password
```

3. Specify that you want to configure RADIUS support.

```
[edit access profile Retailer1]
user@host# edit radius
```

4. Specify the IP address of the RADIUS server used for authentication.

```
[edit access profile Retailer1 radius]
user@host# set authentication-server 10.10.10.1
```

5. Specify the IP address of the RADIUS server used for accounting.

```
[edit access profile Retailer1 radius]
user@host# set accounting-server 10.10.10.1
```

6. Configure any desired options for the RADIUS server.

   See *RADIUS Servers and Parameters for Subscriber Access*.

7. Configure subscriber accounting (RADIUS accounting).

   See *Configuring Per-Subscriber Session Accounting*.

SEE ALSO

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *Specifying the Authentication and Accounting Methods for Subscriber Access*
- *RADIUS Servers and Parameters for Subscriber Access*
- *Configuring Per-Subscriber Session Accounting*

Configuring Dynamic Profiles for the DHCPv6 Layer 3 Wholesale Network Solution

IN THIS SECTION

A dynamic profile is a set of characteristics, defined in a type of template, that you can use to provide services for broadband applications. These services are assigned dynamically to interfaces as they access the network. When configuring dynamic profiles for the DHCPv6 Layer 3 wholesale network, you can choose to configure one dynamic profile to address all incoming subscribers or you can configure individual dynamic profiles for use by the different network management groups (that is, the wholesaler and any retailers). In fact, you can create multiple dynamic profiles that you can use to roll out different services and selectively apply those dynamic profiles to different subscriber groups as necessary.

In this solution example, one dynamic profile is created for use by the wholesaler when subscribers initially access the network. Other dynamic profiles are created for the subscribers for each individual retailer to use after they are redirected to that retailer network space.

Configuring a Wholesale Dynamic Profile for use in the DHCPv6 Solution

You can configure a basic access profile to initially manage subscribers that access the network.

To configure a dynamic profile for use by the wholesaler:

1. Create a wholesale dynamic profile.

```
[edit]
user@host# edit dynamic-profiles Wholesaler_Profile
```

2. Specify that you want to configure the `demux0` interface in the dynamic profile.

```
[edit dynamic-profiles Wholesaler_Profile]
user@host#  edit interfaces demux0
```

3. Configure the unit for the `demux0` interface.

   a. Configure the variable for the unit number of the `demux0` interface.

The variable is dynamically replaced with the unit number that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Wholesaler_Profile demux0]
user@host# edit unit $junos-interface-unit
```

b. Configure the variable for the underlying interface of the demux interfaces and specify the `$junos-underlying-interface` variable.

The variable is dynamically replaced with the underlying interface that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Wholesaler_Profile interfaces demux0 unit “$junos-interface-unit”]
user@host# set demux-options underlying-interface $junos-underlying-interface
```

4. Configure the family for the demux interfaces.

a. Specify that you want to configure the family.

```
[edit dynamic-profiles Wholesaler_Profile interfaces demux0 unit “$junos-interface-unit”]
user@host# edit family inet6
```

b. Configure the unnumbered address for the family.

```
[edit dynamic-profiles Wholesaler_Profile demux0 unit “$junos-interface-unit” family inet6]
user@host#  set unnumbered-address lo0.0
```

c. Configure the variable for the IPv6 address of the demux interface.

The variable is dynamically replaced with the IPv6 address that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Wholesaler_Profile interfaces demu0 unit “$junos-interface-unit”]
user@host# set demux-source $junos-subscriber-ipv6-address
```

Configuring a Dynamic Profile for use by Each Retailer in the DHCPv6 Solution

To configure a dynamic profile for use with retailer access:

1. Create a retail dynamic profile.

```
[edit]
user@host# edit dynamic-profiles Subscriber_Profile_Retail1
```

2. Define the dynamic routing instance variable in the dynamic profile.

```
[edit dynamic-profiles Subscriber_Profile_Retail1]
user@host# edit routing-instances $junos-routing-instance
```

3. Set the dynamic interface variable for the dynamic routing instance.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 routing-instances “$junos-routing-instance”]
user@host# set interface $junos-interface-name
```

4. Specify that you want to configure the `demux0` interface in the dynamic profile.

```
[edit dynamic-profiles Subscriber_Profile_Retail1]
user@host#  edit interfaces demux0
```

5. Configure the unit for the `demux0` interface.

   a. Configure the variable for the unit number of the `demux0` interface.

      The variable is dynamically replaced with the unit number that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 demux0]
user@host# edit unit $junos-interface-unit
```

   b. Configure the variable for the underlying interface of the demux interfaces and specify the `$junos-underlying-interface` variable.

      The variable is dynamically replaced with the underlying interface that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces demux0 unit “$junos-interface-unit”]
user@host# set demux-options underlying-interface $junos-underlying-interface
```

6. Configure the family for the demux interfaces.

a. Specify that you want to configure the family.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces demux0 unit “$junos-interface-unit”]
user@host# edit family inet6
```

b. Configure the unnumbered address and preferred source address for the family.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 demux0 unit “$junos-interface-unit” family inet6]
user@host#  set unnumbered-address $junos-loopback-interface preferred-source-address $junos-preferred-source-ipv6-address
```

c. Configure the variable that identifies the demux interface on the logical interface.

The variable is dynamically replaced with the IPv6 address that DHCP supplies when the subscriber logs in.

```
[edit dynamic-profiles business-profile interfaces demu0 unit “$junos-interface-unit”]
user@host# set demux-source $junos-subscriber-ipv6-address
```

Configuring Separate Routing Instances for DHCPv6 Service Retailers

As the owner of the system, the wholesaler typically uses the default routing instance. You must create separate routing instances for each individual retailer to keep routing information for individual retailers separate and to define any servers and forwarding options specific to each retailer.

To define a retailer routing instance:

1. Create the retailer routing instance.

```
[edit]
user@host# edit routing-instances Retailer_Instance1
```

2. Specify the routing instance type for the retailer.

```
[edit routing-instances “Retailer_Instance1”]
user@host# set instance-type vrf
```

3. Specify the access profile that you want the routing instance to use.

```
[edit routing-instances “Retailer_Instance1”]
user@host# set access-profile Retailer_Access1
```

4. Specify the interface that faces the Retailer1 RADIUS server.

```
[edit routing-instances “Retailer_Instance1”]
user@host# set interface ge-11/1/9.10
```

5. Specify the loopback interface unit for this routing instance.

```
[edit routing-instances “RetailerInstance1”]
user@host# set interface lo0.1
```

NOTE: Loopback interfaces must be unique for each routing instance.

6. Repeat this procedure for other retailers.

Configuring Address Server Elements for the DHCPv6 Layer 3 Wholesale Solution

IN THIS SECTION

Configuring a DHCPv6 Address Assignment Pool

Address assignment pools enable you to specify groups of IPv6 addresses that different client applications can share. In this configuration, the extended DHCPv6 local server configuration uses the address pool to provide addresses to subscribers that are accessing the network. You must create separate address assignment pools for each retailer routing instance.

You can create address assignment pools that provide full 128 bit IPv6 addresses or pools that provide prefixes of a specified length.

To configure an address assignment pool that provides full 128 -bit IPv6 addresses:

1. Create and name an address assignment pool.

```
[edit]
user@host# edit access address-assignment pool AddressPool_1
```

2. Edit the address pool family.

```
[edit access address-assignment pool AddressPool_1]
user@host# edit family inet6
```

3. Define the IPv6 network prefix.

```
[edit access address-pool AddressPool_1 family inet6]
user@host# set prefix 2001:db8:2121::0/64
```

4. Define a named address range for the pool of IPv6 addresses.

```
[edit access address-assignment pool AddressPool_1 family inet6]
user@host# set range Range1 low 2001:db8:2121::a/128
user@host# set range Range1 high 2001:db8:2121::7ffe/128
```

5. (Optional) Edit the family DHCP attributes.

```
[edit access address-assignment pool AddressPool_1 family inet6]
user@host# edit dhcp-attributes
```

6. (Optional) Set the maximum lease time.

```
[edit access address-assignment pool AddressPool_1 family inet dhcp-attributes]
user@host# set maximum-lease-time 3600
```

7. (Optional) Set the grace period.

```
[edit access address-assignment pool AddressPool_1 family inet dhcp-attributes]
user@host# set grace-period 60
```

To configure an address assignment pool that provides shorter, 74-bit IPv6 prefixes:

1. Create and name an address assignment pool.

```
[edit]
user@host# edit access address-assignment pool AddressPool_2
```

2. Edit the address pool family.

```
[edit access address-assignment pool AddressPool_2]
user@host# edit family inet6
```

3. Define the IPv6 network prefix.

```
[edit access address-pool AddressPool_2 family inet6]
user@host# set prefix 2001:db8:2222::0/64
```

4. Define a named address range limit for the pool of IPv6 addresses.

```
[edit access address-assignment pool AddressPool_2 family inet6]
user@host# set range BitLimit prefix-length 74
```

5. (Optional) Edit the family DHCP attributes.

```
[edit access address-assignment pool AddressPool_2 family inet6]
user@host# edit dhcp-attributes
```

6. (Optional) Set the maximum lease time.

```
[edit access address-assignment pool AddressPool_2 family inet dhcp-attributes]
user@host# set maximum-lease-time 3600
```

7. (Optional) Set the grace period.

```
[edit access address-assignment pool AddressPool_2 family inet dhcp-attributes]
user@host# set grace-period 60
```

Configuring Extended DHCPv6 Local Server

You can enable the MX Series router to function as an extended DHCPv6 local server. The extended DHCPv6 local server provides IPv6 addresses and other configuration information to a subscriber logging into the network. You must configure extended DHCPv6 local server for the wholesaler (default) routing instance and also for each retailer routing instance.

To configure the DHCPv6 local server:

1. Edit the routing system services.

```
[edit]
user@host# edit system services
```

2. Edit the DHCPv6 local server.

```
[edit system services]
user@host# edit dhcp-local-server
```

3. Define the DHCP pool match order.

```
[edit system services dhcp-local-server]
user@host# set pool-match-order ip-address-first
```

4. Set the authentication password.

```
[edit system services dhcp-local-server]
user@host# set authentication password $ABC123
```

5. (Optional) Edit the values you want included with the username.

```
[edit system services dhcp-local-server]
user@host# edit authentication username-include
```

6. (Optional) Set the values you want included with the username.

```
[edit system services dhcp-local-server username-include]
user@host# set domain-name example.com
user@host# set user-prefix user-defined-prefix
```

7. Access the DHCPv6-specific service configuration.

```
[edit system services dhcp-local-server]
user@host# edit dhcpv6
```

8. Create and name a DHCPv6 local server group.

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit group dhcp-ls-group
```

9. Specify a dynamic profile that you want the DHCPv6 local server group to use.

```
[edit system services dhcp-local-server dhcpv6 group dhcp-ls-group]
user@host# set dynamic-profile Wholesaler_Profile
```

10. Assign interfaces to the group.

```
[edit system services dhcp-local-server dhcpv6 group dhcp-ls-group]
user@host#  set interface ge-1/3/0.1 upto ge-1/3/0.5
```

11. Edit the DHCPv6 local server trace options.

```
[edit system processes dhcp-service]
user@host# edit traceoptions
```

12. Specify a log file into which you want trace option information to be saved.

```
[edit system processes dhcp-service traceoptions]
user@host# set file dhcp-server-msgs.log
```

13. Specify the DHCPv6 local server message operations that you want saved in the log file.

```
[edit system processes dhcp-service traceoptions]
user@host# set flag all
```

RELATED DOCUMENTATION

Address-Assignment Pools Overview

DHCPv6 Local Server Overview

Example: Retailer Dynamic Profile for a DHCPv6 Wholesale Network

```
dynamic-profiles {
    Subscriber_Profile_Retailer1 {
        routing-instances {
            "$junos-routing-instance" {
                interface "$junos-interface-name";
            }
        }
        interfaces {
            demux0 {
                unit "$junos-interface-unit" {
                    demux-options {
                        underlying-interface "$junos-underlying-interface";
                    }
```

```
                    family inet6 {
                        demux-source {
                            "$junos-subscriber-ip-address";
                        }
                        unnumbered-address "$junos-loopback-interface" preferred-source-address
"$junos-preferred-source-address";
                    }
                }
            }
        }
    }
```

RELATED DOCUMENTATION

Configuring Dynamic Profiles for the DHCPv6 Layer 3 Wholesale Network Solution | 50

Example: Retailer Routing Instances for a DHCPv6 Wholesale Network

```
routing-instances {
    Retailer_Instance1 {
        instance-type vrf;
        access-profile Retailer_Access1;
        interface ge-11/1/9.10;
        interface lo0.1;
        route-distinguisher 1:1;
    }
    Retailer_Instance2 {
        instance-type vrf;
        access-profile  Retailer_Access2;
        interface ge-7/1/9.10;
        interface lo0.2;
    }
}
```

RELATED DOCUMENTATION

Configuring Separate Routing Instances for DHCPv6 Service Retailers | 53

Example: DHCPv6 Address Assignment Pool That Provides Full 128-bit IPV6 Addresses for a DHCPv6 Wholesale Network

```
access {
    address-assignment {
        pool AddressPool_1 {
            family inet6 {
                prefix 2001:db8:2121::0/64;
                range Range1 {
                    low 2001:db8:2121::a/128;
                    high 2001:db8:2121::7ffe/128;
                }
                dhcp-attributes {
                    maximum-lease-time 3600;
                    grace-period 60;
                }
            }
        }
    }
}
```

Example: DHCPv6 Address Assignment Pool That Provides 74-bit IPV6 Prefixes for a DHCPv6 Wholesale Network

```
access {
    address-assignment {
        pool AddressPool_2 {
            family inet6 {
                prefix 2001:db8:2222::0/64;
                range BitLimit prefix-length 74;
                dhcp-attributes {
                    maximum-lease-time 3600;
                    grace-period 60;
                }
            }
            }
            }
```

```
        }
    }
}
```

RELATED DOCUMENTATION

Configuring Address Server Elements for the DHCPv6 Layer 3 Wholesale Solution | 54

Example: Extended DHCPv6 Local Server for a DHCPv6 Wholesale Network

```
system {
    services {
        dhcp-local-server {
            traceoptions {
                file dhcp-server-msgs.log;
                flag all;
            }
            dhcpv6 {
                group dhcp-ls-group {
                    dynamic-profile Wholesaler_Profile;
                    interface ge-1/3/0.1 {
                        upto ge-1/3/0.5;
                    }
                }
            }
            pool-match-order {
                ip-address-first;
            }
            authentication {
                password $ABC123;
                username-include {
                    domain-name example.com;
                    user-prefix user-defined-prefix;
                }
            }
        }
```

```
    }
}
```

RELATED DOCUMENTATION

Configuring Address Server Elements for the DHCPv6 Layer 3 Wholesale Solution | 54

2

PART

Configuring PPPoE Layer 3 Wholesale Networks

CHAPTER 4

Subscriber Management PPPoE Wholesale Overview

IN THIS CHAPTER

Layer 2 and Layer 3 Wholesale Overview

In general, wholesaling broadband services allows service providers to resell broadband services and allows other providers to deploy their own services over the incumbent network. There are different methods to partitioning an access network for resale. The two most common approaches are based on either Layer 2 or Layer 3 information. Wholesale access is the process by which the access network provider (the *wholesaler*) partitions the access network into separately manageable and accountable subscriber segments for resale to other network providers (or *retailers*).

In a Layer 3 wholesale configuration, you partition the wholesaler access network at the network layer or the subscriber IP component by associating the IP component with a distinct Layer 3 domain. In a Layer 2 wholesale configuration, you partition the access network at the subscriber circuit or customer VLAN (C-VLAN) by backhauling the connection through the service provider backbone network to the subscribing retailer network where the access traffic can be managed at higher layers.

In a Junos OS Dynamic Host Configuration Protocol (DHCP) or Point-to-Point Protocol over Ethernet (PPPoE) subscriber access configuration, wholesale partitioning is accomplished through the use of logical systems and routing instances within the router. Logical systems offer a stricter partitioning of routing resources than routing instances. The purpose behind the use of logical systems is to distinctly partition the physical router into separate administrative domains. This partitioning enables multiple providers to administer the router simultaneously, with each provider having access only to the portions of the configuration relevant to their logical system. Junos OS supports up to 15 named logical systems

in addition to the default logical system (that is, `inet.0`). Unless otherwise specified in configuration, all interfaces belong to the default logical system.

> **NOTE**: This Junos OS release supports the use of only the default logical system. Partitioning currently occurs through the use of separate routing instances.

A logical system can have one or more routing instances. Typically used in Layer 3 VPN scenarios, a routing instance does not have the same level of administrative separation as a logical system because it does not offer administrative isolation. However, the routing instance defines a distinct routing table, set of routing policies, and set of interfaces.

RELATED DOCUMENTATION

- Broadband Subscriber Management DHCPv4 Layer 3 Wholesale Topology and Configuration Elements | **8**
- Broadband Subscriber Management PPPoE Layer 3 Wholesale Topology and Configuration Elements | **69**
- Broadband Subscriber Management Layer 2 Wholesale Topology and Configuration Elements | **93**

PPPoE Layer 3 Wholesale Configuration Interface Support

PPPoE Layer 3 wholesale requires the use of PPP interfaces. This means that you must specify the PP0 interface when configuring Layer 3 wholesaling in a PPPoE network.

For general additional information about configuring PPPoE interfaces, see the Junos OS Network Interfaces Library for Routing Devices.

RELATED DOCUMENTATION

- Junos OS Network Interfaces Library for Routing Devices
- *Configuring a PPPoE Dynamic Profile*
- *Configuring Dynamic PPPoE Subscriber Interfaces*

Subscriber to Logical System and Routing Instance Relationship

As subscriber sessions are established, subscriber to logical system/routing instance memberships are established by the AAA framework configured for the default logical system. When configuring Layer 3 wholesaling, you typically configure global (wholesale) information within the default (primary) logical system and default routing instance. Incoming subscribers must then be authenticated, but this authentication can be handled in one of two ways:

- Single (wholesaler only) authentication—Incoming subscribers are authenticated by the wholesaler RADIUS server. After authentication, the subscribers are assigned values specified by dynamic profiles (routing instances, interfaces, and any configuration values) specific to a particular retailer.
- Dual (wholesaler and retailer) authentication—Sometimes referred to as *double-dip authentication*. Incoming subscribers are initially authenticated by RADIUS using the wholesale configuration. Authenticated subscribers are then redirected to other routing instances associated with individual retailer network space. When you redirect subscribers, and those subscribers are to be authenticated by AAA servers owned by individual retailers, the subscribers must be authenticated again by the AAA servers before they are provided an address and any dynamic profile values are assigned. After reauthentication, however, the subscribers are managed normally using any values specific to the retailer routing instance to which they are assigned.

RELATED DOCUMENTATION

Routing Instances Overview

RADIUS VSAs and Broadband Subscriber Management Wholesale Configuration Overview

You can use RADIUS to assign various values through the use of dynamic variables within dynamic profiles. However, the configuration of at least one of the two VSAs described in Table 2 on page 68 is required for a wholesale network to function.

Table 2: Required Juniper Networks VSAs for the Broadband Subscriber Management Wholesale Network Solution

Attribute Number	Attribute Name	Description	Value
26-1	LSRI-Name	Client logical system/ routing instance membership name. Allowed only from RADIUS server for “default” logical system/ routing instance membership.	string: logical system:routing instance
26-25	Redirect-LSRI-Name	Client logical system/ routing instance membership name indicating to which logical system/routing instance membership the request is redirected for user authentication.	string: logical system:routing instance

Specifying the `$junos-routing-instance` dynamic variable in a dynamic profile triggers a RADIUS access-accept response of either the LSRI-Name VSA or the Redirect-LSRI-Name VSA. Returning an LSRI-Name attribute in the access-accept response provides the logical system and routing instance in which the *logical interface* is to be created and the router updates the session database with the specified routing instance value. Returning a Redirect-LSRI-Name attribute in the access-accept response results in the router immediately sending a second access-request message (sometimes referred to as a *double-dip*) to the RADIUS server specified by the logical system:routing instance attribute specified by the Redirect-LSRI-Name VSA.

NOTE: Attributes returned as a result of a second access-request message to the logical system/ routing instance membership specified by the Redirect-LSRI-Name VSA override any prior attributes returned by initial access-accept responses to the default logical system/routing instance membership.

RELATED DOCUMENTATION

Juniper Networks VSAs Supported by the AAA Service Framework

CHAPTER 5

Configuring PPPoE Layer 3 Wholesale Networks

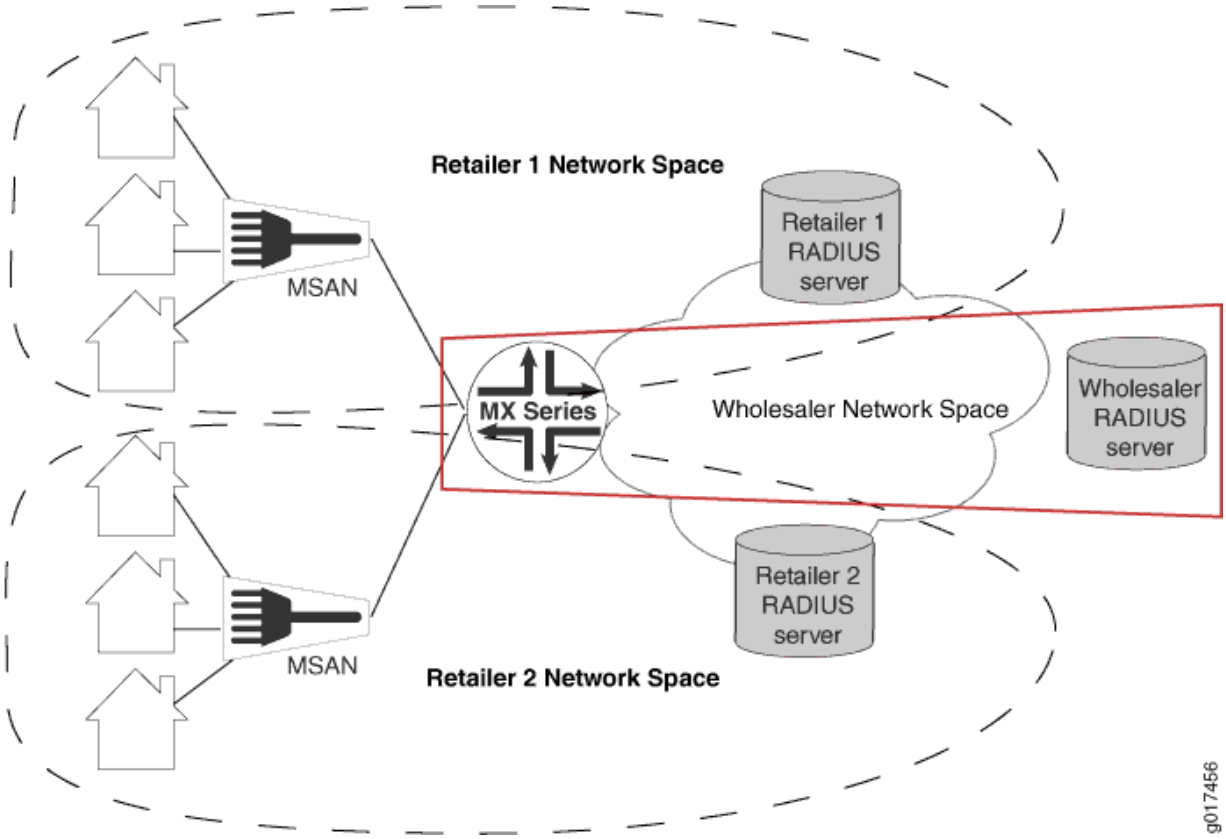
IN THIS CHAPTER

Broadband Subscriber Management PPPoE Layer 3 Wholesale Topology and Configuration Elements

The network topology for the subscriber management PPPoE Layer 3 wholesale solution includes configuring separate routing instances for individual retailers that use a portion of the router.

To explain the concept, but to limit complexity, this solution provides a configuration with one wholesaler and only two retailers. Figure 5 on page 70 illustrates a basic PPPoE Layer 3 wholesale topology model from which you can expand.

Figure 5: Basic Subscriber Management PPPoE Layer 3 Wholesale Solution Topology



When you are configuring a PPPoE Layer 3 wholesale network solution, the following configuration elements are required:

- Subscriber network VLAN configuration
- Addressing server or addressing server access configuration
- RADIUS server access configuration
- Dynamic profile configuration for default (wholesaler) access
- Routing instance configuration for individual retailers
- Group configuration and forwarding options for the network
- Core network configuration

This implementation of PPPoE Layer 3 wholesale supports the following:

- Dynamic PPPoE interface creation.
- Static VLAN use only.

- AAA server assignment of subscribers to different routing instances within the same (default) logical system only.

RELATED DOCUMENTATION

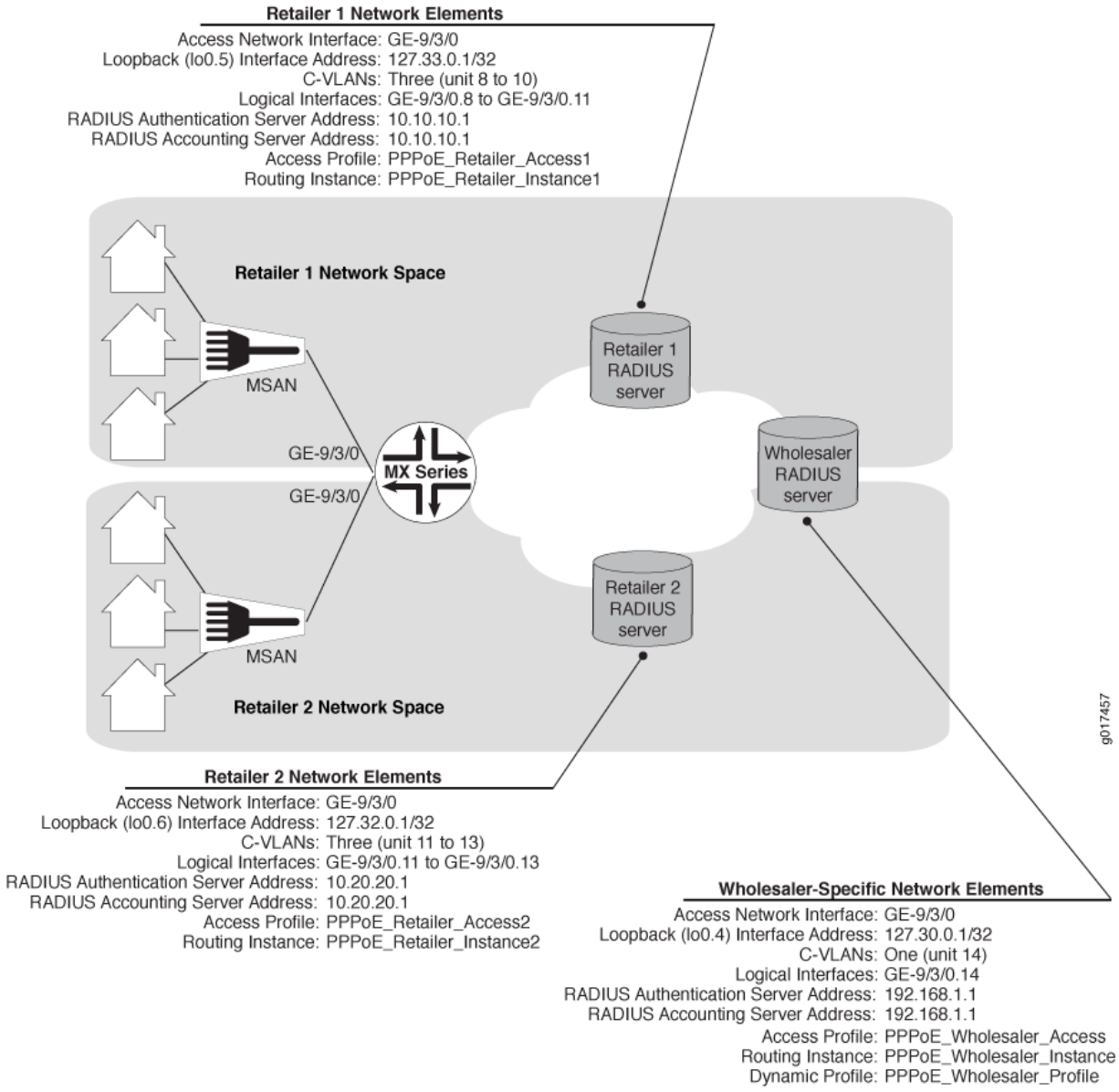
Layer 2 and Layer 3 Wholesale Overview | 2

PPPoE Layer 3 Wholesale Network Topology Overview | 71

PPPoE Layer 3 Wholesale Network Topology Overview

This configuration explains how to configure a simple PPPoE Layer 3 wholesale subscriber access network. This solution incorporates two retailers sharing resources on a wholesaler router. Figure 6 on page 72 provides the reference topology for this configuration example.

Figure 6: PPPoE Layer 3 Wholesale Network Reference Topology



RELATED DOCUMENTATION

Layer 2 and Layer 3 Wholesale Overview | 2

Broadband Subscriber Management DHCPv4 Layer 3 Wholesale Topology and Configuration Elements | 8

Configuring Loopback Interfaces for the PPPoE Layer 3 Wholesale Solution

You must configure loopback interfaces for use in the subscriber management access network. The loopback interfaces are automatically used for unnumbered interfaces.

> **NOTE**: If you do not configure the loopback interface, the routing platform chooses the first interface to come online as the default. If you configure more than one address on the loopback interface, we recommend that you configure one to be the primary address to ensure that it is selected for use with unnumbered interfaces. By default, the primary address is used as the source address when packets originate from the interface.

To configure loopback interfaces:

1. Edit the loopback interface.

```
[edit]
user@host# edit interfaces lo0
```

2. Edit the unit for the wholesale loopback interface.

```
[edit interfaces lo0]
user@host# edit unit 4
```

3. Edit the wholesale loopback interface family.

```
[edit interfaces lo0 unit 4]
user@host# edit family inet
```

4. Specify the wholesale loopback interface address.

```
[edit interfaces lo0 unit 4 family inet]
user@host# set address 127.30.0.1/32
```

5. (Optional) Specify the loopback interface address as the primary loopback interface.

```
[edit interfaces lo0 unit 4 family inet]
user@host# set address 127.30.0.2/32 primary
```

6. Edit the unit for a retail loopback interface.

```
[edit interfaces lo0]
user@host# edit unit 5
```

7. Edit the retail loopback interface family.

```
[edit interfaces lo0 unit 5]
user@host# edit family inet
```

8. Specify the retail loopback interface address.

```
[edit interfaces lo0 unit 5 family inet]
user@host# set address 127.33.0.1/32
```

9. (Optional) Specify the loopback interface address as the primary loopback interface.

```
[edit interfaces lo0 unit 5 family inet]
user@host# set address 127.33.0.2/32 primary
```

10. Repeat steps 7 through 10 for additional retailers, making sure to use unique unit and address values for each retailer loopback interface.

RELATED DOCUMENTATION

- Junos OS Network Interfaces Library for Routing Devices

Configuring Static Customer VLANs for the PPPoE Layer 3 Wholesale Network Solution

In this example configuration, the access interface (`ge-9/3/0`) connects to a device (that is, a DSLAM) on the access side of the network. You can define static customer VLANs (C-VLANs) for use by the wholesaler and any access network subscribers.

To configure the customer VLANs:

1. Edit the access side interface.

```
[edit]
user@host# edit interfaces ge-9/3/0
```

2. Specify the use of flexible VLAN tagging.

```
[edit interfaces ge-9/3/0]
user@host# set flexible-vlan-tagging
```

3. Edit the interface unit for the wholesaler VLAN.

```
[edit interfaces ge-9/3/0]
user@host# edit unit 14
```

4. Specify the type of encapsulation that you want the wholesaler VLAN to use.

```
[edit interfaces ge-9/3/0 unit 14]
user@host# set encapsulation ppp-over-ether
```

5. (Optional) Specify that you want the wholesaler VLAN to use Proxy ARP.

```
[edit interfaces ge-9/3/0 unit 14]
user@host# set proxy-arp
```

6. Define a unique VLAN ID for the wholesaler VLAN.

```
[edit interfaces ge-9/3/0 unit 14]
user@host# set vlan-id 14
```

7. Specify the dynamic profile that you want the wholesaler VLAN to use.

```
[edit interfaces ge-9/3/0 unit 14]
user@host# set pppoe-underlying-options dynamic-profile PPPoE_Wholesaler_Profile
```

Configuring Access Components for the PPPoE Wholesale Network Solution

IN THIS SECTION

When configuring a wholesale network, you must configure several components globally. This configuration provides access to RADIUS servers (if used) that you want the wholesaler and any configured retailers to use globally. The access configuration includes the following general steps:

Configuring RADIUS Server Access

You can globally define any RADIUS servers in your network that either the wholesale access profile or retailer access profile can use. After you define the global RADIUS servers, you can specify specific RADIUS servers within individual access profiles.

To define RADIUS servers for profile access:

1. Access the [edit access radius-server] hierarchy level.

```
[edit ]
user@host# edit access radius-server
```

2. Specify the address and secret for any RADIUS servers in the network.

```
[edit access radius-server]
user@host# set 192.168.10.1 secret $ABC123$ABC123$ABC123
user@host# set 10.10.10.1 secret $ABC123$ABC123
```

SEE ALSO

> *RADIUS Servers and Parameters for Subscriber Access*

Configuring a PPPoE Wholesaler Access Profile

You must define the network and interface over which you want subscribers to initially access the network with a wholesale access profile. When a subscriber attempts to access the network, the access profile provides initial access information including authentication and accounting values that the router uses for the accessing subscriber.

To define a wholesale access profile:

1. Create the wholesale access profile.

```
[edit]
user@host# edit access profile PPPoE_Wholesaler_Access
```

2. Specify the authentication methods for the profile and the order in which they are used.

```
[edit access profile PPPoE_Wholesaler_Access]
user@host# set authentication-order radius
```

3. Specify that you want to configure RADIUS support.

```
[edit access profile PPPoE_Wholesaler_Access]
user@host# edit radius
```

4. Specify the IP address of the RADIUS server used for authentication.

```
[edit access profile PPPoE_Wholesaler_Access radius]
user@host# set authentication-server 192.168.10.1
```

5. Specify the IP address of the RADIUS server used for accounting.

```
[edit access profile PPPoE_Wholesaler_Access radius]
user@host# set accounting-server 192.168.10.1
```

6. Configure any desired options for the RADIUS server.

   See *RADIUS Servers and Parameters for Subscriber Access*.

7. Configure subscriber accounting (RADIUS accounting).

   See *Configuring Per-Subscriber Session Accounting*.

SEE ALSO

> *Configuring Authentication and Accounting Parameters for Subscriber Access*
>
> *Specifying the Authentication and Accounting Methods for Subscriber Access*
>
> *RADIUS Servers and Parameters for Subscriber Access*
>
> *Configuring Per-Subscriber Session Accounting*

Configuring PPPoE Retailer Access Profiles

In this solution, subscribers are redirected to a networking space used by a specific retailer and defined by a unique routing instance. This method requires that you define the network and interface over which you want subscribers to access the network after being redirected by the wholesale access profile.

To define a retailer access profile:

1. Create the retailer access profile.

```
[edit]
user@host# edit access profile PPPoE_Retailer_Access1
```

2. Specify the authentication methods for the profile and the order in which they are used.

```
[edit access profile PPPoE_Retailer_Access1]
user@host# set authentication-order radius
```

3. Specify that you want to configure RADIUS support.

```
[edit access profile PPPoE_Retailer_Access1]
user@host# edit radius
```

4. Specify the IP address of the RADIUS server used for authentication.

```
[edit access profile PPPoE_Retailer_Access1 radius]
user@host# set authentication-server 10.10.10.1
```

5. Specify the IP address of the RADIUS server used for accounting.

```
[edit access profile PPPoE_Retailer_Access1 radius]
user@host# set accounting-server 10.10.10.1
```

6. Configure any desired options for the RADIUS server.

   See *RADIUS Servers and Parameters for Subscriber Access*.

7. Configure subscriber accounting (RADIUS accounting).

   See *Configuring Per-Subscriber Session Accounting*.

SEE ALSO

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *Specifying the Authentication and Accounting Methods for Subscriber Access*
- *RADIUS Servers and Parameters for Subscriber Access*
- *Configuring Per-Subscriber Session Accounting*

Configuring Dynamic Profiles for the PPPoE Layer 3 Wholesale Network Solution

IN THIS SECTION

A dynamic profile is a set of characteristics, defined in a type of template, that you can use to provide services for broadband applications. These services are assigned dynamically to interfaces as they access the network. When configuring dynamic profiles for the PPPoE Layer 3 wholesale network, you can choose to configure one dynamic profile to address all incoming subscribers or you can configure individual dynamic profiles for use by the different network management groups (that is, the wholesaler and any retailers). In fact, you can create multiple dynamic profiles that you can use to roll out different services and selectively apply those dynamic profiles to different subscriber groups as necessary.

In this solution example, one dynamic profile is created for use by the wholesaler when subscribers initially access the network. Subscribers are assigned by the wholesaler RADIUS server to a particular retailer routing instance and can then be redirected to that retailer network space.

Configuring a Wholesale Dynamic Profile for use in the PPPoE Solution

You can configure a basic access profile to initially manage PPPoE subscribers that access the network.

To configure a dynamic profile for use by the wholesaler:

1. Create a wholesale dynamic profile.

```
[edit]
user@host# edit dynamic-profiles PPPoE_Wholesaler_Profile
```

2. Define the dynamic routing instance variable in the dynamic profile.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile]
user@host# edit routing-instances $junos-routing-instance
```

3. Set the dynamic interface variable for the dynamic routing instance.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile routing-instances “$junos-routing-instance”]
user@host# set interface $junos-interface-name
```

4. Specify that you want to configure the pp0 interface in the dynamic profile.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile]
user@host# edit interfaces pp0
```

5. Configure the unit for the pp0 interface.

   a. Configure the variable for the unit number of the pp0 interface.

      The variable is dynamically replaced with the unit number that RADIUS supplies when the subscriber logs in.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile interfaces pp0]
user@host# edit unit $junos-interface-unit
```

   b. Configure PAP or CHAP (or both) to function on the interface.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile interfaces pp0 unit “$junos-interface-
unit”]
user@host# set ppp-options chap pap
```

   c. Configure the variable for the underlying interface of the pp0 interfaces.

      The variable is dynamically replaced with the underlying interface that RADIUS supplies when the subscriber logs in.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile interfaces pp0 unit “$junos-interface-
unit”]
user@host# set pppoe-options underlying-interface $junos-underlying-interface
```

   d. Configure the router to act as a PPPoE server.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile interfaces pp0 unit “$junos-interface-
unit”]
user@host# set pppoe-options server
```

6. (Optional) Modify the PPPoE keepalive interval.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile interfaces pp0 unit “$junos-interface-unit”]
user@host# set keepalives interval 15
```

7. Configure the family for the `pp0` interface.

   a. Specify that you want to configure the family.

> **NOTE**: You can specify `inet` for IPv4 and `inet6` for IPv6. However, this solution provides the IPv4 configuration only.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile interfaces pp0 unit “$junos-interface-unit”]
user@host# edit family inet
```

   b. Configure the unnumbered address for the family.

```
[edit dynamic-profiles PPPoE_Wholesaler_Profile interfaces pp0 unit “$junos-interface-unit” family inet]
user@host#  set unnumbered-address $junos-loopback-interface
```

Configuring Separate Routing Instances for PPPoE Service Retailers

As the owner of the system, the wholesaler uses the default routing instance. You must create separate routing instances for each individual retailer to keep routing information for individual retailers separate and to define any servers and forwarding options specific to each retailer.

To define a retailer routing instance:

1. Create the retailer routing instance.

```
[edit]
user@host# edit routing-instances PPPoE_Retailer_Instance1
```

2. Specify the routing instance type for the retailer.

```
[edit routing-instances “PPPoE_Retailer_Instance1”]
user@host# set instance-type vrf
```

3. Specify the access profile that you want the routing instance to use.

```
[edit routing-instances “PPPoE_Retailer_Instance1”]
user@host# set access-profile PPPoE_Retailer_Access1
```

4. Specify the interface that faces the Retailer1 RADIUS server.

```
[edit routing-instances “PPPoE_Retailer_Instance1”]
user@host# set interface ge-11/1/9.10
```

5. Specify the loopback interface unit for this routing instance.

```
[edit routing-instances “PPPoE_Retailer_Instance1”]
user@host# set interface lo0.5
```

NOTE: Loopback interfaces must be unique for each routing instance.

6. Specify an identifier to distinguish the VPN to which the route belongs.

```
[edit routing-instances “PPPoE_Retailer_Instance1”]
user@host# set route-distinguisher 1:1
```

7. Specify how routes are imported into the local PE router’s VPN routing table from the remote PE router.

```
[edit routing-instances “PPPoE_Retailer_Instance1”]
user@host# set vrf-import policyImport
```

8. Specify which routes are exported from the local instance table to the remote PE router.

```
[edit routing-instances “PPPoE_Retailer_Instance1”]
user@host# set vrf-export policyExport
```

9. Repeat this procedure for other retailers.

Example: Wholesaler Dynamic Profile for a PPPoE Wholesale Network

This example specifies a dynamic profile name of *PPPoE_Wholesaler_Profile*, uses pp0 interfaces, and references the predefined input firewall filter.

```
PPPoE_Wholesaler_Profile {
    routing-instances {
        "$junos-routing-instance" {
            interface "$junos-interface-name";
        }
    }
    interfaces {
        pp0 {
            unit "$junos-interface-unit" {
                ppp-options {
                    chap;
                    pap;
                }
                pppoe-options {
                    underlying-interface "$junos-underlying-interface";
                    server;
                }
                keepalives interval 15;
                family inet {
                    filter {
                        input "$junos-input-filter";
                        output "$junos-output-filter";
                    }
                    unnumbered-address "$junos-loopback-interface";
                }
            }
        }
```

```
    }
}
```

RELATED DOCUMENTATION

Configuring Dynamic Profiles for the PPPoE Layer 3 Wholesale Network Solution | 80

Example: Retailer Routing Instances for a PPPoE Wholesale Network

```
routing-instances {
    PPPoE_Retailer_Instance1 {
        instance-type vrf;
        access-profile PPPoE_Retailer_Access1;
        interface ge-11/1/9.10;
        interface lo0.5;
        route-distinguisher 1:1;
        vrf-import policyImport;
        vrf-export policyExport;
    }
    Retailer_Instance2 {
        instance-type vrf;
        access-profile  PPPoE_Retailer_Access2;
        interface ge-11/1/9.10;
        interface lo0.6;
        route-distinguisher 2:2;
        vrf-import policyImport;
        vrf-export policyExport;
    }
}
```

RELATED DOCUMENTATION

Configuring Separate Routing Instances for PPPoE Service Retailers | 82

3

PART

Configuring Layer 2 Wholesale Networks

CHAPTER 6

Subscriber Management Layer 2 Wholesale Overview

IN THIS CHAPTER

Layer 2 and Layer 3 Wholesale Overview

In general, wholesaling broadband services allows service providers to resell broadband services and allows other providers to deploy their own services over the incumbent network. There are different methods to partitioning an access network for resale. The two most common approaches are based on either Layer 2 or Layer 3 information. Wholesale access is the process by which the access network provider (the *wholesaler*) partitions the access network into separately manageable and accountable subscriber segments for resale to other network providers (or *retailers*).

In a Layer 3 wholesale configuration, you partition the wholesaler access network at the network layer or the subscriber IP component by associating the IP component with a distinct Layer 3 domain. In a Layer 2 wholesale configuration, you partition the access network at the subscriber circuit or customer VLAN (C-VLAN) by backhauling the connection through the service provider backbone network to the subscribing retailer network where the access traffic can be managed at higher layers.

In a Junos OS Dynamic Host Configuration Protocol (DHCP) or Point-to-Point Protocol over Ethernet (PPPoE) subscriber access configuration, wholesale partitioning is accomplished through the use of logical systems and routing instances within the router. Logical systems offer a stricter partitioning of routing resources than routing instances. The purpose behind the use of logical systems is to distinctly partition the physical router into separate administrative domains. This partitioning enables multiple providers to administer the router simultaneously, with each provider having access only to the portions of the configuration relevant to their logical system. Junos OS supports up to 15 named logical systems

in addition to the default logical system (that is, `inet.0`). Unless otherwise specified in configuration, all interfaces belong to the default logical system.

> **NOTE**: This Junos OS release supports the use of only the default logical system. Partitioning currently occurs through the use of separate routing instances.

A logical system can have one or more routing instances. Typically used in Layer 3 VPN scenarios, a routing instance does not have the same level of administrative separation as a logical system because it does not offer administrative isolation. However, the routing instance defines a distinct routing table, set of routing policies, and set of interfaces.

RELATED DOCUMENTATION

- Broadband Subscriber Management DHCPv4 Layer 3 Wholesale Topology and Configuration Elements | 8
- Broadband Subscriber Management PPPoE Layer 3 Wholesale Topology and Configuration Elements | 69
- Broadband Subscriber Management Layer 2 Wholesale Topology and Configuration Elements | 93

Wholesale Network Configuration Options and Considerations

You can configure a wholesale network any number of ways using Juniper Networks hardware and Junos OS software. The general configuration options, and considerations for each, are provided in the following table:

Wholesale Configuration Options	Considerations
Fully Static (all interfaces, VLANs, and routing instances are configured statically)	Providing more control over retailer space and access, this option is more labor intensive and can require more detailed planning of the network, address allocation, and so on.

(Continued)

Wholesale Configuration Options	Considerations
Static VLANs and Dynamic Demux Interfaces	Service VLANS are created statically and must be managed. Demux interfaces are dynamically created over the service VLANs. This option uses more logical interfaces; one for each VLAN and one for each dynamic demux interface that runs over each VLAN.
Dynamic VLANs Only (dedicated customer VLANs for each subscriber)	Dynamic (auto-sensed) VLANs are authenticated and installed in the correct non-default routing instance before DHCP is instantiated. This method helps to conserve logical interfaces by avoiding the need for additional logical interfaces being created for each demux interface. **NOTE**: In a customer VLAN model, each VLAN functions on a 1:1 basis for each customer (in this case, per household).
Dynamic VLANs and Dynamic Demux Interfaces	Allows for the greatest ease of use and flexibility in configuring subscribers, by enabling access over a service VLAN and targetting more service levels over individual, dynamically-created demux interfaces over the service VLAN. This option uses more logical interfaces; one for each VLAN and one for each demux interface that runs over each VLAN.

RADIUS VSAs and Broadband Subscriber Management Wholesale Configuration Overview

You can use RADIUS to assign various values through the use of dynamic variables within dynamic profiles. However, the configuration of at least one of the two VSAs described in Table 3 on page 90 is required for a wholesale network to function.

Table 3: Required Juniper Networks VSAs for the Broadband Subscriber Management Wholesale Network Solution

Attribute Number	Attribute Name	Description	Value
26-1	LSRI-Name	Client logical system/ routing instance membership name. Allowed only from RADIUS server for “default” logical system/ routing instance membership.	string: logical system:routing instance
26-25	Redirect-LSRI-Name	Client logical system/ routing instance membership name indicating to which logical system/routing instance membership the request is redirected for user authentication.	string: logical system:routing instance

Specifying the `$junos-routing-instance` dynamic variable in a dynamic profile triggers a RADIUS access-accept response of either the LSRI-Name VSA or the Redirect-LSRI-Name VSA. Returning an LSRI-Name attribute in the access-accept response provides the logical system and routing instance in which the *logical interface* is to be created and the router updates the session database with the specified routing instance value. Returning a Redirect-LSRI-Name attribute in the access-accept response results in the router immediately sending a second access-request message (sometimes referred to as a *double-dip*) to the RADIUS server specified by the logical system:routing instance attribute specified by the Redirect-LSRI-Name VSA.

NOTE: Attributes returned as a result of a second access-request message to the logical system/ routing instance membership specified by the Redirect-LSRI-Name VSA override any prior attributes returned by initial access-accept responses to the default logical system/routing instance membership.

RELATED DOCUMENTATION

Juniper Networks VSAs Supported by the AAA Service Framework

Extensible Subscriber Services Manager

IN THIS SECTION

Extensible Subscriber Services Manager Overview

Extensible Subscriber Services Manager (ESSM) is a background process that is part of the Intelligent Customer Extendable authentication, authorization, and accounting (ICE-AAA) framework, which supports customer extensible services for both business and residential subscribers. Services are classified as residential or business on the basis of the value specified for the RADIUS VSA (26-173) `ERX-Service-Activate-Type` that is received in the Access-Accept message.

Extensible Subscriber Services Manager uses the ICE-AAA framework, which comprises a dictionary, operation scripts, and RADIUS vendor-specific attributes (VSAs), to create business services for subscribers without modifying Junos OS. Extensible Subscriber Services Manager supports only the `ERX-Activate` service type.

Using the Extensible Subscriber Services Manager, you can create business services using the following sources:

- The dictionary that refers to or invokes the operation scripts.
- The operation scripts that you use to create subscriber-specific configuration
- The VSAs that the RADIUS server sends that contain configuration values for provisioning services

SEE ALSO

Understanding the Dictionary File | 92

show subscribers

show subscribers summary

Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167

Understanding the Dictionary File

The XML-based dictionary specifies the action to be taken by ESSMD when it receives a service request. The dictionary contains provisioning, deprovisioning, and operation scripts. ESSMD parses the dictionary file during initialization and stores the parsed information in the database. Extensible Subscriber Services Manager acts on the extensible-subscriber-service requests on the basis of the services configured in the dictionary file.

During a commit operation, essmd verifies the path and the filename of the dictionary file. If the path or the filename is invalid, the commit operation fails and the error is logged in a system log message. Restarting the daemon or performing a graceful Routing Engine switchover (GRES) operation forces essmd to use the new dictionary. Ensure that you always configure a valid dictionary for essmd.

When loading the dictionary file after a successful commit operation, essmd validates whether:

- There are errors in parsing the dictionary file.
- The operation scripts specified in the dictionary file are available on the router.
- Any active services are modified.

If the validation fails, an error is logged in a system log message, and essmd continues to use the existing version of the dictionary file. Use the `request services extensible-subscriber-services reload-dictionary` command to reload the dictionary file after resolving the errors.

SEE ALSO

dictionary

show extensible-subscriber-services dictionary | **657**

show extensible-subscriber-services dictionary attributes | **663**

show extensible-subscriber-services dictionary services | **667**

CHAPTER 7

Configuring Layer 2 Wholesale Networks

IN THIS CHAPTER

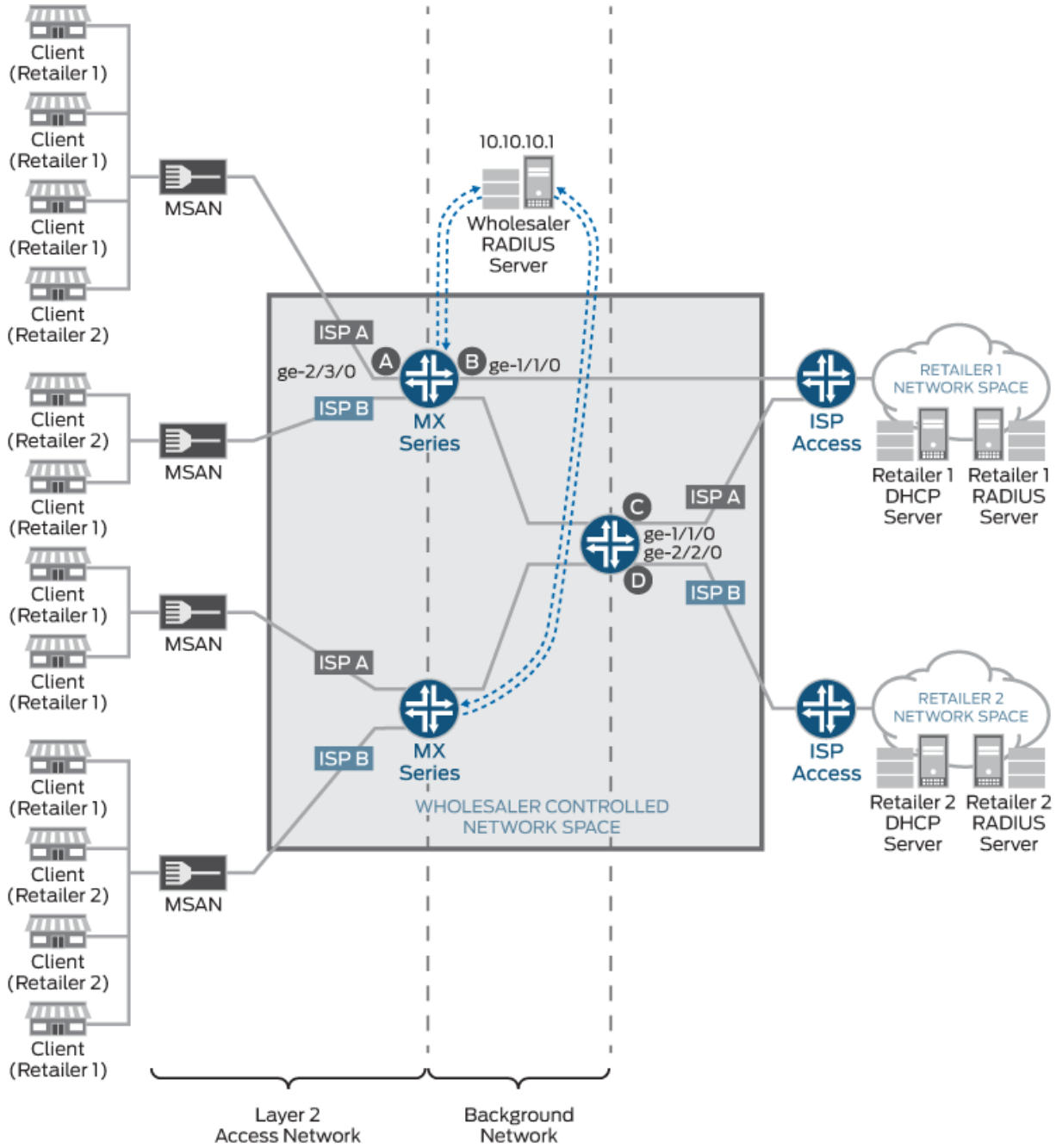
Broadband Subscriber Management Layer 2 Wholesale Topology and Configuration Elements

The network topology for the subscriber management Layer 2 wholesale solution includes configuring separate routing instances for individual retailers that use a portion of the router. This solution uses a Virtual Private LAN Service (VPLS) configuration.

Layer 2 wholesale networks are supported on MPC/MIC interfaces.

To explain the concept but limit complexity, this solution provides a configuration with one wholesaler and only two retailers. Figure 7 on page 95 illustrates a basic Layer 2 wholesale topology model from which you can expand.

Figure 7: Basic Subscriber Management Layer 2 Wholesale Solution Topology



When you are configuring a Layer 2 wholesale network solution, the following configuration elements are required:

- Subscriber access dynamic VLAN configuration including dynamic profile configuration for retailer routing instances
- Routing instance configuration for individual retailers on provider edge (PE) routers and network-to-network interface (NNI) routers.
- VLAN interface configuration
- RADIUS server access configuration
- Core network configuration

RELATED DOCUMENTATION

Layer 2 and Layer 3 Wholesale Overview | 2

Layer 2 Wholesale Network Topology Overview | 96

Layer 2 Wholesale Network Topology Overview

This configuration explains how to configure a simple Layer 2 wholesale subscriber access network. This solution illustrates two Internet Service Provider (ISP) retailers sharing access to a wholesaler network. The wholesaler network contains a Layer 2 Network access router and two Virtual Private LAN Service (VPLS) network-to-network interface (NNI) routers.

NOTE: You can have more than one ISP router connecting to a single VPLS NNI router with VPLS interfaces configured with routing instances specific to each different ISP-facing interfaces.

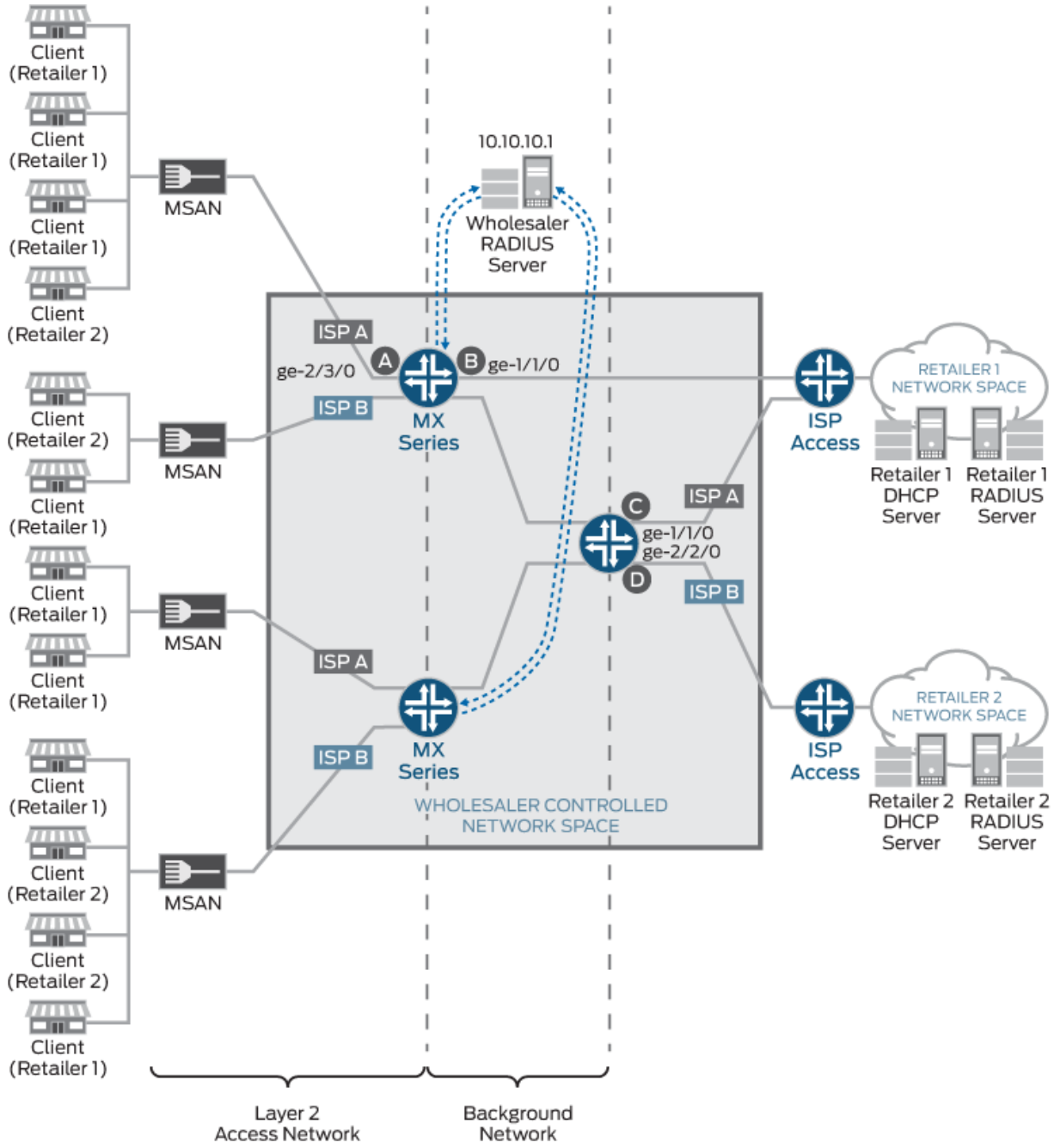
The example also shows two different connection options from one subscriber access router to one of the individual ISP access routers. One connection option uses an interface on the subscriber access router to connect directly to the ISP access router. Another connection option uses two routers: a subscriber access router and another NNI router that connects to the ISP access router.

NOTE: When using the NNI router connection option, use a standard BGP or MPLS configuration between the subscriber access routers and the edge router that connects to the

ISP access routers. See the BGP User Guide for information about BGP configuration. See the MPLS Applications User Guide for information about MPLS configuration.

Figure 8 on page 98 provides the reference topology for this configuration example.

Figure 8: Layer 2 Wholesale Network Reference Topology



RELATED DOCUMENTATION

Layer 2 and Layer 3 Wholesale Overview | 2

Broadband Subscriber Management Layer 2 Wholesale Topology and Configuration Elements | 93

Configuring a Retail Dynamic Profile for Use in the Layer 2 Wholesale Solution

To configure a dynamic profile for use with retailer access:

NOTE: To support Layer 2 access profiles the RADIUS server must provide VLAN authentication.

1. Create a retail dynamic profile.

```
[edit]
user@host# edit dynamic-profiles Subscriber_Profile_Retail1
```

2. Define the dynamic routing instance variable in the dynamic profile.

```
[edit dynamic-profiles Subscriber_Profile_Retail1]
user@host# edit routing-instances $junos-routing-instance
```

3. Set the dynamic interface variable for the dynamic routing instance.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 routing-instances “$junos-routing-instance”]
user@host# set interface $junos-interface-name
```

4. Define the dynamic interfaces variable for the dynamic profile.

```
[edit dynamic-profiles Subscriber_Profile_Retail1]
user@host# edit interfaces $junos-interface-ifd-name
```

5. Define the dynamic interface unit variable for the dynamic profile.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name”]
user@host# edit unit $junos-interface-unit
```

6. (Optional) Define VLAN encapsulation for the dynamic interfaces.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit”]
user@host# set encapsulation vlan-vpls
```

> **NOTE**: If you choose not to specify an encapsulation for the logical interface, you must specify an encapsulation for the physical interface.

7. Define the VLAN tag parameters for the dynamic profile:

> **NOTE**: This solution example uses stacked VLAN tagging. However, you can also specify single-tag VLANs. For additional information about configuring dynamic VLANs, see the Broadband Subscriber VLANs and Interfaces User Guide.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit”]
user@host# set vlan-tags outer "$junos-stacked-vlan-id" inner "$junos-vlan-id"
```

8. Define the input and output VLAN maps. See "Stacking and Rewriting VLAN Tags for the Layer 2 Wholesale Solution" on page 102 for details. For our example, we use:

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit”]
user@host# set input-vlan-map swap-push
user@host# set input-vlan-map vlan-id "$junos-vlan-map-id"
user@host# set input-vlan-map inner-vlan-id "$junos-inner-vlan-map-id"
user@host# set output-vlan-map pop-swap
user@host# set output-vlan-map inner-tag-protocol-id 0x8100
```

9. Specify the unit family as `vpls` at the `[edit dynamic-profiles` *`profile-name`* `interfaces “$junos-interface-ifd-name” unit “$junos-interface-unit” family]` hierarchy level.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit”]
user@host# set family vpls
```

The result is a dynamic subscriber profile that uses RADIUS authentication to assign the outer VLAN ID dynamically.

The dynamic profile is displayed in curly brace format:

```
[edit]
user@host# show dynamic-profiles
Subscriber_Profile_Retail1
    routing-instances {
        "$junos-routing-instance" {
            interface "$junos-interface-name";
        }
    }
    interfaces {
        "$junos-interface-ifd-name" {
            unit "$junos-interface-unit" {
                encapsulation vlan-vpls;
                vlan-tags outer "$junos-stacked-vlan-id" inner "$junos-vlan-id";
                input-vlan-map {
                    swap-push;
                    vlan-id "$junos-vlan-map-id";
                    inner-vlan-id "$junos-inner-vlan-map-id";
                }
                output-vlan-map {
                    pop-swap;
                    inner-tag-protocol-id 0x8100;
                }
                family vpls;
            }
        }
    }
```

The need to authenticate the VLAN through RADIUS is specified by `"$junos-vlan-map-id"` and `"$junos-vlan-id"` parameters.

The outer VLAN ID is returned by the RADIUS server as part of the user name attribute, as shown:

```
Type: VLAN
User Name: user1.xe-0/1/0:2015
Logical System: default
Routing Instance: ISP02-Test
Interface: xe-0/1/0.3221225509
```

```
Interface type: Dynamic
Underlying Interface: xe-0/1/0
Core IFL Name: xe-0/1/3.0
Dynamic Profile Name: Subscriber_Profile_Retail1
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 43
Session ID: 43
PFE Flow ID: 87
VLAN Id: 2015
VLAN Map Id: 100
Inner VLAN Map Id: 201
Login Time: 2021-07-07 06:42:33 PDT
Dynamic configuration:
  junos-vlan-map-id: 100
```

Stacking and Rewriting VLAN Tags for the Layer 2 Wholesale Solution

Stacking and rewriting VLAN tags allows you to use an additional (outer) VLAN tag to differentiate between routers in the Layer 2 wholesale network. A frame can be received on an interface, or it can be internal to the system (as a result of the `input-vlan-map` statement).

You can configure rewrite operations to stack (`push`), remove (`pop`), or rewrite (`swap`) tags on single-tagged frames and dual-tagged frames. If a port is not tagged, rewrite operations are not supported on any logical interface on that port.

You can configure the following single-action VLAN rewrite operations:

- `pop`—Remove a VLAN tag from the top of the VLAN tag stack. The outer VLAN tag of the frame is removed.
- `push`—Add a new VLAN tag to the top of the VLAN stack. An outer VLAN tag is pushed in front of the existing VLAN tag.
- `swap`—Replace the inner VLAN tag of the incoming frame with a user-specified VLAN tag value.

You configure VLAN rewrite operations for logical interfaces in the input VLAN map for incoming frames and in the output VLAN map for outgoing frames.

You can include both the `input-vlan-map` and `output-vlan-map` statements at the `[edit dynamic-profiles` *`profile-name`* `interface “$junos-interface-ifd-name” unit ” $junos-interface-unit]` hierarchy level.

The type of VLAN rewrite operation permitted depends upon whether the frame is single-tagged or dual-tagged. Table 4 on page 103 shows supported rewrite operations and whether they can be applied to single-tagged frames or dual-tagged frames. The table also indicates the number of tags being added or removed during the operation.

Table 4: Rewrite Operations on Single-Tagged and Dual-Tagged Frames

Rewrite Operation	Single-Tagged	Dual-Tagged	Number of Tags
pop	Yes	Yes	– 1
push	Yes	Yes	+1
swap	Yes	Yes	0

Depending on the VLAN rewrite operation, you configure the rewrite operation for the interface in the input VLAN map, the output VLAN map, or both. Table 5 on page 103 shows what rewrite operation combinations you can configure. “None” means that no rewrite operation is specified for the VLAN map.

Table 5: Applying Rewrite Operations to VLAN Maps

Input VLAN Map	Output VLAN Map			
	none	push	pop	swap
none	Yes	No	No	Yes
push	No	No	Yes	No
pop	No	Yes	No	No
swap	Yes	No	No	Yes

To configure the input VLAN map:

NOTE: You configure the `input-vlan-map` statement only when there is a need either to push an outer tag on a single-tagged subscriber packet or to modify the outer tag in a subscriber dual-tagged packet.

1. Include the `input-vlan-map` statement.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit”]
user@host# edit input-vlan-map
```

2. Specify the action that you want the input VLAN map to take.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit” input-vlan-map]
user@host# set push
```

3. Include the `vlan-id` statement along with the `$junos-vlan-map-id` dynamic variable.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit” input-vlan-map]
user@host# set vlan-id $junos-vlan-map-id
```

To configure the output VLAN map:

NOTE: You configure the `output-vlan-map` statement only when there is a need to either pop or modify the outer tag found in a dual-tagged packet meant for the subscriber.

1. Include the `output-vlan-map` statement.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit”]
user@host# edit output-vlan-map
```

2. Specify the action that you want the output VLAN map to take.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit” output-vlan-map]
user@host# set pop
```

You must know whether the VLAN rewrite operation is valid and is applied to the input VLAN map or the output VLAN map. You must also know whether the rewrite operation requires you to include statements to configure the inner and outer tag protocol identifiers (TPIDs) and inner and outer VLAN IDs in the input VLAN map or output VLAN map. For information about configuring inner and outer TPIDs and inner and outer VLAN IDs, see Configuring Inner and Outer TPIDs and VLAN IDs.

Configuring VLAN Interfaces for the Layer 2 Wholesale Solution

Clients access the Layer 2 Wholesale network through a specific interface. After they access this interface, and when they are authenticated, VLANs are dynamically created to carry the client traffic.

NOTE: To support Layer 2 access profiles the RADIUS server must provide VLAN authentication.

To configure a VLAN interface for dynamic client access:

1. Access the physical interface that you want to use for dynamically creating VLAN interfaces.

```
[edit interfaces]
user@host# edit ge-2/3/0
```

2. Specify the encapsulation type for the VLAN interfaces.

```
[edit interfaces ge-2/3/0]
user@host# set encapsulation flexible-ethernet-services
```

3. Specify the desired VLAN tagging.

NOTE: This example uses flexible VLAN tagging to simultaneously support transmission of 802.1Q VLAN single-tag and dual-tag frames on logical interfaces on the same Ethernet port.

```
[edit interfaces ge-2/3/0]
user@host# set flexible-vlan-tagging
```

4. Specify that you want to automatically configure VLAN interfaces.

```
[edit interfaces ge-2/3/0]
user@host# edit auto-configure
```

5. Specify that you want to configure stacked VLANs.

```
[edit interfaces ge-2/3/0 auto-configure]
user@host# edit stacked-vlan-ranges
```

6. Create the dynamic VLAN profile that you want the interface to use.

```
[edit interfaces ge-2/3/0 auto-configure stacked-vlan-ranges]
user@host# edit dynamic-profile Subscriber_Profile_Retail1
```

7. Define the VLAN ranges for the dynamic profile.

```
[edit interfaces ge-2/3/0 auto-configure stacked-vlan-ranges dynamic-profile
“Subscriber_Profile_Retail1”]
user@host# set accept any
user@host# set ranges any,any
```

8. Move up two levels in the configuration hierarchy to define the VLAN authentication profile.

```
[edit interfaces ge-2/3/0 auto-configure stacked-vlan-ranges dynamic-profile
“Subscriber_Profile_Retail1”]
user@host# up 2
[edit interfaces ge-2/3/0 auto-configure stacked-vlan-ranges]
user@host# set authentication password abc123
user@host# set authentication username-include user-prefix user1
```

```
user@host# set authentication username-include interface-name
user@host# set access-profile access-profile-1
```

9. Define a simple access profile that specifies the RADIUS server used to provide VLAN authentication. Use the `top` command to position yourself at the edit hierarchy.

```
[edit]
user@host# set access profile access-profile-1 radius-server 10.10.10.1 secret abc123
```

10. Repeat steps for any other interfaces that you want to use for creating VLANs.

The configuration of the VLAN Interface for the Layer 2 wholesale dynamic profile is displayed in curly brace format:

```
[edit]
user@host# show interfaces
ge-2/3/0 {
    flexible-vlan-tagging;
    auto-configure {
        stacked-vlan-ranges {
            dynamic-profile Subscriber_Profile_Retail1 {
                accept any;
                ranges {
                    any,any;
                }
            }
            authentication {
                password abc123;
                username-include {
                    user-prefix user1;
                    interface-name;
                }
            }
            access-profile access-profile-1;
        }
    }
}
```

RELATED DOCUMENTATION

Configuring Encapsulation for Layer 2 Wholesale VLAN Interfaces | 108

Configuring Encapsulation for Layer 2 Wholesale VLAN Interfaces

Each dynamic VLAN interface in a Layer 2 wholesale network must use encapsulation. You can configure encapsulation dynamically for each VLAN interface by using the `encapsulation` statement at the `[edit dynamic-profiles *profile-name* interface "$junos-interface-ifd-name" unit "$junos-interface-unit"]` hierarchy level or configure encapsulation for the physical interfaces at the `[edit interfaces *interface-name*]` hierarchy level for each dynamically created VLAN interface to use. However, how you choose to configure (or not configure) encapsulation at the `[edit dynamic-profiles *profile-name* interface "$junos-interface-ifd-name" unit "$junos-interface-unit"]` hierarchy level affects how you configure encapsulation at the `[edit interfaces *interface-name*]` hierarchy level.

Table 6 on page 108 provides the valid encapsulation combinations for both dynamic profiles and physical interfaces in the Layer 2 wholesale network.

Table 6: Encapsulation Combinations for Layer 2 Wholesale Interfaces

Dynamic Profile Encapsulation	Physical Interface Encapsulation	Usage Notes
`vlan-vpls`	`vlan-vpls`	Using the `vlan-vpls` encapsulation type in both the dynamic profile and when configuring the physical interface limits the VLAN ID value to a number greater than or equal to 512.
`vlan-vpls`	`flexible-ethernet-services`	Using the `flexible-ethernet-services` encapsulation type removes any VLAN ID value limitation.
`vlan-vpls`	`extended-vlan-vpls`	The `extended-vlan-vpls` encapsulation type can support multiple TPIDs. Using this encapsulation type removes any VLAN ID value limitation.

Table 6: Encapsulation Combinations for Layer 2 Wholesale Interfaces *(Continued)*

Dynamic Profile Encapsulation	Physical Interface Encapsulation	Usage Notes
No encapsulation type	`extended-vlan-vpls`	The `extended-vlan-vpls` encapsulation type can support multiple TPIDs. Using this encapsulation type removes any VLAN ID value limitation.

To configure encapsulation for Layer 2 wholesale VLAN interfaces:

1. (Optional) Define the VLAN encapsulation for the dynamic interfaces.

```
[edit dynamic-profiles Subscriber_Profile_Retail1 interfaces “$junos-interface-ifd-name” unit
“$junos-interface-unit”]
user@host# set encapsulation encapsulation-type
```

2. Specify the encapsulation type for the physical VLAN interface.

```
[edit interfaces ge-2/3/0]
user@host# edit encapsulation encapsulation-type
```

NOTE: If you choose not to specify an encapsulation for the logical interface, you must specify `extended-vlan-vpls` encapsulation for the physical interface.

RELATED DOCUMENTATION

Configuring a Retail Dynamic Profile for Use in the Layer 2 Wholesale Solution | 99

Configuring VLAN Interfaces for the Layer 2 Wholesale Solution | 105

Configuring NNI ISP-Facing Interfaces for the Layer 2 Wholesale Solution

You must configure separate, ISP-facing interfaces on each NNI ISP-facing router that connect to individual retailer ISP access routers in the Layer 2 Wholesale solution.

NOTE: On the network-to-network (NNI) or egress interfaces of provider edge (PE) routers, you cannot configure the `inner-range` *vid1-vid2* option with the `vlan-tags` statement for ISP-facing interfaces.

To configure an NNI ISP-facing interface:

1. Access the physical interface that you want to use to access the retailer ISP network.

```
[edit interfaces]
user@host# edit interfaces ge-1/1/0
```

2. Specify the encapsulation type for the VLAN interfaces.

```
[edit interfaces ge-1/1/0]
user@host# edit encapsulation ethernet-vpls
```

3. Specify the interface unit that you want ISP clients to use.

```
[edit interfaces ge-1/1/0]
user@host# edit unit 0
```

4. Repeat these steps for any other NNI ISP-facing interfaces that you want to use. In this example, you must also configure interface `ge-2/2/0.0`.

RELATED DOCUMENTATION

Configuring Direct ISP-Facing Interfaces for the Layer 2 Wholesale Solution | 110

Configuring Separate Access Routing Instances for Layer 2 Wholesale Service Retailers | 112

Configuring Direct ISP-Facing Interfaces for the Layer 2 Wholesale Solution

When connecting a subscriber access router directly to an ISP access router, you must define any ISP-facing interfaces that connect to the retailer ISP access routers as core-facing interfaces.

To configure a direct ISP-facing interface:

1. Access the physical interface that you want to use to access the retailer ISP network.

```
[edit interfaces]
user@host# edit interfaces ge-1/1/0
```

2. Specify the encapsulation type for the VLAN interfaces.

```
[edit interfaces ge-1/1/0]
user@host# edit encapsulation ethernet-vpls
```

3. Specify the interface unit that you want ISP clients to use.

```
[edit interfaces ge-1/1/0]
user@host# edit unit 1
```

4. Specify the unit family.

```
[edit interfaces ge-1/1/0 unit 1]
user@host# set family vpls
```

5. Define the interface as core-facing to ensure that the network does not improperly treat the interface as a client interface..

```
[edit interfaces ge-1/1/0 unit 1 family vpls]
user@host# set core-facing
```

6. Repeat steps for any other direct ISP-facing interfaces that you want to use..

RELATED DOCUMENTATION

Configuring NNI ISP-Facing Interfaces for the Layer 2 Wholesale Solution | 109

Configuring Separate Access Routing Instances for Layer 2 Wholesale Service Retailers | 112

Configuring Separate Access Routing Instances for Layer 2 Wholesale Service Retailers

As the owner of the system, the wholesaler uses the default routing instance. You must create separate routing instances for each individual retailer to keep routing information for individual retailers separate and to define any servers and forwarding options specific to each retailer.

When creating separate routing instances, it is important to understand the role that the router plays in the Layer 2 Wholesale network and specify that role (either access or NNI) in the routing instance configuration. If the router connects directly to an ISP network (or ISP-controlled device), you must configure the routing instances as an NNI routing instance. See "Configuring Separate NNI Routing Instances for Layer 2 Wholesale Service Retailers" on page 115.

To define an access retailer routing instance:

1. Create the retailer routing instance.

```
[edit]
user@host# edit routing-instances RetailerInstance1
```

2. Specify the VLAN model that you want the retailer to follow.

```
[edit routing-instances RetailerInstance1]
user@host# set vlan-model one-to-one
```

3. Specify the role that you want the routing instance to take.

```
[edit routing-instances RetailerInstance1]
user@host# set instance-role access
```

4. Specify the routing instance type for the retailer.

```
[edit routing-instances RetailerInstance1]
user@host# set instance-type l2backhaul-vpn
```

5. Specify the access interface for the retailer.

```
[edit routing-instances RetailerInstance1]
user@host# set interface ge-2/3/0.0
```

6. Specify that access ports in this VLAN domain do not forward packets to each other.

```
[edit routing-instances RetailerInstance1]
user@host# set no-local-switching
```

7. Specify a unique identifier attached to a route that enables you to distinguish to which VPN the route belongs.

```
[edit routing-instances RetailerInstance1]
user@host# set route-distinguisher 10.10.1.1:1
```

8. (Optional) Specify a VRF target community.

```
[edit routing-instances RetailerInstance1]
user@host# set vrf-target target:100:1
```

> **NOTE**: The purpose of the `vrf-target` statement is to simplify the configuration by allowing you to configure most statements at the `[edit routing-instances]` hierarchy level.

9. Define the VPLS protocol for the routing instance.

   a. Access the routing instance `protocols` hierarchy.

```
[edit routing-instances RetailerInstance1]
user@host# edit protocols
```

   b. Enable VPLS on the routing instance.

```
[edit routing-instances RetailerInstance1 protocols]
user@host# edit vpls
```

   c. Specify the maximum number of sites allowed for the VPLS domain.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set site-range 10
```

d. Specify the size of the VPLS MAC address table for the routing instance.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set mac-table-size 6000
```

e. Specify the maximum number of MAC addresses that can be learned by the VPLS routing instance.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set interface-mac-limit 2000
```

f. (Optional) Specify the `no-tunnel-services` statement if the router does not have a Tunnel Services PIC.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set no-tunnel-services
```

g. Specify a site name.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set site A-PE
```

h. Specify a site identifier.

```
[edit routing-instances RetailerInstance1 protocols vpls site A-PE]
user@host# set site-identifier 1
```

10. Repeat this procedure for other retailers. In this example, you must configure a routing instance for Retailer 2.

RELATED DOCUMENTATION

Configuring the VPLS Site Name and Site Identifier

Configuring NNI ISP-Facing Interfaces for the Layer 2 Wholesale Solution | 109

Configuring Separate NNI Routing Instances for Layer 2 Wholesale Service Retailers | 115

Configuring Separate NNI Routing Instances for Layer 2 Wholesale Service Retailers

As the owner of the system, the wholesaler uses the default routing instance. You must create separate routing instances for each individual retailer to keep routing information for individual retailers separate and to define any servers and forwarding options specific to each retailer.

When creating separate routing instances, it is important to understand the role that the router plays in the Layer 2 Wholesale network and specify that role (either access or NNI) in the routing instance configuration. If the router connects to the access portion of the network (for example, to an MSAN device) , you must configure the routing instances as an access routing instance. See "Configuring Separate Access Routing Instances for Layer 2 Wholesale Service Retailers" on page 112.

To define a retailer routing instance:

1. Create the retailer routing instance.

```
[edit]
user@host# edit routing-instances RetailerInstance1
```

2. Specify the VLAN model that you want the retailer to follow.

```
[edit routing-instances RetailerInstance1]
user@host# set vlan-model one-to-one
```

3. Specify the role that you want the routing instance to take.

```
[edit routing-instances RetailerInstance1]
user@host# set instance-role nni
```

4. Specify the routing instance type for the retailer.

```
[edit routing-instances RetailerInstance1]
user@host# set instance-type l2backhaul-vpn
```

5. Define the NNI ISP-facing interface for this retailer.

```
[edit routing-instances RetailerInstance1]
user@host# set interface ge-1/1/0.0
```

6. Specify that access ports in this VLAN domain do not forward packets to each other.

```
[edit routing-instances RetailerInstance1]
user@host# set no-local-switching
```

7. Specify a unique identifier attached to a route that enables you to distinguish to which VPN the route belongs.

```
[edit routing-instances RetailerInstance1]
user@host# set route-distinguisher 10.10.10.1:1
```

8. (Optional) Specify a VRF target community.

```
[edit routing-instances RetailerInstance1]
user@host# set vrf-target target:100:1
```

> **NOTE**: The purpose of the `vrf-target` statement is to simplify the configuration by allowing you to configure most statements at the `[edit routing-instances]` hierarchy level.

9. Define the VPLS protocol for the routing instance.

   a. Access the routing instance `protocols` hierarchy.

```
[edit routing-instances RetailerInstance1]
user@host# edit protocols
```

   b. Enable VPLS on the routing instance.

```
[edit routing-instances RetailerInstance1 protocols]
user@host# edit vpls
```

   c. Specify the maximum number of sites allowed for the VPLS domain.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set site-range 1000
```

d. (Optional) Specify the `no-tunnel-services` statement if the router does not have a Tunnel Services PIC.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set no-tunnel-services
```

e. Specify a site name.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set site A-PE
```

f. Specify a site identifier.

```
[edit routing-instances RetailerInstance1 protocols vpls site A-PE]
user@host# set site-identifier 1
```

g. Define the connectivity of the VPLS routing instance as `permanent` to keep the VPLS connection up until specifically taken down.

```
[edit routing-instances RetailerInstance1 protocols vpls]
user@host# set connectivity-type permanent
```

10. Repeat this procedure for other retailers.

RELATED DOCUMENTATION

Configuring the VPLS Site Name and Site Identifier

Configuring VLAN Interfaces for the Layer 2 Wholesale Solution | 105

Configuring Separate Access Routing Instances for Layer 2 Wholesale Service Retailers | 112

Configuring Access Components for the Layer 2 Wholesale Network Solution

IN THIS SECTION

When configuring a wholesale network, you must configure several components globally. This configuration provides access to RADIUS servers (if used) that you want the wholesaler and any configured retailers to use globally. The access configuration includes the following general steps:

Configuring RADIUS Server Access

You can globally define any RADIUS servers in your network that either the wholesale access profile or retailer access profile can use. After you define the global RADIUS servers, you can specify specific RADIUS servers within individual access profiles.

To define RADIUS servers for profile access:

1. Access the `[edit access radius-server]` hierarchy level.

```
[edit ]
user@host# edit access radius-server
```

2. Specify the address and secret for any RADIUS servers in the network.

```
[edit access radius-server]
user@host# set 192.168.10.1 secret $ABC123$ABC123$ABC123
user@host# set 10.10.10.1 secret $ABC123$ABC123
```

SEE ALSO

RADIUS Servers and Parameters for Subscriber Access

Configuring a Layer 2 Wholesaler Access Profile

You must define the network and interface over which you want subscribers to initially access the network with a wholesale access profile. When a subscriber attempts to access the network, the access profile provides initial access information including authentication and accounting values that the router uses for the accessing subscriber.

To define a wholesale access profile:

1. Create the wholesale access profile.

```
[edit]
user@host# edit access profile AccessProfile
```

2. Specify the authentication methods for the profile and the order in which they are used.

```
[edit access profile AccessProfile]
user@host# set authentication-order radius password
```

3. Specify that you want to configure RADIUS support.

```
[edit access profile AccessProfile]
user@host# edit radius
```

4. Specify the IP address of the RADIUS server used for authentication.

```
[edit access profile AccessProfile radius]
user@host# set authentication-server 10.10.10.1
```

5. Specify the IP address of the RADIUS server used for accounting.

```
[edit access profile AccessProfile radius]
user@host# set accounting-server 10.10.10.1
```

6. Configure any desired options for the RADIUS server.

   See *Configuring Access Profile Options for Interactions with RADIUS Servers*.

7. Configure subscriber accounting (RADIUS accounting).

   See *Configuring Per-Subscriber Session Accounting*.

SEE ALSO

Configuring Authentication and Accounting Parameters for Subscriber Access

Specifying the Authentication and Accounting Methods for Subscriber Access

RADIUS Servers and Parameters for Subscriber Access

Configuring Per-Subscriber Session Accounting

Example: Retailer Dynamic Profile for a Layer 2 Wholesale Network

```
dynamic-profiles {
    Subscriber_Profile_Retail1 {
        routing-instances {
            "$junos-routing-instance" {
                interface "$junos-interface-name";
            }
        }
        interfaces {
            "$junos-interface-ifd-name" {
                unit "$junos-interface-unit" {
                    encapsulation vlan-vpls;
                    vlan-tags outer "$junos-stacked-vlan-id" inner "$junos-vlan-id";
                    input-vlan-map {
                        swap;
                        vlan-id "$junos-vlan-map-id";
                    }
                    output-vlan-map swap;
                    family vpls;
                }
            }
        }
    }
```

RELATED DOCUMENTATION

Layer 2 and Layer 3 Wholesale Overview | 2

Layer 2 Wholesale Network Topology Overview | 96

Configuring a Retail Dynamic Profile for Use in the Layer 2 Wholesale Solution | 99

Example: Access Interface for a Layer 2 Wholesale Network

```
interfaces {
    ge-2/3/0 {
    flexible-vlan-tagging;
    auto-configure {
        stacked-vlan-ranges {
            dynamic-profile Subscriber_Profile_Retail1 {
                accept any;
                ranges {
                    any,any;
                }
            }
            access-profile AccessProfile;
        }
    }
    encapsulation flexible-ethernet-services;
}
```

RELATED DOCUMENTATION

- Layer 2 and Layer 3 Wholesale Overview | 2
- Layer 2 Wholesale Network Topology Overview | 96
- Configuring VLAN Interfaces for the Layer 2 Wholesale Solution | 105

Example: Retailer Access Routing Instances for a Layer 2 Wholesale Network

You need to create a routing instance for each retailer to keep routing information for different retailers separate and to define servers and forwarding options specific to each retailer.

There are two types of routing instances that you can create: access or NNI. The following code snippets show how to configure separate access routing instances for two retailers: Retailer_Instance1 and Retailer_Instance2.

```
routing-instances {
    Retailer_Instance1 {
        vlan-model one-to-one;
        instance-role access;
        instance-type l2backhaul-vpn;
        interface ge-1/1/0.0
        no-local-switching;
        route-distinguisher 10.10.1.1:1;
        vrf-target target:100:1;
        protocols {
            vpls {
                site-range 10;
                mac-table-size {
                    6000;
                }
                interface-mac-limit {
                    2000;
                }
                no-tunnel-services;
                site A-PE {
                    site-identifier 1;
                }
            }
        }
    }
    Retailer_Instance2 {
        vlan-model one-to-one;
        instance-role access;
        instance-type l2backhaul-vpn;
        interface ge-2/2/0.0
        no-local-switching;
        route-distinguisher 10.10.1.1:2;
        vrf-target target:300:1;
        protocols {
            vpls {
                site-range 1000;
                no-tunnel-services;
                site A-PE {
```

```
                    site-identifier 1;
                }
            }
        }
    }
}
```

RELATED DOCUMENTATION

- Layer 2 and Layer 3 Wholesale Overview | 2
- Layer 2 Wholesale Network Topology Overview | 96
- Configuring Separate Access Routing Instances for Layer 2 Wholesale Service Retailers | 112

Example: Retailer NNI ISP-Facing Interfaces for a Layer 2 Wholesale Network

```
interfaces {
    ge-1/1/0 {
    description Retailer 1 NNI ISP-facing interface;
    encapsulation ethernet-vpls;
    unit 0{
}
interfaces {
    ge-2/2/0 {
    description Retailer 2 NNI ISP-facing interface;
    encapsulation ethernet-vpls;
    unit 0;
}
```

RELATED DOCUMENTATION

- Layer 2 and Layer 3 Wholesale Overview | 2
- Layer 2 Wholesale Network Topology Overview | 96
- Configuring Separate NNI Routing Instances for Layer 2 Wholesale Service Retailers | 115

Example: Retailer Direct ISP-Facing Interface for a Layer 2 Wholesale Network

```
interfaces {
    ge-1/1/0 {
    description Retailer 1 Direct ISP-facing interface;
    encapsulation ethernet-vpls;
    unit 1
        family vpls {
            core-facing;
        }
    }
}
```

RELATED DOCUMENTATION

- Layer 2 and Layer 3 Wholesale Overview | **2**
- Layer 2 Wholesale Network Topology Overview | **96**
- Configuring Direct ISP-Facing Interfaces for the Layer 2 Wholesale Solution | **110**

PART 4

Configuring ANCP-Triggered Layer 2 Wholesale Services

CHAPTER 8

ANCP-Triggered Layer 2 Wholesale Service Overview

IN THIS CHAPTER

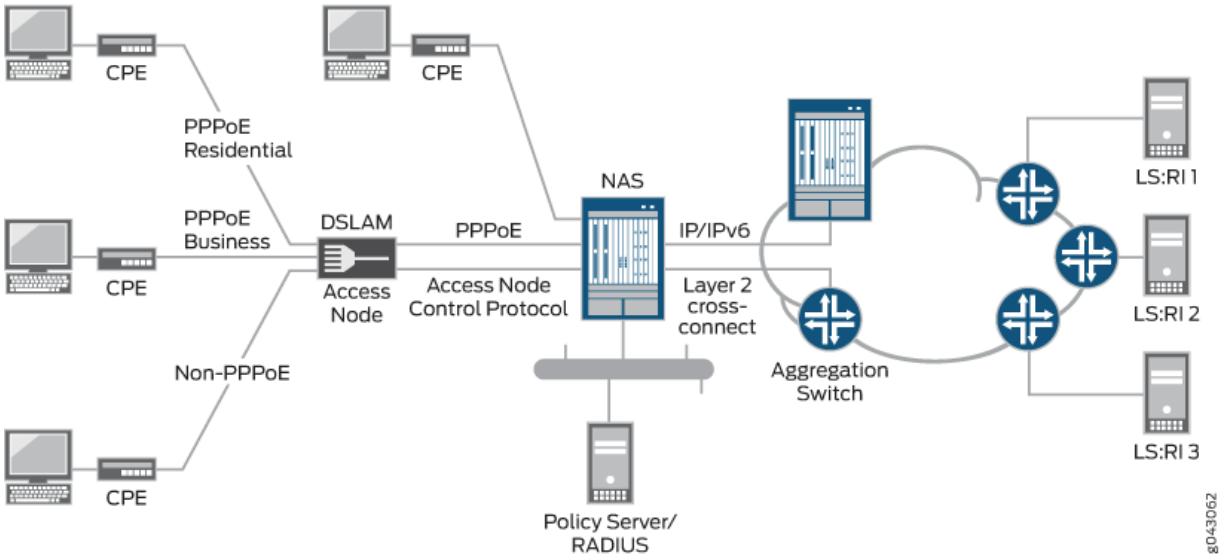
Layer 2 Wholesale with ANCP-Triggered VLANs Overview

IN THIS SECTION

The conventional mechanism for triggering autosensed dynamic VLANs relies on access line attributes provided by PPPoE or DHCP traffic in upstream control packets. Packets of a specified type are exceptioned and authorization depends on fields extracted from the packet as specified in a dynamic profile assigned to the autosensed VLAN range. However, for some wholesale networks, the traffic might not be PPPoE or DHCP. In this case, a different mechanism is required.

Figure 9 on page 127 shows a sample topology with direct connections between the wholesaler's BNG and the NSP (network service provider) routers for the retailers. Each retailer's network resides in a dedicated routing instance. The wholesaler uses Layer 2 cross-connects to implement the retail networks with 1:1 autosensed, dynamic VLANs and VLAN tag swapping. Core-facing physical interfaces are dedicated to forwarding subscriber connections to the retailer's router. The traffic for an entire outer VLAN can be wholesaled this way. This direct-connect model supports any combination of wholesaler-owned and wholesaled connections for the entire access-facing VLAN range.

Figure 9: Sample Layer 2 Wholesale Access Topology



A wholesaler providing Layer 2 bitstream access to NSP partners might use this model. Bitstream access enables retailers to offer bidirectional transmission of broadband data and other high-speed services directly to customers across the wholesaler's network. In this topology, the PPPoE residential and subscriber customers are retained by the wholesaler (access provider). The non-PPPoE connections (here multiple connections and subscribers are represented by a single line) can be wholesaled to retail NSPs.

In this model, dynamic VLAN detection and creation for the wholesaled connections do not use in-band control packets. Instead, they rely on an out-of-band protocol, ANCP. ANCP Port Up messages both announce to the ANCP agent on the BNG that new access lines are operational and provide updates

about previously announced lines. The messages include ANCP DSL attributes that correspond to Juniper Networks DSL VSAs and DSL Forum VSAs.

Starting in Junos OS Release 16.1R4, you can configure the ANCP agent to trigger the creation of an autosensed VLAN when the ANCP agent receives a Port Up message where the DSL-Line-State attribute has a value of Showtime. The Showtime state indicates that ports are configured, the subscriber is connected, and the DSL modem is online and ready to transfer data. The other possible values of the attribute, Idle and Silent, are ignored for this purpose and are used by the ANCP agent only to update the ANCP session database (SDB).

During VLAN authorization, RADIUS determines which traffic belongs to the access provider's own subscribers and which belongs to the wholesale customer (retail NSP) based on identification of the subscriber's access line by the agent remote identifier.

When the ANCP agent receives the Port Up message, the agent triggers the autoconfiguration daemon, autoconfd, to initiate the VLAN detection, authorization, and creation processes. Those processes require the following information:

- Three ANCP subscriber access loop attributes (TLVs) that identify the access line and are conveyed in the Port Up message:
    - Access-Loop-Circuit-ID—Access loop circuit identifier used by the ANCP agent to determine which logical interface or interface set corresponds to the subscriber; corresponds to the Juniper Networks Acc-Loop-Cir-ID VSA (26-110).
    - Access-Loop-Remote-ID—Unique identifier of the access line; corresponds to the Juniper Networks Acc-Loop-Remote-ID VSA (26-182).
    - Access-Aggregation-Circuit-ID-Binary—Identifier that represents the outer VLAN tag that the access node inserts on upstream traffic; corresponds to the Juniper Networks Acc-Aggr-Cir-Id-Bin VSA (26-111).
- The name of the physical interface facing the subscriber. This name derives from the local mapping of an ANCP neighbor to the corresponding subscriber-facing access port.

The Access-Aggregation-Circuit-ID-Binary attribute and the access-facing interface name together provide information equivalent to that used for conventional autosensed VLAN detection.

ANCP Port Down messages indicate that the subscriber access loop is not present or at least is no longer operational. This message triggers the automatic destruction of the dynamic VLAN, regardless of the value of any other ANCP line attribute.

VLAN logical interfaces are created in the default routing-instance unless a nondefault routing instance is provided by local authorization (domain map) or external authorization (RADIUS). Multiple routing instances are required when both access-provider-owned and wholesaled connections are supported at the same time. One routing instance is required for the access provider's own subscribers. An additional routing instance is required for each retail NSP. Consequently, the routing-instance has to be specified

when the VLAN is authorized. The RADIUS-based VLAN authorization process determines whether the subscriber access-loop identified by the attributes in the Port Up message is wholesaled to a partner NSP—and therefore maintained as a unique routing-instance—or managed as a subscriber owned by the access provider.

RADIUS Authorization for ANCP-Triggered VLANs

When a subscriber logs in, the Access-Request message that is sent to the RADIUS server includes a username and optionally a password generated locally on the router. You can configure the router to create a unique username with the value of ANCP TLVs— Access-Loop-Circuit-ID, Access-Loop-Remote-Id, or both—as received in the ANCP Port Up message from the access node. Alternatively, if you configure the router to convey ANCP-sourced access loop attributes as Juniper Networks VSAs—in this case Acc-Loop-Cir-Id (26-110) and Acc-Loop-Remote-Id (26-182)—then the Access-Request message includes sufficient unique access line information for the RADIUS server to determine whether the access loop is wholesaled to a retailer or retained for the wholesaler.

The RADIUS server responds to the Access-Request with one of the following messages:

- Access-Accept—In this case, the VLAN triggered by the Port Up message is wholesaled to a retail NSP. Authorization is similar to that for PPPoE sessions. The Access-Accept includes the Virtual-Router VSA (26-1) with a value that corresponds to the NSP's unique, nondefault routing instance. The message can optionally include client services, such as attributes for parameterized CoS, firewall filters and policies for the logical interface, and Layer 2 service activations.
- Access-Reject—In this case, either the VLAN triggered by the Port Up message is one of the wholesaler's own subscribers or RADIUS refuses to grant access to the network. In either case, the VLAN entry is removed from the ANCP SDB. Unless a Port Down message is received first, the router ignores subsequent Port Up messages for this subscriber. However, conventional dynamic stacked VLAN autosensing may be initiated by access protocol negotiation, such as PPPoE.

Instantiation of an ANCP-Triggered, Autosensed, Dynamic VLAN

When the RADIUS server returns an Access-Accept message, the dynamic profile assigned to the autosensed VLAN range is instantiated with the following results:

1. The dynamic VLAN logical interface that represents the Layer 2 wholesale service within the NSP's unique routing instance is created.
2. A core-facing physical interface is selected by a weighted load distribution method from the set of eligible interfaces assigned to the NSP's routing instance. A physical interface is eligible when it is operationally up and has at least one VLAN tag that is available for assignment.
3. The access-facing, autosensed outer VLAN tag is mapped to a unique inner VLAN tag. The outer VLAN tag is derived from the Access-Aggregation-Circuit-ID-Binary TLV carried in the ANCP Port

Up message. The inner VLAN tag is allocated from the VLAN range configured for the core-facing physical interface.

4. The inner VLAN tag is swapped with (replaces) the outer VLAN tag when the subscriber traffic is tunneled to the NSP. In the dynamic profile, the inner VLAN tag is provided by the predefined variable, `$junos-inner-vlan-map-id`.

5. The autosensed outer VLAN tag is swapped with the inner VLAN tag when downstream packets from the NSP (which include the allocated inner VLAN tag) are forwarded to the subscriber.

   You can configure each core-facing physical interface with a range of up to 4094 VLAN IDs. The inner VLAN swap range is assigned to the physical interface locally. This means that inner VLAN ranges for different physical interfaces can overlap each other completely, partially, or not at all.

6. Optionally, before the subscriber packets are forwarded to an NSP, the outer VLAN tag protocol identifier (TPID) in the subscriber packets can be swapped with a TPID to meet the requirements of an individual NSP. In this case, the original value is swapped with the NSP TPID for packets forwarded to the subscriber.

7. An additional VLAN tag, the Trunk VLAN ID, is used internally to identify the provisioned core-facing physical interface so that the subscriber traffic can be tunneled to the allocated interface. In the dynamic profile, this ID is provided by the predefined variable, `$junos-vlan-map-id`. This identifier differentiates among multiple core-facing trunk physical interfaces for the same NSP.

8. Any client services, such as CoS or firewall filters, are applied to the subscriber session. These services are optionally specified in the RADIUS configuration and conveyed in the RADIUS message as Juniper Networks VSAs.

9. The VLAN session is activated after the logical interface is created and configured for the dynamic VLAN session. Session activation initiates a RADIUS Accounting-Start message. Any services that were received from RADIUS during authorization are now activated.

10. After the dynamic VLAN has been created, subsequent ANCP Port Up messages do not cause a re-authorization of the dynamic VLAN session. Instead, when the ANCP agent receives another Port Up message for the access loop, it updates the ANCP SDB with any changes in ANCP attributes.

Weighted Load Balancing for Subscriber Sessions over Eligible Core-Facing Physical Interfaces

Tthe router uses weighted load distribution instead of round-robin distribution to assign Layer 2 wholesale subscriber sessions across multiple core-facing physical interfaces according to the weight of the interface. The weight of an interface correlates with the number of VLAN tags available from the aggregate inner (core-facing) VLAN ID swap ranges on the interface.

How you configure the inner VLAN ID swap ranges determines the relative weights of the interfaces:

- The interface with the highest number of available inner VLAN ID tags has the highest weight.
- The interface with the next-highest number of tags has the next-highest weight, and so on.
- The interface with the lowest number of available tags has the lowest weight.

Using the available inner VLAN ID tags from the swap ranges rather than the aggregate total VLAN tags means that the relative weights of the interfaces are more dynamic. The weighted load distribution mechanism can respond more quickly to subscriber logouts, migration of subscriber ownership from wholesaler to retailer and retailer to wholesaler, core-facing physical interface state transitions (including movement to the remaining eligible core-facing interfaces when an interface state transitions from Up to Down), and failures of any of the core-facing physical interfaces. When an interface recovers (transitions from Down to Up), weighted load distribution generally favors this interface for either pending sessions or for new Layer 2 wholesale sessions that subsequently occur.

NOTE: Core-facing physical interface selection and session distribution are probability based; the load is not strictly distributed according to weight.

With weighted load distribution the router selects interfaces randomly, but the sessions are distributed across interfaces proportionally in relationship to the weight of the interfaces. The router generates a random number within a range equal to the aggregate total of all available inner VLAN ID tags from the swap ranges of all the core-facing physical interfaces. The router then associates part of the range—a pool of numbers—with each interface proportional to the interface's weight. An interface with a higher weight is associated with a greater portion of the range—a larger pool—than an interface with a lower weight. An interface is selected when the random number is in its associated pool of numbers. The random number is more likely, on average, to be in a larger pool, so an interface with a higher weight (larger pool) is more likely to be selected than an interface with a lower weight (smaller pool).

For example, consider two core-facing physical interfaces, IFD1 and IFD2. Based on the inner VLAN ID swap ranges configured for these two interfaces, IFD1 has 1000 available VLAN tags and IFD2 has only 500 available tags. The subscriber sessions are randomly distributed across the two interfaces based on their relative weights; IFD1 has a higher weight than IFD2. Because IFD1 has twice as many available tags as IFD2, the pool of numbers associated with IFD1 is also twice as many as for IFD2. The random number generated by the router is twice as likely to be in the pool for IFD1 than for IFD2. Consequently, IFD1 is favored 2:1 over IFD2, and subscriber sessions are twice as likely to be assigned to IFD1 as IFD2.

RADIUS Interim Accounting Updates

Interim accounting reports sent to AAA for out-of-band triggered, autosensed dynamic VLANs are supported in the same manner as for conventional autosensed, dynamic, authorized VLANs or client sessions (such as PPPoE sessions). The ANCP agent sends a notification to AAA when it receives an

update from the access node. By default, AAA only reports the update to the RADIUS server at the configured interval.

You can configure the ANCP agent so that when it notifies AAA, an interim update Accounting-Request message is immediately sent to the RADIUS server. Immediate interim accounting updates can be sent for an ANCP-triggered dynamic VLAN session only when a change occurs in certain key ANCP attributes for the associated access line that can influence system behavior. To prevent an additional load on the RADIUS server for changes to less critical ANCP attributes, changes to any other ANCP attributes do not trigger immediate accounting-interim-update messages. Instead, those changes are reported in the next scheduled Accounting-Interim-Update message.

Immediate interim accounting updates can be sent for changes to any of the following ANCP attributes for an existing session that corresponds to the access line (based on the Access-Loop-Circuit-ID TLV):

- Actual-Net-Data-Rate-Upstream—When the calculated (adjusted) upstream rate results in a change to this attribute, the accounting message reports the attribute in the Juniper Networks Act-Data-Rate-Up VSA (26-113). The calculated speed change is reported in the Upstream-Calculated-QoS-Rate VSA (26-142).

- Actual-Net-Data-Rate-Downstream—When the calculated (adjusted) downstream rate results in a change to this attribute , the accounting message reports the attribute in the Juniper Networks Act-Data-Rate-Dn VSA (26-114). The calculated speed change is reported in the Downstream-Calculated-QoS-Rate VSA (26-141).

When the `ancp-speed-change-immediate-update` statement is configured at the `[edit access profile` *`profile-name`* `accounting]` hierarchy level, RADIUS immediate interim accounting updates are sent for changes to the Actual-Net-Data-Rate-Upstream and Actual-Net-Data-Rate-Downstream TLVs.

When in addition the `auto-configure-trigger interface` *`interface-name`* statement is configured at the `[edit protocols ancp neighbor` *`ip-address`*`]` hierarchy level, immediate interim accounting updates are also sent for changes to the Access-Loop-Remote-ID and Access-Aggregation-Circuit-ID-Binary TLVs.

For more information about RADIUS immediate interim accounting updates, see *Configuring Immediate Interim Accounting Updates to RADIUS in Response to ANCP Notifications*.

Removal of the Layer 2 Wholesale Service

Any of the following events can remove the logical interface for the dynamic VLAN that represents the access service provided by the Layer 2 wholesaler:

- The receipt of an ANCP Port Down message for the corresponding access loop. The same ANCP attributes that initiate dynamic VLAN creation also initiate dynamic VLAN destruction.

  No action is taken for an ANCP Port Down message for which any of the following is true:

  - No corresponding subscriber session exists.

  - A corresponding subscriber session is present, but is in the process of being deleted.
  - The message refers to a conventional autosensed session (which is removed by normal protocol processing).
- An explicit reset of the connection between the ANCP agent and the access node, which triggers a mass logout of all affected dynamic VLAN sessions that support the wholesaled Layer 2 access connections. Sessions for the wholesaler's own subscribers are not affected.
- The deletion or transition to an operational down state of the subscriber-facing physical interface or the core-facing physical interface.
- The loss of adjacency between the neighbor and the ANCP agent.
- The issuance of the `clear auto-configuration interfaces` command to log out the VLAN or the `clear ancp access-loop` command to force a subscriber reset.
- The receipt of a RADIUS-initiated disconnect message.

Any of these events also deactivates the subscriber session to prevent future service activations and issues a RADIUS Accounting-Stop message for related services and for the dynamic VLAN subscriber session. The dynamic profile is then de-instantiated to remove first the dynamic VLAN logical interface and then the corresponding session entry in the VLAN SDB.

You can monitor the number of Layer 2 cross-connected subscriber sessions per port. Use the `show subscribers summary port extensive` command to display the number of subscribers per port by client type (VLAN-OOB) and connection type (Corss-connected). Additionally, the object ID jnxSubscriberPortL2CrossConnectCounter in the jnxSubscriberPortCountTable in the Juniper Networks enterprise-specific Subscriber MIB displays the number of Layer 2 cross-connected subscriber sessions on ports that have active sessions.

Interactions Between In-Band and Out-of-Band VLAN Autosensing

The ANCP-triggered Layer 2 wholesale implementation accommodates both subscribers wholesaled to a retailer and subscribers belonging to the wholesaler. Any subscriber session detected on the access-facing physical interface can be one or the other. This means that an overlap exists between the outer tag range for the out-of-band autosensed VLANs and that for in-band, autosensed, stacked VLANs.

Both a PPPoE session and a wholesaled session might be attempted for the same access loop. To avoid the undesirable load on the router and the RADIUS server that can ensue when that happens, the order of session negotiation is determined by the order in which packets (PPPoE PADI or ANCP Port Up message) are received for the same access-facing physical interface and VLAN outer tag.

NOTE: The following sequences assume that the `remove-when-no-subscribers` statement is included at the `[edit interfaces` *`interface-name`* `auto-configure]` hierarchy level for the access-facing physical interface.

The following sequence of events occurs when a PPPoE PADI packet is received on an in-band control channel before an ANCP Port Up message is received on an out-of-band control channel, for the same access loop:

1. The PADI receipt triggers creation of a dynamic stacked VLAN logical interface. PPPoE and PPP negotiation are in progress.
2. The ANCP Port-Up message is received for the access loop. Because the corresponding in-band VLAN logical interface already exists for the same access-facing physical interface and outer VLAN tag, the ANCP agent simply stores the ANCP access line attributes and the name of the physical interface in the session database. The agent takes no other action for the message as long as the PPP session (PPP logical interface and the underlying dynamic VLAN logical interface) is maintained.
3. PPP negotiation terminates due to authentication failure (RADIUS Access-Reject response) or a normal logout, which triggers clean-up of the PPP session and removal of the PPP logical interface.
4. Because the `remove-when-no-subscribers` statement is configured. deletion of the PPP logical interface results in deletion of the dynamic stacked VLAN.
5. The next event depends on whether authorization of the ANCP Port Up message has been attempted before.

   - If authorization was not previously attempted:

     a. A VLAN-OOB SDB session is created and authorization of the access-loop is initiated.

     b. All exceptioned PPPoE PADI packets received by in-band VLAN auto-sensing are ignored until RADIUS responds to the authorization request.

     c. The authorization result determines what happens next:

        - If the authorization succeeds (RADIUS returns an Access-Accept message), then a dynamic Layer 2 wholesale logical interface is created within the retailer NSP's routing-instance.
        - If the authorization fails (RADIUS returns an Access-Reject message), then the VLAN-OOB session is cleaned up. Processing resumes for any exceptioned PPPoE PADI packets that are subsequently received by in-band VLAN autosensing.

   - If authorization was previously attempted, then no action is taken because the failure of the PPP session negotiation is assumed to be a login failure outside the Layer2 wholesale context. This

behavior prevents unnecessary authorization in response to the ANCP Port-Up message every time a PPPoE session terminates and cleans up from a normal subscriber logout.

The following sequence of events occurs when an ANCP Port Up message is received on an out-of-band control channel before a PPPoE PADI packet for an access loop is received on an in-band control channel, both for the same access loop:

1. Receipt of the ANCP Port Up message triggers authorization of the access loop.
2. A PPPoE PADI packet is received. The packet is ignored because authorization is already in progress for the same access-facing physical interface and outer VLAN tag.
3. The authorization result determines what happens next:
   - If authorization succeeds (RADIUS returns an Access-Accept message)—represented by a VLAN-OOB session in the SDB—then dynamic creation of the VLAN logical interface is initiated for a Layer 2 wholesale session. When the interface is created, subsequent PPPoE PADI packets detected by in-band VLAN autosensing are ignored and no longer exceptioned.
   - If authorization fails (RADIUS returns an Access-Reject message), the VLAN-OOB session is cleaned up.
     a. Receipt of a subsequent PPPoE PADI packet initiates creation of a dynamic stacked VLAN.
     b. PPPoE and PPP negotiation takes place and events proceed as usual for a conventional, dynamic autosensed VLAN.

Migration of Subscriber Ownership from Wholesaler to Retailer

The wholesaler-owned subscribers are connected by means of dynamic PPPoE interfaces over dynamic VLANs. For each subscriber, the PPPoE session must be disconnected and the corresponding PPP logical interface deleted before ANCP Port Up messages for the same underlying physical interface and VLAN outer tag can serve as out-of-band triggers for dynamic VLAN autosensing.

One approach to migrating from wholesale to retail ownership is to do the following:

1. Update the RADIUS server database so that subscriber authentication for the relevant access lines results in a RADIUS Access-Reject response. This causes subsequent attempts to negotiate PPPoE for the access line to fail.
2. Initiate logout of the dynamic PPPoE sessions; for example, by issuing a RADIUS-initiated disconnect. This triggers cleanup of the PPPoE logical interface and associated services, which includes issuing RADIUS Accounting-Stop messages for the session and active services, as well as removing the dynamic PPPoE logical interface.

If the migration requires swapping out the current CPE device for another, and the PPPoE session is not otherwise gracefully logged out, then turning off the CPE results in a PPP keepalive failure on the router and triggers session logout.

3. Remove the underlying dynamic VLAN logical interface. This occurs automatically when the `remove-when-no-subscribers` statement is included at the `[edit interfaces` *`interface-name`* `auto-configure]` hierarchy level for the access-facing physical interface. Otherwise, issue the `clear auto-configuration interfaces` *`interface-name`* command to remove the dynamic VLAN logical interface.

4. Trigger a Port Up notification to initiate dynamic VLAN detection, authorization, and creation by one of the following methods:

   - Power cycle the CPE, with a sufficient delay between turning off and turning back on the device so that a Port Down message is sent followed by a Port Up message and the router is given enough time to detect a keepalive failure indicating loss of the session.

   - Issue a `clear ancp access-loop` command.

   - Issue a `request ancp oam port-up` command.

Migration of Subscriber Ownership from Retailer to Wholesaler

One approach to migrating from retail to wholesale ownership is to do the following:

1. Update the RADIUS server database so that dynamic VLAN authorization for the relevant access lines results in a RADIUS Access-Reject response. Doing this causes subsequent ANCP Port Up messages to be ignored.

2. Initiate logout of the dynamic VLAN sessions supporting the wholesale access service; for example, by issuing a RADIUS-initiated disconnect. Doing this triggers cleanup of the session, which includes issuing RADIUS Accounting-Stop messages for the session, removal of the dynamic VLAN logical interface and active services, and freeing the allocated inner VLAN tag associated with the core-facing physical interface for assignment to a different Layer 2 wholesale subscriber session.

   If the migration requires swapping out the current CPE device for another, then turning off the CPE results in an ANCP Port Down message that triggers session logout and cleanup.

3. Allow subscribers to connect to the wholesaler's network using conventional dynamic VLAN autosensing followed by PPPoE and PPP negotiation and creation of PPP logical interfaces.

Migration of Subscriber Ownership Between Retailers

Typically, you migrate access between NSP retailers by triggering a restart of the existing dynamic VLAN session. The restart initiates a logout from the session followed by immediate dynamic VLAN detection, authorization, and creation within the routing-instance corresponding to the new NSP. A restart is a

logical Port Down and Port Up sequence for the VLAN's corresponding access loop. You can use any of the following methods to restart a given dynamic VLAN logical interface:

- Initiate a RADIUS Disconnect-Request message or configure your RADIUS server to send the message. The message must have the Acct-Terminate-Cause RADIUS attribute (49) set to a value of 16 (callback). This cause is processed as a disconnect (logout) followed immediately by a reconnect (login) only for dynamic VLANs created by an ANCP Port Up message. Other clients respond to this value with only a disconnect.

- Include the `reconnect` option when you log out subscribers with the `clear network-access aaa subscriber` command. You can specify subscribers by either the session identifier or the username. This option attempts to reconnect a cleared session as a Layer 2 wholesale session when the subscriber session has been fully logged out. This behavior is equivalent to issuing a RADIUS-initiated disconnect that is configured for reconnect; that is, when the message includes Acct-Terminate-Cause (RADIUS attribute 49) with a value of callback (16).

- Trigger a Port Down message followed by a Port UP message by one of the following methods:

  - Power cycle the CPE, with a sufficient delay between turning off and turning back on the device so that a Port Down message is sent followed by a Port Up message and the router is given enough time to detect a keepalive failure indicating loss of the session.

  - Issue a `clear ancp access-loop` command.

Modification of the Access Line Identifier or Port VLAN Identifier

When the line identifier or port VLAN identifier for an access loop is modified, the access node reports the change in a Port Up message to the ANCP agent. The message conveys the line ID in the Access-Loop-Remote-ID TLV and the port VLAN ID in the Access-Aggregation-Circuit-ID-Binary TLV.

The access node should send a Port Down message for the access loop before it modifies any of the identification attributes for an existing session. The Port Down message triggers clean up of the corresponding Layer 2 wholesale session. If the access node does not send a Port Down in this case, then the following behavior has the same effect as inserting the Port Down message that the access node failed to send:

- For a line ID change, the ANCP agent treats the reconfiguration as a logical Port Down message for the access line identified by the previous Access-Loop-Remote-Id, followed by a Port Up message for the access line identified by the new Access-Loop-Remote-Id.

- For a port VLAN ID change, the ANCP agent treats the reconfiguration as a logical Port Down message for the access line identified by the previous Access-Aggregation-Circuit-Id-Binary, followed by a Port Up message for the access line identified by the new Access-Aggregation-Circuit-Id-Binary.

In either case, the ANCP agent notifies the autoconfiguration daemon (autoconfd), which takes the following actions:

1. Logs out the corresponding Layer 2 wholesale session.
2. Sends a RADIUS Accounting-Stop message with the final statistics for the associated service sessions and client session.
3. Removes the dynamic VLAN logical interface.
4. Attempts to reestablish the Layer 2 wholesale session by means of a login sequence, including authentication, creation of the dynamic VLAN logical interface, activation of any services, and if successful, sending RADIUS Accounting-Start messages for the service and client sessions.

You must manually log out any PPPoE session corresponding to the access line with the previous identifiers, even if the access node sends the appropriate Port Down message when the values change.

NOTE: In the case of a change in the port VLAN ID only, autoconfd takes no action to reinitiate the session when a dynamic stacked VLAN or a Layer 2 wholesale session exists with the same access-facing physical interface and outer VLAN tag. You must manually intervene in this case, such as by issuing a `request ancp oam port-up` command to initiate the creation of the Layer 2 wholesale session.

BEST PRACTICE: Because an existing session is not automatically logged out, we recommend that the network operator disconnect the session—for example, by issuing a RADIUS Disconnect-Request message—before modifying any of the access line attributes. Depending on subsequent subscriber login and successful negotiation, a new session with the new identifier may then be created as usual.

Disconnecting PPPoE Sessions and Automatically Attempting Reconnection as Layer 2 Wholesale Sessions

You can use RADIUS-initiated disconnect messages to disconnect and log out existing PPPoE sessions and attempt to reestablish them as Layer 2 wholesale sessions. Use Access-Reject messages to prevent PPPoE subscriber access and attempt a reconnect as a Layer 2 wholesale session. Use this feature when you want to migrate sessions from PPPoE to Layer 2 wholesale. Both the RADIUS-initiated disconnect and Access-Reject message must include Acct-Terminate-Cause (RADIUS attribute 49) with a value of callback (16); callback causes the reconnect attempt. The `remove-when-no-subscribers` statement must be configured on the underlying physical interface.

1. The initial behavior for the messages is the following:

- Access-Reject message—When a PPPoE PADI is received and a new PPPoE session is requested, RADIUS responds to the Access-Request message with an Access-Reject message. The session is rejected, fully logged out, and the underlying dynamic VLAN logical interface is removed.
- RADIUS-initiated disconnect message—When a RADIUS-initiated disconnect message is received for an existing PPPoE session, the dynamic PPPoE session is logged out and the underlying dynamic VLAN logical interface is removed.

2. The next action is the same for both messages:
   - If an ANCP Port Up message has been received for the corresponding access line, the router attempts to authorize the access line and create a dynamic Layer 2 wholesale VLAN logical interface in place of the underlying dynamic VLAN logical interface that was removed.
   - If a Port Up message has not been received, then this action is deferred until the message is received.
   - If a PPPoE PADI is received before an ANCP Port Up message, RADIUS responds to the Access-Request for a new PPPoE session with an Access-Reject message. The session is rejected, fully logged out, and the underlying dynamic VLAN logical interface is removed.

If the RADIUS-initiated disconnect or Access-Reject message is received for a non-PPPoE session, such as DHCP, the session is disconnected, but the reconnect request is ignored. No attempt is made to establish a Layer 2 wholesale session.

If the RADIUS-initiated disconnect does not include Acct-Terminate-Cause with a value of callback, PPPoE renegotiation after the disconnect can succeed, but if an ANCP Port Up message is received for the access line before a PPPoE session is established, then a Layer 2 wholesale session is attempted.

As an alternative to the RADIUS-initiated disconnect, you can manually log out the PPPoE session with the `clear network-access aaa subscriber` command. Specify the subscriber by either username or session ID. When you include the `reconnect` option, it attempts to reconnect thecleared session as a Layer 2 wholesale session when the subscriber session has been fully logged out.

Consequences of a State Transition in the Access-Facing Physical Interface

The following behavior results when the access-facing physical interface state transitions from Up to Down:

- Conventional in-band VLAN autosensing stops for the interface.
- ANCP-sourced Port Up messages for the interface are ignored. Action on new or unprocessed Port Up messages is deferred until the interface transitions to the Up state. If the ANCP connection is in band with the subscriber traffic on the interface, then all ANCP traffic stops; if the outage lasts long enough, the ANCP adjacency is lost.

- All Layer 2 wholesale sessions that are assigned to the interface are treated as if the ANCP agent received a Port Down message for the corresponding access line. Each session is subject to being logged out. Whether a session is logged out depends on the ANCP adjacency loss hold timer. The timer starts running when the ANCP agent detects the state transition to Down. The subscriber continues using the original session if all three of the following occur before the timer expires:

  1. The physical interface comes back up.
  2. The ANCP adjacency is restored.
  3. A Port Up message is received on the interface.

  Otherwise, autoconfd takes the following actions:

  1. Logs out the session.
  2. Sends a RADIUS Accounting-Stop message with the final statistics for the associated service sessions and client session.
  3. Removes the dynamic VLAN logical interface.

  These sessions can be reestablished when the physical interface recovers, unless an ANCP Port Down message is received.

- The autoconfiguration daemon does not automatically delete dynamic, autosensed VLAN logical interfaces. The interfaces for the ANCP-triggered Layer 2 wholesale VLANs are maintained because the assumption is that an outage is short-lived. If the outage is not short-lived, then a subsequent Port Down message brings down the session and removes the interface.

  For conventional autosensed dynamic VLANs, the interface is removed only when the `remove-when-no-subscribers` statement is configured on the access-facing physical interface and all references to the VLAN logical interface from a higher logical interface or session are removed. This mechanism does not apply to the ANCP-triggered Layer 2 wholesale VLANs because they do not have upper session references.

The following behavior results when the access-facing physical interface state transitions from Down to Up:

1. Conventional in-band VLAN autosensing resumes for the interface. PPPoE sessions owned by the access provider that were logged out due to the transition from Up to Down can renegotiate and undergo a full login sequence.
2. Appropriate actions are taken for all ANCP Port Up messages for the interface, including messages that were deferred because of the previous Down state for the interface. If the ANCP connection is in band with the subscriber traffic, then all ANCP traffic resumes.
3. Forwarding resumes for any dynamic, autosensed VLAN logical interfaces that were not deleted when the interface went down.

Deletion of an access-facing physical interface triggers logout and removal of all upper dynamic VLAN logical interfaces and their corresponding sessions.

Consequences of a State Transition from Up to Down in the Core-Facing Physical Interface

The following behavior results when the core-facing physical interface state transitions from Up to Down:

- The core-facing physical interface is no longer eligible for assigning new or pending access lines in this routing instance as based on the original RADIUS authorization.
- All Layer 2 wholesale sessions that are assigned to the interface are treated as if the ANCP agent received a Port Down/Port Up message sequence for the corresponding access line. Each session is subject to being logged out. Whether a session is logged out depends on the ANCP adjacency loss hold timer. The timer starts running when the ANCP agent detects the state transition to Down. The subscriber continues using the original session if all three of the following occur before the timer expires:

  1. The physical interface comes back up.
  2. The ANCP adjacency is restored.
  3. A Port Up message is received on the interface.

  Otherwise, autoconfd takes the following actions:

  1. Logs out the session.
  2. Removes the session entry from the SDB.
  3. Sends a RADIUS Accounting-Stop message with the final statistics for the associated service sessions and client session.
  4. Removes the dynamic VLAN logical interface.

- Next, autoconfd attempts to migrate the sessions to available connections on any remaining eligible core-facing physical interfaces that are assigned to the same routing instance:

  1. The original request is placed on a retry queue.
  2. A login sequence is attempted for each session, including authentication, creation of dynamic VLAN logical interfaces, activation of any services, and sending RADIUS Accounting-Start messages for the service and client sessions.

     - If the login sequence is successful, then the request is removed from the retry queue.

- If the login fails, then the session is logged out, the session entry is removed from the SDB, and the corresponding access line is set to a pending state.

When the available connections are all used—when there are no more available VLAN tags from the configured inner VLAN ID swap ranges—as a result of successful reconnections, no attempt is made to connect any remaining Layer 2 wholesale sessions. Although authentication can succeed, the creation of dynamic VLAN logical interfaces fails during profile instantiation. In this case, the session is out, the session entry is removed from the SDB, and the corresponding access line is set to a pending state.

- The pending access lines that represent these non-migrated sessions can be reestablished if the interface recovers or if additional VLAN connections become available; for example, by a configuration change that either increases the inner VLAN ID swap range for one or more remaining core-facing physical interfaces or adds new core-facing physical interfaces. However, if the ANCP agent receives a Port Down message for a pending access line, the corresponding session is not reestablished.

You can use the `show auto-configuration out-of-band pending` command to display a count of pending access lines per routing instance.

NOTE: In addition to core-facing physical interface state transitions from Up to Down, these behaviors also apply in the following circumstances:

- A core-facing physical interface is deleted.
- More Layer 2 wholesale sessions are assigned to a routing instance than can be accommodated by the inner VLAN ID swap range configured on the interface assigned to the routing instance.

BEST PRACTICE: We recommend that you use aggregated Ethernet for the core-facing physical interfaces to provide link protection, bandwidth aggregation, or both.

Consequences of a State Transition from Down to Up in the Core-Facing Physical Interface

The following behavior results when the core-facing physical interface state transitions from Down to Up:

- The physical interface is now eligible to assign new Layer 2 wholesale subscriber sessions.

- The ANCP agent notifies the autoconfiguration daemon (autoconfd), which attempts to reestablish the Layer 2 wholesale sessions that correspond to pending access line by initiating a conventional login sequence. This sequence includes authentication, creation of dynamic VLAN logical interfaces, activation of any services, and sending RADIUS Accounting-Start messages for the service and client sessions.
- Pending sessions continue to be reestablished until none are left or an error occurs, typically due to exhaustion of inner VLAN tags from the swap ranges on the interface. In the latter case, the sessions are logged out, the session entry is removed from the SDB, and the access line is set to a pending state.

You can use the `show auto-configuration out-of-band pending` command to display a count of pending access lines per routing instance.

These behaviors also occur in the following cases:

- Additional VLAN connection resources become available, by a configuration change that either increases the inner VLAN ID swap range for one or more remaining core-facing physical interfaces or adds new core-facing physical interfaces. The newly added physical interface must be in the Up state to assume any Layer 2 wholesale sessions.
- A RADIUS-initiated disconnect is received for an existing Layer 2 wholesale session assigned to this routing instance is logged out (disconnect only). For a disconnect with a reconnect qualifier, the affected session is given preference to reconnect over pending access lines.
- You issue the `request auto-configuration reconnect-pending`, `clear ancp access-loop`, or `request ancp oam port-up` command.

Loss of ANCP TCP Adjacency

The ANCP agent can lose its TCP adjacency with a neighbor in any of the following circumstances:

- The access node renegotiates the connection; for example, as a result of losing synchronization. The renegotiation triggers the local state to change from established to not established. The state transitions back to established when the session is successfully renegotiated.
- An end-of-file (EOF) message is received on the socket indicating the adjacency is closed. This can result when the ANCP configuration is deleted on the access node.
- An adjacency keepalive failure occurs. When no response is received for three consecutive polls, the adjacency is declared to be lost.

The ANCP agent treats the loss of adjacency as if it has received a Port Down message for each access loop represented by the ANCP connection. The agent notifies autoconfd, which takes the following actions:

- Logs out all Layer 2 wholesale sessions that were triggered by this ANCP connection.
- Sends a RADIUS Accounting-Stop message with the final statistics for the associated service sessions and client session.
- Removes the dynamic VLAN logical interface.

If the assigned access-facing or core-facing physical interface is in the Down state, any pending sessions that were triggered by this ANCP connection cannot be reestablished when the interface recovers to the Up state.

Dynamic, conventionally auto-sensed VLAN logical interfaces, such as those supporting PPPoE sessions, are not affected by the TCP adjacency loss.

If the adjacency is reestablished, the expected behavior is a complete replay of Port Down and Port Up messages for all associated configured access lines. The Layer 2 wholesale sessions for which the ANCP agent receives Port Up messages are reestablished.

You can mitigate the effects of short-term adjacency losses by configuring an adjacency loss hold time. The timer starts when adjacency is lost. Even though the adjacency is lost, established sessions are maintained while the timer runs unless a Port Down message is received for the corresponding access line.

Any access line that for which the ANCP agent has not received a Port Up message by the time the timer expires is treated as though the agent has received a Port Down message for the line. The ANCP Agent notifies autoconfd, which takes the following actions:

- Logs out all Layer 2 wholesale sessions that correspond to the access line.
- Sends a RADIUS Accounting-Stop message with the final statistics for the associated service sessions and client session.
- Removes the dynamic VLAN logical interface.

Port Up messages received after the timer expires repopulate the SDB access line table and reestablish the Layer 2 wholesale sessions

The adjacency loss hold timer serves the following purposes:

- Dampens the effect of adjacency loss of short duration thereby maintaining existing Layer 2 wholesale sessions.
- Detects the removal of an access line configuration on the access node. For example, in some circumstances you may want to remove the configuration of an access line on a neighbor. You first disconnect the ANCP session between a neighbor and the BNG, remove the configuration on the neighbor, and then restore the ANCP connection with the BNG. The neighbor does not issue a Port Down message. if the adjacency-loss hold-timer is configured, the ANCP agent detects an access line

for which it has not received a Port Up or Port Down message, and consequently triggers logout and removal of the corresponding Layer 2 wholesale session.

NOTE: When you deactivate the ANCP protocol, the router does not perform a commit check to determine whether any ANCP or L2-BSA subscribers are present (active or inactive). Any subscribers that are active at the time of deactivation remain active.

Release History Table

Release	Description
16.1R4	Starting in Junos OS Release 16.1R4, you can configure the ANCP agent to trigger the creation of an autosensed VLAN when the ANCP agent receives a Port Up message where the DSL-Line-State attribute has a value of Showtime.

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Configuring Out-of-Band ANCP Messages to Trigger Dynamic VLAN Instantiation | **150**

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Junos OS Predefined Variables

Juniper Networks VSAs Supported by the AAA Service Framework

AAA Access Messages and Supported RADIUS Attributes and Juniper Networks VSAs for Junos OS

AAA Accounting Messages and Supported RADIUS Attributes and Juniper Networks VSAs for Junos OS

CHAPTER 9

Configuring ANCP-Triggered Layer 2 Wholesale Services

IN THIS CHAPTER

Configuring ANCP Neighbors

You must configure each neighboring access node that you want the ANCP agent to monitor and potentially shape traffic for. Some neighbor settings override globally configured values.

To configure an ANCP neighbor:

1. Specify the IP address of the neighbor.

```
[edit protocols ancp]
user@host# set neighbor 203.0.113.234
```

2. (Optional) Configure the neighbor to operate in a backward-compatible mode when it does not support the current IETF standard and the backward-compatible mode is not configured globally.

```
[edit protocols ancp neighbor 203.0.113.234]
user@host# set pre-ietf-mode
```

3. (Optional) Override the globally configured backward-compatible mode when the neighbor supports the current IETF standard.

```
[edit protocols ancp neighbor 203.0.113.234]
user@host# set ietf-mode
```

4. (Optional) Configure the interval in seconds between ANCP adjacency messages exchanged with this neighbor.

```
[edit protocols ancp neighbor 203.0.113.234]
user@host# set adjacency-timer 20
```

5. (Optional) Specify the maximum number of discovery table entries that are accepted from this neighbor.

```
[edit protocols ancp neighbor 203.0.113.234]
user@host# set maximum-discovery-table-entries 10000
```

6. (Optional) Enable out-of-band ANCP triggering of autosensed, dynamic VLANs on the physical interface.

```
[edit protocols ancp neighbor 203.0.113.234]
user@host# set auto-configure-trigger interface ge-1/0/0
```

7. (Optional) Configure how long the ANCP agent maintains a Layer 2 wholesale session when an adjacency loss occurs.

```
[edit protocols ancp neighbor 203.0.113.234]
user@host# set adjacency-loss-hold-time 10
```

Configuring the ANCP Agent for ANCP-Triggered, Autosensed Dynamic VLANs

Starting in Junos OS Release 16.1R4, you can configure the ANCP agent to associate a neighbor with an access-facing physical interface for the creation of autosensed dynamic VLANs on the interface. When the ANCP agent receives a Port Up message from the neighbor, it triggers notification to the autoconfd daemon to initiate the detection, authorization, and creation of dynamic VLANs. Receipt of an out-of-band ANCP Port Down message triggers notification to the autoconfd daemon to initiate the destruction of an existing VLAN on the interface.

NOTE: The following physical interface types are supported: aggregated Ethernet (ae), Gigabit Ethernet (ge), 10-Gigabit Ethernet (xe), 100-Gigabit Ethernet (et), demux, and pseudowire (ps). The ps interface type was added in Junos OS Release 19.3R1.

This configuration assumes the following:

- The dynamic profile is configured to instantiate a dynamic VLAN when notified by the ANCP agent that it has received an out-of-band ANCP Port Up message.
- The RADIUS authentication server is properly configured to authorize the VLANs and apply services as needed.
- The ANCP agent is configured to initiate interim accounting updates (which also enables immediate interim accounting updates) in response to information received in Port Up messages.

To map a neighbor to a physical interface for autosensed dynamic VLANs:

- Specify the physical interface name.

```
[edit protocols ancp]
user@host# set auto-configure-trigger interface physical-interface-name
```

Release History Table

Release	Description
16.1R4	Starting in Junos OS Release 16.1R4, you can configure the ANCP agent to associate a neighbor with an access-facing physical interface for the creation of autosensed dynamic VLANs on the interface.

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Configuring Out-of-Band ANCP Messages to Trigger Dynamic VLAN Instantiation | **150**

Configuring a Username for Authentication of Out-of-Band Triggered Dynamic VLANs

When a subscriber logs in, the Access-Request message that is sent to the RADIUS server includes a username and optionally a password generated locally on the router to authenticate the subscriber during the VLAN authorization process. For a Layer 2 network that is wholesaled to a retailer where the dynamic VLANs are instantiated by out-of-band ANCP Port Up messages, you can configure the router to create a unique username with the value of the ANCP TLVs—Access-Loop-Circuit-ID, Access-Loop-Remote-Id, or both—as received in the ANCP Port Up message from the access node.

This configuration assumes the following:

- The ANCP agent is configured to notify AAA when it receives ANCP Port Up and Port Down messages.
- The dynamic profile is configured to instantiate a dynamic VLAN when notified by the ANCP agent that it has received an out-of-band ANCP Port Up message.
- The RADIUS authentication server is properly configured.

To include ANCP TLVs in the authentication username

1. (Optional) Specify inclusion of the Access-Loop-Circuit-ID TLV value.

```
[edit interfaces ge-0/0/0 auto-configure vlan-ranges username-include (Interfaces)]
user@host# set circuit-id
```

2. (Optional) Specify inclusion of the Access-Loop-Remote-ID TLV value.

```
[edit interfaces ge-0/0/0 auto-configure vlan-ranges username-include (Interfaces)]
user@host# set remote-id
```

NOTE: This ANCP information is not supported in stacked VLANs.

NOTE: You can use any of the attributes available to the `username-include` statement, except: `mac-address`, `option-18`, `option-37`, and `option-82`.

You can include other information in the username as for conventional autosensed dynamic VLANs. Alternatively, if you configure the router to convey ANCP-sourced access loop attributes as Juniper Networks VSAs—in this case Acc-Loop-Cir-Id (26-110) and Acc-Loop-Remote-Id (26-182)—the Access-Request message includes sufficient unique access line information for the RADIUS server to determine whether the access loop is wholesaled to a retailer or retained for the wholesaler.

RELATED DOCUMENTATION

Configuring VLAN Interface Username Information for AAA Authentication

Configuring Out-of-Band ANCP Messages to Trigger Dynamic VLAN Instantiation | **150**

Configuring the ANCP Agent for ANCP-Triggered, Autosensed Dynamic VLANs | **148**

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Configuring Out-of-Band ANCP Messages to Trigger Dynamic VLAN Instantiation

The instantiation of conventional autosensed dynamic VLANs is triggered by in-band PPPoE or DHCP control packets that the Packet Forwarding Engine exceptions to the Routing Engine. A VLAN is authorized based on information extracted from specific fields and created according to a dynamic profile assigned to the VLAN range or stacked VLAN range.

Another way to instantiate an autosensed dynamic VLAN is with the processing of packets from an out-of-band protocol, ANCP. The out-of-band protocol method is useful where the traffic received might not be PPPoE or DHCP, such as in a Layer 2 wholesale scenario, where the traffic for an entire outer VLAN is wholesaled to a retailer and the VLANs are based on access line identifiers.

For this method, you configure the dynamic profile to accept packets from the out-of-band protocol. The dynamic profile is on an access-facing physical interface and is associated with a VLAN range available for the autosensed VLANs.

This configuration assumes the following:

- The dynamic profile is configured to instantiate a dynamic VLAN when notified by the ANCP agent that it has received an out-of-band ANCP Port Up message.
- The RADIUS authentication server is properly configured to authorize the VLANs and apply services as needed.
- The ANCP agent is configured to notify AAA when it receives ANCP Port Up and Port Down messages.
- The ANCP agent is configured to initiate interim accounting updates (which also enables immediate interim accounting updates) in response to information received in Port Up messages.

NOTE: Out-of-band triggering is supported only for single-tag VLANs; it is not supported for stacked VLANs.

To configure the instantiation of autosensed dynamic VLANs by out-of-band ANCP packets:

- Specify that ANCP packets are accepted.

```
[edit interfaces interface-name auto-configure vlan-ranges dynamic-profile profile-name]
user@host# set accept-out-of-band ancp
```

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Configuring VLAN Interface Username Information for AAA Authentication

Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs

Triggering ANCP OAM to Simulate ANCP Port Down and Port Up Messages

You can trigger ANCP OAM to simulate the sending of an ANCP Port-Down or Port-Up message. Typically you use this feature only when troubleshooting an ANCP issue or to mitigate an error condition when ANCP is not operating normally.

When you issue either the `request ancp oam port-down` command or the `request ancp oam port-up` command from operational mode, you must specify either an IP address for an ANCP neighbor or the physical interface used for subscriber access. You must also specify all of the following; all three are required together to identify the access node:

- circuit-id *aci*—ANCP Access-Loop-Circuit-ID TLV
- remote-id *ari*—ANCP Access-Loop-Remote-ID TLV
- outer-vlan-id *vlan-id*—ANCP Access-Aggregation-Circuit-ID-Binary TLV

You can use the `request ancp oam port-up` command to trigger reauthorization and re-creation of the dynamic VLAN session and logical interface that is supporting Layer 2 wholesale after they have been removed by any of the following:

- Issuance of the `clear network-access aaa subscriber` command.
- Receipt of a RADIUS disconnect message that does not include the RADIUS Acct-Terminate-Cause attribute (49).
- Action by the ANCP agent.

The previous instance of the VLAN can be either ANCP-triggered (a wholesaled VLAN) or a conventionally autosensed dynamic VLAN (an access-provider-owned VLAN).

If no access line parameters are available from ANCP for a given access line, you can use the `request ancp oam port-up` command as a test mechanism to trigger authorization of a dynamic VLAN session and logical interface. The session and interface are created when a RADIUS Access-Accept message is subsequently received.

These commands have no effect on conventionally autosensed dynamic VLANs (for the access provider's own subscriber sessions) that have matching access loop attributes.

> **NOTE**: Genuine ANCP Port-Down and Port-Up messages take precedence over these simulated messages. This means that when a Port-Down message has already been received, you cannot use the `request ancp oam port-up` command to initiate the Port-Up condition. When a Port-Up message has already been received, you cannot use the `request ancp oam port-down` command to initiate the Port-Down condition.

You can use the `request ancp oam port-down` command to trigger removal of the ANCP-triggered, autosensed, dynamic VLAN that corresponds to the specified attributes. The typical use for this command is to remove the VLAN created by sending a `request ancp oam port-up` command.

To simulate an ANCP Port Up message:

- Identify the loop by the neighbor's IP address or the access-facing physical interface, and the ACI, ARI, and outer VLAN ID.

```
user@host> request ancp oam port-up neighbor 192.168.32.5 circuit-id line-aci-1 remote-id
line-ari-1 outer-vlan-id 126
user@host> request ancp oam port-up subscriber-interface ge-1/0/1 circuit-id line-aci-1
remote-id line-ari-1 outer-vlan-id 126
```

To simulate an ANCP Port Down message:

- Identify the loop by the neighbor's IP address or the access-facing physical interface, and the ACI, ARI, and outer VLAN ID.

```
user@host> request ancp oam port-down neighbor 192.168.32.5 circuit-id line-aci-1 remote-id
line-ari-1 outer-vlan-id 126
user@host> request ancp oam port-down subscriber-interface ge-1/0/1 circuit-id line-aci-1
remote-id line-ari-1 outer-vlan-id 126
```

To verify the operation of either request, you can enter the following commands before and after initiating the Port Down or Port Up message:

- `show subscribers client-type vlan-oob detail`—Subscriber information is displayed for the VLAN on Port UP, or disappears on Port Down.
- `show subscribers summary`—The VLAN-OOB counter reflects the creation or removal of the VLAN-OOB session by incrementing (Port Up) or decrementing (Port Down).
- `show l2-routing-instance` *routing-instance-name*—The VLAN counters reflect to reflect the creation or removal of the VLAN-OOB session by incrementing (Port Up) or decrementing (Port Down).

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Triggering ANCP OAM to Test the Local Loop

Configuring the ANCP Agent to Dampen the Effects of Short-Term Adjacency Losses

By default, the ANCP agent treats a loss of adjacency as if it has received a Port Down message for every access loop that is represented by the adjacency. All Layer 2 wholesale sessions are logged out and cleaned up. If the associated physical interface is in the Down state, then pending sessions cannot be reestablished when the interface transitions back to the Up state.

You can configure the ANCP agent to maintain the corresponding ANCP-triggered Layer 2 wholesale sessions for a configurable period in the event that an ANCP adjacency is lost. If the adjacency is restored before the timer expires, the session continues. If the timer expires before the adjacency is restored, then the session is logged out and cleaned up. This behavior dampens the effect of unstable ANCP connections. The hold timer can also detect when an access line is unconfigured on a neighbor and trigger logout and cleanup of the related sessions.

NOTE: The default value of the timer is 0, which means that the loss of neighbor adjacency immediately triggers a logout of all corresponding Layer 2 wholesale sessions.

To configure how long the ANCP agent maintains sessions in the event of an adjacency loss for any neighbor:

- Specify the hold timer duration in seconds.

```
[edit protocols ancp]
user@host# set adjacency-loss-hold-time seconds
```

To configure how long the ANCP agent maintains sessions in the event of an adjacency loss for a specific neighbor:

- Specify the hold timer duration in seconds.

```
[edit protocols ancp neighbor ip-address]
user@host# set adjacency-loss-hold-time seconds
```

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Reestablishing Pending Access Line Sessions for Layer 2 Wholesale

The access lines for ANCP-triggered, Layer 2 wholesale sessions can transition to a pending state after an ANCP adjacency loss when the inner VLAN ID swap range has been exhausted of tags and no other eligible core-facing physical interfaces are available. Typically, the sessions are reestablished when more VLAN IDs are made available, such as by extending the swap range, or more interfaces are available, such as by reconfiguration. When that does not happen, you can manually initiate the reestablishment process by issuing the `request auto-configuration reconnect-pending` command.

To manually reestablish sessions for which the corresponding access lines are in the pending state:

- Specify the routing instance with the reconnection request.

```
user@host> request auto-configuration reconnect-pending
```

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Configuring Multiple Non-Overlapping VLAN Ranges for Core-Facing Physical Interfaces

You can configure up to 32 non-overlapping inner VLAN ID swap ranges for each core-facing physical interface in a Layer 2 wholesale network with VLAN-OOB subscribers. VLAN IDs from the ranges are allocated to replace the outer VLAN tag on traffic received on the access-facing physical interfaces. The swap occurs before the subscriber traffic is forwarded to the network service provider (NSP).

You can add or remove ranges or increase or decrease the size of existing ranges even while Layer 2 wholesale sessions are assigned to the core-facing interface associated with the ranges. You cannot remove a range from which a VLAN ID has already been allocated. You cannot reduce a range if the new range excludes a VLAN ID that has already been allocated.

To configure multiple ranges per interface:

- Specify the ranges.

```
user@host# set interfaces interface-name unit logical-unit-number inner-vlan-id-swap-ranges
low-inner-tag1-high-inner-tag1
user@host# set interfaces interface-name unit logical-unit-number inner-vlan-id-swap-ranges
low-inner-tag2-high-inner-tag2
user@host# set interfaces interface-name unit logical-unit-number inner-vlan-id-swap-ranges
low-inner-tag3-high-inner-tag3
...
```

You can configure the ranges in any order. For example, one way to configure three non-overlapping ranges on interface ge-0/1/1 is the following:

```
[edit]
user@host# set interfaces ge-0/1/1 unit 0 inner-vlan-id-swap-ranges 70-80
user@host# set interfaces ge-0/1/1 unit 0 inner-vlan-id-swap-ranges 100-120
user@host# set interfaces ge-0/1/1 unit 0 inner-vlan-id-swap-ranges 10-60
```

Regardless of the order of configuration, `show` commands display the ranges in ascending order from lowest to highest:

```
user@host> show interfaces ge-0/1/1
description "ISP 1 core-facing PE1";
encapsulation ethernet-vpls;
unit 0 {
    inner-vlan-id-swap-ranges [10-60 70-80 100-120];
...
```

Clearing ANCP Access Loops

You can force a reset of a particular Layer 2 wholesale connection while the access loop is operationally up by issuing the `clear ancp access-loop` command. The command initiates logout of an ANCP-triggered, dynamic VLAN session, which includes issuing RADIUS Accounting-Stop messages for the session, and removal of the dynamic VLAN logical interface and active services. After the session is cleaned up, the command initiates re-authorization of the dynamic VLAN session, simulating receipt of an ANCP Port Up message. The session may then be recreated.

You must identify the access loop by either the IP address of the ANCP neighbor or the name of the subscriber-facing physical interface. You must also specify one or more of the following additional identifiers for the access loop:

- `circuit-id`—The value of the ANCP Access-Loop-Circuit-ID TLV.
- `remote-id`—The value of the ANCP Access-Loop-Remote-ID TLV.
- `outer-vlan-id`—The value of the ANCP Access-Aggregation-Circuit-ID-binary TLV.

NOTE: The `clear ancp access-loop` command has no effect in the following circumstances:

- The access line is reported to be down, as indicated by an ANCP Port Down message, when the command is issued.
- An ANCP Port Down message is received for the access line while the dynamic VLAN logical interface and the services are being removed. In this case, re-authorization of the dynamic VLAN cannot take place until an ANCP Port Up message is received for that access line.
- A conventionally autosensed dynamic VLAN (for the access provider's own subscriber sessions) has matching access loop attributes. In this case, the Layer 2 wholesale access line for which the command is intended is cleared, but the other VLAN, for sessions owned by the access-provider, is cleared as expected.

To clear an ANCP access loop:

- Identify the loop by the neighbor's IP address or the access-facing physical interface, and one or more of the ACI, ARI, and outer VLAN ID.

```
user@host> clear ancp access-loop neighbor 192.168.32.5 circuit-id line-aci-1 remote-id line-
ari-1 outer-vlan-id 126
user@host> clear ancp access-loop subscriber-interface ge-1/0/1 circuit-id line-aci-1 remote-
id line-ari-1 outer-vlan-id 126
```

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CHAPTER 10

Configuring Flat-File Accounting for Layer 2 Wholesale Services

IN THIS CHAPTER

Flat-File Accounting Overview

Accounting statistics can be collected from the Packet Forwarding Engine and reported in an XML flat file, which both contains and describes the data. Starting in Junos OS Release 16.1R4, you can use a flat-file profile that acts as a template to define attributes for accounting flat files.

Subscriber service accounting statistics are typically collected based on RADIUS Acct-Start and Acct-Stop messages that are sent to a RADIUS server individually or in bulk.

Starting in Junos OS Release 17.1R1, you can alternatively configure service-filter-based accounting statistics to be recorded per subscriber in a local flat file that is not automatically forwarded to a RADIUS server. This configuration collects the running total service statistics per interface family. Service accounting is initiated when the service profile is attached to the interface, whether by a static configuration or a RADIUS Change of Authorization (CoA) message.

NOTE: Starting in Junos OS Release 18.4R1, flat-file service accounting to a local file is no longer supported.

When the accounting file is created, a file header is also created if the file format is IP Detail Record (IPDR). The header is not created if the format is comma-separated variable (CSV). The file header includes the following information:

- XML namespace—Static link to the World Wide Web Consortium (W3C) organization's XML Schema Instance (XSI) definition.
- Schema version—Configurable name of the schema that defines the information conveyed in the accounting file. The schema version is associated with a specific XML format and output based on the flat-file profile configuration that is used for the business purpose. This structure enables the XML-formatted contents of the file to be correctly interpreted by the service provider's external file processor.
- NAS ID—Name of the BNG host (network access server) where the accounting statistics are collected.
- File creation timestamp—UTC time zone date and time when the accounting file was created.
- File ID—Number identifying the file. The ID is incremented when a new accounting file is created and can range from 1 through 2,147,483,647.

For example, consider the following sample header for an accounting file for Extensible Subscriber Services Manager (ESSM) business subscribers:

```
<BNGFile xmlns:xsi=http://"www.w3.org/2001/XMLSchema-instance"
 xsi:noNamespaceSchemaLocation="BNG_IPDR_20130423.xsd" NAS-ID="host-mx480-x5"
 FileCreationTimeStamp="2015-10-09T08:25:50" FileID=”29”>
<IPDR>
……
……
</IPDR>
</BNGFile>
```

Table 7 on page 159 lists the elements and their values in the sample header.

Table 7: Value of Elements in Sample Accounting Flat File XML Header

Description	Header Element	Value
XML namespace	xmlns	:xsi=http://"www.w3.org/2001/XMLSchema-instance"
schema version	xsi:noNamespaceSchemaLocation	BNG_IPDR_20130423.xsd
NAS ID	NAS-ID	host-mx480-x5

Table 7: Value of Elements in Sample Accounting Flat File XML Header *(Continued)*

Description	Header Element	Value
file creation timestamp	FileCreationTimeStamp	2015-10-09T08:25:50
File ID	FileID	29

You can configure the following options for flat-file accounting at the [edit accounting-options file *filename*] hierarchy level:

- Maximum size of the accounting file.
- Number of files that are saved before overwriting.
- One or more sites where the files are sent for archiving.
- Frequency at which the files are transferred to an archive site.
- Start time for file transfer.
- Compression for the transferred files.
- Local backup on the router for files when transfer fails.
- Whether accounting files are saved when a change in primary role occurs for both the new primary Routing Engine and the new backup Routing Engine or for only the new primary Routing Engine.
- How long files are kept before being deleted from the local backup directory.

You can also create one or more flat-file profiles at the [edit accounting-options flat-file-profile *profile-name*] hierarchy level that act as templates to specify the following attributes for new accounting files when they are created:

- Statistics fields that you want to collect, such as egress statistics or ingress statistics fields.
- Name and format of the accounting file.
- Frequency at which the Packet Forwarding Engine is polled for the statistics.
- Schema version.

Archive sites provide security and storage for the accounting files, which are transferred at regular intervals. When more than one archive site is configured, the router attempts to transfer the files to the first site on the list. If that fails, the router tries each of the other sites in turn until the transfer either succeeds for one site or fails for all sites. If you configure the last site in the list to be a local directory on

the router rather than another remote site, then the files are backed up locally if all remote sites fail. The failed files are simply stored in the designated site. They are not automatically resubmitted to the archival sites. You must use an event script or some other means to have these files resubmitted. Any files remaining in the local directory are deleted when the `cleanup-interval` expires.

Alternatively, you can use the `backup-on-failure` statement at the `[edit accounting-options file filename]` hierarchy level to back up the files locally if all the remote attempts fail. If that occurs, the router compresses the accounting files and backs them up to the **/var/log/pfedBackup/** directory. Whenever any of the archive sites is reachable, the router attempts to transfer the data from **/var/log/pfedBackup/** to that site in compressed format. If the transfer of the backed-up files to the reachable site fails, the system tries to transfer the files to any other site that becomes reachable during the transfer interval. Any files that fail to transfer are compressed and kept in **/var/log/pfedBackup/** until an archival site is reachable and the files are successfully transferred. Any files that remain in that directory are deleted when the `cleanup-interval` expires.

> **BEST PRACTICE**: Use the `backup-on-failure` feature to reliably and automatically back up files and retransmit them to archives rather than relying on a local site listed as the last archive site.

If the backup Routing Engine does not have access to the archive site—for example, when the site is not connected by means of an out-of-band interface or when the path to the site is routed through a line card—you can ensure that the backup Routing Engine's accounting files are backed up by using the `push-backup-to-master` statement at the `[edit accounting-options file filename]` hierarchy level. When a change in primary role occurs, the new backup Routing Engine saves its files to the **/var/log/pfedBackup/** directory. The primary Routing Engine subsequently includes these files when it sends its own accounting files to the archive site at every transfer interval.

To conserve resources during transfer of accounting files and at the archive site, use the `compress` statement at the `[edit accounting-options file filename]` hierarchy level to compress the files when they are transferred. This option is disabled by default.

A system logging message is generated when a transfer succeeds (`transfer-file: Transferred filename`) or fails (`transfer-file failed to transfer`). In the event of a failure, an error message is logged to indicate the nature of the failure.

Release History Table

Release	Description
17.1R1	Starting in Junos OS Release 17.1R1, you can alternatively configure service-filter-based accounting statistics to be recorded per subscriber in a local flat file that is not automatically forwarded to a RADIUS server.

16.1R4	Starting in Junos OS Release 16.1R4, you can use a flat-file profile that acts as a template to define attributes for accounting flat files.

RELATED DOCUMENTATION

- Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167
- Configuring Flat-File Accounting for Layer 2 Wholesale | 162
- Configuring Service Accounting in Local Flat Files | 172
- Configuring Accounting-Data Log Files

Configuring Flat-File Accounting for Layer 2 Wholesale

Flat-file accounting is typically used for recording accounting statistics on logical interfaces for Extensible Subscriber Services Manager (ESSM) business subscribers. However, starting in Junos OS Release 16.1R4, you can also use flat-file accounting to collect and archive various accounting statistics for your Layer 2 wholesale environment. You do this by creating a flat-file profile and applying it to a core-facing physical interface.

You can also configure a flat-file profile to monitor and report Layer 2 multicast statistics; you assign this profile to the logical interface configured on the core-facing physical interface. This approach enables you to have separate accounting files that overlap in content only in the non-statistical, general parameters. The Layer 2 multicast statistics are available only when the encapsulation on the logical interface is `ethernet-vpls`.

You can configure multiple accounting profiles with different combinations of fields for specific accounting requirements, and then assign the profiles as needed to provisioned interfaces to satisfy the accounting requirements for each interface depending on how the interface is used.

A given flat-file profile can be assigned to both use cases; for example, by specifying `all-fields` for a global or group level. In this case, the fields you configure appear in the accounting record only if they make sense in the context.

> **BEST PRACTICE**: We recommend you use separate flat-file profiles for Layer 2 wholesale core-facing physical interfaces and ESSM business subscriber logical interfaces.

Some statistics and general parameter fields are available either only for logical interfaces or only for physical interfaces. The `accounting-type`, `line-id`, `nas-port-id`, and `vlan-id` general parameters are not available for core-facing physical interfaces. Because the core-facing physical interfaces carry Layer 2

cross-connected sessions, no useful IPv6 statistics are available. Accordingly, do not configure the `input-v6-bytes`, `input-v6-packets`, `output-v6-bytes`, or `output-v6-packets` overall packet fields.

To configure flat-file accounting for a Layer 2 wholesale network:

1. Create a flat-file profile.

```
[edit accounting-options]
user@host# edit flat-file-profile profile-name
```

2. (Optional) Configure the name of the XML schema for the accounting flat file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set schema-version schema-name
```

3. Specify the filename for the accounting file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set file accounting-filename
```

4. Specify the general, nonstatistical parameters for the accounting file that are displayed as part of the accounting record header.

```
[edit accounting-options flat-file-profile profile-name fields]
user@host# set general-param option
```

> **BEST PRACTICE**: We recommend that you include the general parameter `all-fields` option for both core-facing physical interfaces and, when you are collecting Layer 2 multicast statistics, on the logical interface that represents the physical interface.

5. Specify the accounting statistics that are collected and recorded in the accounting file for the core-facing physical interface.

```
[edit accounting-options flat-file-profile profile-name fields]
user@host# set egress-stats option
user@host# set ingress-stats option
user@host# set overall-packet option
```

BEST PRACTICE: We recommend that you include the following statistics fields in flat-file profiles for core-facing physical interfaces:

- Egress statistics fields: `all-fields`
- Ingress statistics fields: `all-fields`
- Overall packet fields: `input-bytes`, `input-discards`, `input-errors`, `input-packets`, `output-bytes`, `output-errors`, `output-packets`

6. (Optional) For Layer 2 multicast statistics, specify the accounting statistics that are collected and recorded in the accounting file for the logical interface representing the core-facing physical interface.

```
[edit accounting-options flat-file-profile profile-name fields]
user@host# set l2-stats option
```

BEST PRACTICE: We recommend that you include the following statistics fields in flat-file profiles for logical interfaces on the core-facing physical interfaces:

- Layer 2 statistics fields: `all-fields`

7. (Optional) Specify the format of the accounting file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set format (csv | ipdr)
```

8. (Optional) Specify the interval at which the Packet Forwarding Engine associated with the interface is polled for the statistics specified in the profile.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set interval minutes
```

NOTE: When you do not configure this option, the polling interval is 15 minutes.

9. Configure the maximum size of the accounting file.

```
[edit accounting-options file filename]
user@host# set size bytes
```

10. Configure one or more archive sites for the files.

```
[edit accounting-options file filename]
user@host# set archive-sites site-name
```

The *site-name* is any valid FTP or Secure FTP URL. When the file is archived, the router attempts to transfer the file to the archive site. If you have specified more than one site, it tries the first site in the list. If that fails, it tries each site in turn until a transfer succeeds The log file is stored at the archive site with a filename of the format *router-name_log-filename_timestamp*. The last site in a list is often a local directory, in case no remote site is reachable.

11. (Optional) Configure the start time for transferring files.

```
[edit accounting-options file filename]
user@host# set start-time YYYY-MM-DD.hh:mm
```

12. (Optional) Configure how frequently the file is transferred.

```
[edit accounting-options file filename]
user@host# set transfer-interval minutes
```

NOTE: When you do not configure this option, the file is transferred every 30 minutes.

13. (Optional) Configure the maximum number of files (3 through 1000) to save.

```
[edit accounting-options file filename]
user@host# set files number
```

NOTE: When you do not configure this option, a maximum of 10 files are saved.

14. (Optional) Configure the router to save a backup copy of the accounting file to the **/var/log/pfedBackup** directory if the normal transfer of the files to the archive sites fails.

```
[edit accounting-options file filename]
user@host# set backup-on-failure
```

NOTE: When you do not configure this option, the file is saved on failure into the local directory specified as the last site in the list of archive sites.

15. (Optional) Configure the accounting file to be compressed during transfer to an archive site.

```
[edit accounting-options file filename]
user@host# set compress
```

16. (Optional) Configure the router's new backup Routing Engine to send its accounting file to the **/var/log/pfedBackup** directory on the new primary Routing Engine when a change in primary role occurs.

```
[edit accounting-options file filename]
user@host# set push-backup-to-master
```

17. (Optional) Configure the number of days after which accounting files are deleted from the local backup directory.

```
[edit accounting-options]
user@host# set cleanup-interval days
```

NOTE: Files are retained for 1 day if you do not configure this option.

18. Assign the profile to the relevant interface.

    For the core-facing physical interface:

```
[edit interfaces physical-interface-name]
user@host# set accounting-profileflat-file-profile-name
```

For the logical interface representing the core-facing physical interface:

```
[edit interfaces physical-interface-name unit logical-unit-number]
user@host# set accounting-profile flat-file-profile-name
```

Release History Table

Release	Description
16.1R4	However, starting in Junos OS Release 16.1R4, you can also use flat-file accounting to collect and archive various accounting statistics for your Layer 2 wholesale environment.

RELATED DOCUMENTATION

- Configuring Accounting-Data Log Files
- Flat-File Accounting Overview | **158**
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | **167**
- Layer 2 Wholesale with ANCP-Triggered VLANs Overview | **126**

Configuring Flat-File Accounting for Extensible Subscriber Services Management

Flat-file accounting is typically used to collect and archive various accounting statistics on logical interfaces for Extensible Subscriber Services Manager (ESSM) business subscribers. Other applications include accounting for wholesaler and retailer subscriber activity in a Layer 2 wholesale environment. Starting in Junos OS Release 16.1R4, you can create a flat-file profile to use as a template to define attributes for accounting flat files. The profile specifies the following:

- The statistics fields that are collected.
- The filename where the statistics are logged.
- The format of the file, the interval at which the statistics are collected.
- The name of the XML schema file that specifies the contents of the accounting file.

You can configure multiple accounting profiles with different combinations of fields for specific accounting requirements, and then assign the profiles as needed to provisioned interfaces to satisfy the accounting requirements for each interface depending on how it is used.

A given flat-file profile can be assigned to both use cases; for example, by specifying `all-fields` for a global or group level. In this case, the fields you configure appear in the accounting record only if they make sense in the context.

BEST PRACTICE: We recommend you use separate flat-file profiles for ESSM business subscriber logical interfaces and Layer 2 wholesale core-facing physical interfaces.

To configure flat-file accounting for ESSM business services:

1. Create a flat-file profile.

```
[edit accounting-options]
user@host# edit flat-file-profile profile-name
```

2. (Optional) Configure the name of the XML schema for the accounting flat file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set schema-version schema-name
```

3. Specify the filename for the accounting file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set file accounting-filename
```

4. Specify the general, nonstatistical parameters for the accounting file that are displayed as part of the accounting record header.

```
[edit accounting-options flat-file-profile profile-name fields]
user@host# set general-param option
```

BEST PRACTICE: We recommend that you include the following general parameter fields in flat-file profiles for ESSM subscribers:

- General parameter fields: `accounting-type`, `descr`, `line-id`, `logical-interface`, `nas-port-id`, `timestamp`, and `vlan-id`

5. Specify the accounting statistics that are collected and recorded in the accounting file.

```
[edit accounting-options flat-file-profile profile-name fields]
user@host# set egress-stats option
user@host# set ingress-stats option;
user@host# set overall-packet option;
```

BEST PRACTICE: We recommend that you include the following statistics fields in flat-file profiles for core-facing physical interfaces:

- Egress statistics fields: `all-fields`
- Ingress statistics fields: `all-fields`
- Overall packet fields: `all-fields`

6. (Optional) Specify the format of the accounting file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set format (csv | ipdr)
```

7. (Optional) Specify the interval at which the Packet Forwarding Engine associated with the interface is polled for the statistics specified in the profile.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set interval minutes
```

NOTE: When you do not configure this option, the polling interval is 15 minutes.

8. Configure the maximum size of the accounting file.

```
[edit accounting-options file filename]
user@host# set size bytes
```

9. Configure one or more archive sites for the files.

```
[edit accounting-options file filename]
user@host# set archive-sites site-name
```

The *site-name* is any valid FTP or Secure FTP URL. When the file is archived, the router attempts to transfer the file to the archive site. If you have specified more than one site, it tries the first site in the list. If that fails, it tries each site in turn until a transfer succeeds. The log file is stored at the archive site with a filename of the format *router-name_log-filename_timestamp*. The last site in a list is often a local directory, in case no remote site is reachable.

10. (Optional) Configure the start time for transferring the file.

```
[edit accounting-options file filename]
user@host# set start-time YYYY-MM-DD.hh:mm
```

11. (Optional) Configure how frequently the file is transferred.

```
[edit accounting-options file filename]
user@host# set transfer-interval minutes
```

NOTE: When you do not configure this option, the file is transferred every 30 minutes.

12. (Optional) Configure the maximum number of files (3 through 1000) to save.

```
[edit accounting-options file filename]
user@host# set files number
```

NOTE: When you do not configure this option, a maximum of 10 files are saved.

13. (Optional) Configure the router to save a backup copy of the accounting file to the **/var/log/pfedBackup** directory if the normal transfer of the files to the archive sites fails. Specify whether

only the current file form the primary Routing Engine is saved or both that file and the file from the backup Routing Engine.

```
[edit accounting-options file filename]
user@host# set backup-on-failure (master-and-slave | master-only)
```

NOTE: When you do not configure this option, the file is saved on failure into the local directory specified as the last site in the list of archive sites.

14. (Optional) Configure the accounting file to be compressed during transfer to an archive site.

```
[edit accounting-options file filename]
user@host# set compress
```

15. (Optional) Configure the router's new backup Routing Engine to send its accounting file to the **/var/log/pfedBackup** directory on the new primary Routing Engine when a change in primary role occurs.

```
[edit accounting-options file filename]
user@host# set push-backup-to-master
```

16. (Optional) Configure the number of days after which accounting files are deleted from the local backup directory.

```
[edit accounting-options]
user@host# set cleanup-interval days
```

NOTE: Files are retained for 1 day if you do not configure this option.

17. Assign the profile to an ESSM subscriber.

```
[edit system services extensible-subscriber-services]
user@host# set flat-file-profile flat-file-profile-name
```

Release History Table

Release	Description
16.1R4	Starting in Junos OS Release 16.1R4, you can create a flat-file profile to use as a template to define attributes for accounting flat files.

RELATED DOCUMENTATION

Configuring Accounting-Data Log Files

Configuring Flat-File Accounting for Layer 2 Wholesale | 162

Configuring Service Accounting in Local Flat Files

Starting in Junos OS Release 17.1R1, you can configure flat-file accounting to collect service statistics for subscribers and report those statistics to a local file. This configuration collects the running total service statistics per interface family. Because the statistics are maintained in the Routing Engine in a statistics database, they are not affected by a line-card restart, a graceful Routing Engine switchover, or a unified in-service software upgrade (ISSU). The statistics counters are reset when the router reboots.

NOTE: Starting in Junos OS Release 18.4R1, service accounting in local flat files is no longer supported. If included in a configuration, it is ignored.

To configure local flat-file accounting for services:

1. Configure the subscriber access profile to report service accounting records in a local flat file.

```
[edit access profile profile-name]
user@host# set service accounting-order local
```

NOTE: When you configure `local`, the CLI checks at commit that the flat-file profile is configured under `[edit access profile profile-name local]`.

Alternatively, you can set the service accounting order to `activation-protocol` instead of `local`:

```
user@host# set service accounting-order activation-protocol
```

Use this option only when you plan to activate the service by means of the CLI configuration or a command. In this case, the CLI does not check for the flat-file profile to be configured. If the profile is not configured, no statistics are collected.

NOTE: When you configure the `local` option, both volume and time statistics are collected for the service accounting sessions. In this case, you must not configure the `volume-time` option at the `[edit access profile profile-name service accounting statistics]` hierarchy level; otherwise, an error is generated when you commit the configuration.

2. Specify the name of the flat-file profile that is used to collect the service statistics.

```
[edit access profile profile-name]
user@host#  set local flat-file-profile flat-file-profile-name
```

3. Create the flat-file profile to collect the subscriber service accounting statistics and other parameters.

```
[edit accounting-options]
user@host# edit flat-file-profile profile-name
```

4. Specify the filename for the accounting file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set file accounting-filename
```

5. Specify that service accounting statistics are collected.

```
[edit accounting-options flat-file-profile profile-name fields]
user@host# set service-accounting
```

6. (Optional) Specify the general, nonstatistical parameters for the accounting file that are displayed as part of the accounting record header.

```
[edit accounting-options flat-file-profile profile-name fields]
user@host# set general-param option
```

7. (Optional) Configure the name of the XML schema for the accounting flat file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set schema-version schema-name
```

8. (Optional) Specify the format of the accounting file.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set format (csv | ipdr)
```

NOTE: When you do not configure this option, the format is `ipdr`.

9. (Optional) Specify the interval at which the Packet Forwarding Engine associated with the interface is polled for the statistics specified in the profile.

```
[edit accounting-options flat-file-profile profile-name]
user@host# set interval minutes
```

NOTE: When you do not configure this option, the polling interval is 15 minutes.

NOTE: The interval value configured in the flat-file profile can be overridden by other interval values:

- The service accounting update interval configured at the `edit access profile profile-name service accounting update-interval]` hierarchy level.
- An update interval value configured in the RADIUS attribute, Service-Interim-Acct-Interval (VSA 26–140). This value also overrides the service accounting update interval.

10. Configure the maximum size of the accounting file.

```
[edit accounting-options file filename]
user@host# set size bytes
```

11. (Optional) Configure the maximum number of files (3 through 1000) to save.

```
[edit accounting-options file filename]
user@host# set files number
```

NOTE: When you do not configure this option, a maximum of 10 files are saved.

12. (Optional) Configure one or more archive sites for the files.

```
[edit accounting-options file filename]
user@host# set archive-sites site-name
```

The *site-name* is any valid FTP or Secure FTP URL. When the file is archived, the router attempts to transfer the file to the archive site. If you have specified more than one site, it tries the first site in the list. If that fails, it tries each site in turn until a transfer succeeds The log file is stored at the archive site with a filename of the format *router-name_log-filename_timestamp*. The last site in a list is often a local directory, in case no remote site is reachable.

13. (Optional) Configure the start time for transferring files.

```
[edit accounting-options file filename]
user@host# set start-time YYYY-MM-DD.hh:mm
```

14. (Optional) Configure how frequently the file is transferred.

```
[edit accounting-options file filename]
user@host# set transfer-interval minutes
```

NOTE: When you do not configure this option, the file is transferred every 30 minutes.

15. (Optional) Configure the router to save a backup copy of the accounting file to the **/var/log/pfedBackup** directory if the normal transfer of the files to the archive sites fails.

```
[edit accounting-options file filename]
user@host# set backup-on-failure
```

NOTE: When you do not configure this option, the file is saved on failure into the local directory specified as the last site in the list of archive sites.

16. (Optional) Configure the accounting file to be compressed during transfer to an archive site.

```
[edit accounting-options file filename]
user@host# set compress
```

17. (Optional) Configure the router's new backup Routing Engine to send its accounting file to the **/var/log/pfedBackup** directory on the new primary Routing Engine when a change in primary role occurs.

```
[edit accounting-options file filename]
user@host# set push-backup-to-master
```

18. (Optional) Configure the number of days after which accounting files are deleted from the local backup directory.

```
[edit accounting-options]
user@host# set cleanup-interval days
```

NOTE: When you do not configure this option, files are retained for only 1 day.

Release History Table

Release	Description
17.1R1	Starting in Junos OS Release 17.1R1, you can configure flat-file accounting to collect service statistics for subscribers and report those statistics to a local file.

RELATED DOCUMENTATION

Configuring Accounting-Data Log Files

Flat-File Accounting Overview | 158

CHAPTER 11

Configuring Five-Level and Four-Level Heterogeneous Networks

IN THIS CHAPTER

Five-Level and Four-Level Heterogeneous Networks

IN THIS SECTION

CoS Node Shaping in Four-Level and Five-Level Heterogeneous Networks

A heterogeneous subscriber access model has the following characteristics:

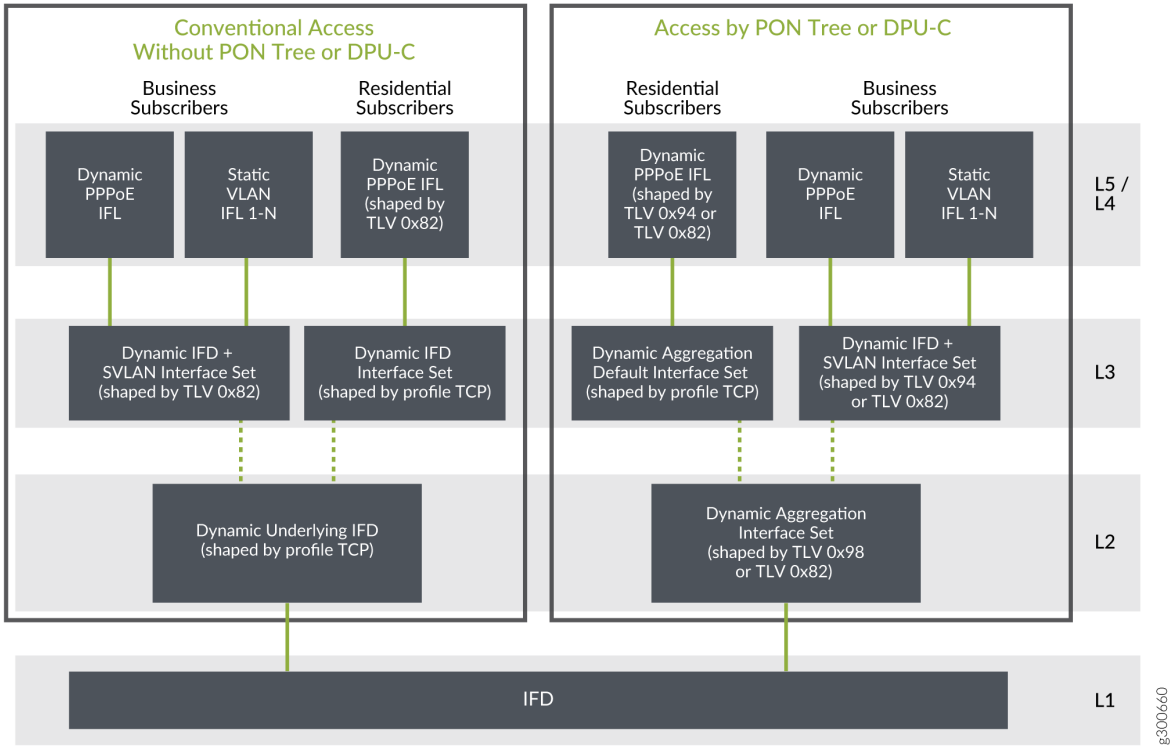
- It includes both residential subscribers and business subscribers. Both subscriber types are typically PPPoE subscribers.
- The access technologies can be conventional or shared media, or both. Shared media access includes bonded copper connections through a DPU-C or fiber connections through a DPU-P. DPU-C and

DPU-P are distribution units for the respective media type. Conventional access networks do not include either a DPU-C or DPU-P.

- Traffic shaping depends on hierarchical CoS. The network can use a four-level scheduler hierarchy, a five-level scheduler hierarchy, or both.

Figure 10 on page 178 summarizes how CoS shapes key nodes in the five-level scheduler hierarchy. Shaping is based either on the adjusted rates from the DSL and PON TLVs or on traffic control profiles in the dynamic client profile configuration. A CoS adjustment control profile specifies the source of the shaping rate applied to a given node.

Figure 10: Five-Level CoS Node Shaping Summary



The following lists describe the CoS scheduler nodes by access type and subscriber type for the five-level hierarchy in Figure 10 on page 178.

For conventional access, residential subscribers:

- Level 1 node—Corresponds to the access-facing physical interface.
- Level 2 node—Corresponds to a dynamic interface set that conserves L2 nodes. This parent interface set is based on the underlying physical interface. The name is derived from the predefined variable,

$junos-phy-ifd-underlying-intf-set-name, by appending “-underlying”. Traffic shaping is determined by a traffic control profile specified in the dynamic client profile.

- Level 3 node—Corresponds to a dynamic interface set that conserves Level 3 nodes. This child interface set is based on the physical interface. The name is derived from the predefined variable, $junos-phy-ifd-intf-set-name. Traffic shaping is determined by a traffic control profile specified in the dynamic client profile.
- Level 4 node—Corresponds to the subscriber’s PPPoE session logical interface. Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82).
- Level 5 node—Corresponds to the scheduling queue for the subscriber.

For conventional access, business subscribers:

- Level 1 node—Corresponds to the access-facing physical interface.
- Level 2 node—Corresponds to a dynamic interface set that conserves L2 nodes. This parent interface set is based on the underlying physical interface. The name is derived from the predefined variable, $junos-phy-ifd-underlying-intf-set-name by appending “-underlying”. Traffic shaping is determined by a traffic control profile specified in the dynamic client profile.
- Level 3 node—Corresponds to a dynamic interface set that conserves L3 nodes. This child interface set is based on the physical interface and VLAN tag. The set name is derived in one of two ways:
  - If configured, it is provided by the Qos-Set-Name VSA (26–4874–130) in the Access-Accept from the RADIUS server.
  - It is created from the $junos-phy-ifd-interface-set-name predefined variable by appending the SVLAN tag to the value.

  Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82).
- Level 4 node—Corresponds to the subscriber’s dynamic PPPoE session logical interface or static VLAN logical interface.
- Level 5 node—Corresponds to the scheduling queue for the subscriber.

For shared-media access, residential subscribers:

- Level 1 node—Corresponds to the access-facing physical interface.
- Level 2 node—Corresponds to a dynamic aggregation interface set that conserves L2 nodes. This parent interface set is based on the backhaul identifier from Access-Aggregation-Circuit-Id-ASCII TLV 0x03, which represents the PON tree connection. The name is derived from the predefined-variable, $junos-aggregation-interface-set-name. Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82) for bonded copper connections and by the PON-Tree-Maximum-Data-Rate-Downstream TLV (0x98) for PON tree connections.

- Level 3 node—Corresponds to a dynamic aggregation interface set that conserves L3 nodes. This child interface set is based on the backhaul identifier from the Access-Aggregation-Circuit-Id-ASCII TLV (0x03), which represents the PON tree connection. The name is derived from the predefined variable, $junos-aggregation-interface-set-name by appending “-default”. Traffic shaping is determined by a traffic control profile specified in the dynamic client profile.

- Level 4 node—Corresponds to the subscriber’s PPPoE session logical interface. Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82) for bonded copper connections and by the ONT/ONU-Peak-Data-Rate-Downstream TLV (0x94) for PON tree connections.

- Level 5 node—Corresponds to the scheduling queue for the subscriber.

For shared-media access, business subscribers:

- Level 1 node—Corresponds to the access-facing physical interface.

- Level 2 node—Corresponds to a dynamic aggregation interface set that conserves L2 nodes. This parent interface set is based on the backhaul identifier from the Access-Aggregation-Circuit-Id-ASCII TLV (0x03), which represents the PON tree connection. The name is derived from the predefined-variable, $junos-aggregation-interface-set-name. Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82) for bonded copper connections and by the PON-Tree-Maximum-Data-Rate-Downstream TLV (0x98) for PON tree connections.

- Level 3 node—Corresponds to a dynamic interface set that conserves L3 nodes. This child interface set is based on the physical interface and VLAN tag. The set name is derived in one of two ways:

  - If configured, it is provided by the Qos-Set-Name VSA (26–4874–130) in the Access-Accept from the RADIUS server.

  - It is created from the $junos-phy-ifd-interface-set-name predefined variable by appending the SVLAN tag to the value.

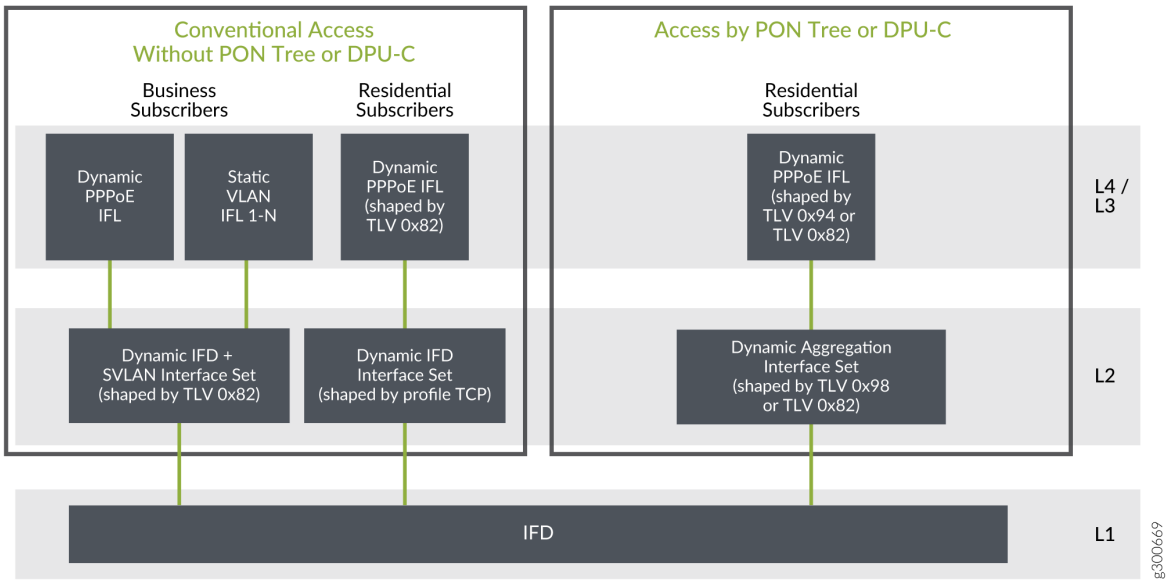
  Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82) for bonded copper connections and by the ONT/ONU-Peak-Data-Rate-Downstream TLV (0x94) for PON tree connections.

- Level 4 node—Corresponds to the subscriber’s dynamic PPPoE session logical interface or static VLAN logical interface.

- Level 5 node—Corresponds to the scheduling queue for the subscriber.

Figure 11 on page 181 summarizes how CoS shapes key nodes in the four-level scheduler hierarchy. Shaping is based either on the adjusted rates resulting from the DSL and PON TLVs or on traffic control profiles in the dynamic client profile configuration. A CoS adjustment control profile specifies the source of the shaping rate applied to a given node.

Figure 11: Four-Level CoS Node Shaping Summary



The following lists describe the CoS scheduler nodes by access type and subscriber type for the four-level hierarchy in Figure 11 on page 181.

For conventional access, residential subscribers:

- Level 1 node—Corresponds to the access-facing physical interface.
- Level 2 node—Corresponds to a dynamic interface set that conserves Level 2 nodes. This interface set is based on the physical interface. The name is derived from the predefined variable, $junos-phy-ifd-intf-set-name. Traffic shaping is determined by a traffic control profile specified in the dynamic client profile.
- Level 3 node—Corresponds to the subscriber's PPPoE session logical interface. Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82).
- Level 4 node—Corresponds to the scheduling queue for the subscriber.

For conventional access, business subscribers:

- Level 1 node—Corresponds to the access-facing physical interface.
- Level 2 node—Corresponds to a dynamic interface set that conserves L2 nodes. This interface set is based on the physical interface and VLAN tag. The set name is derived in one of two ways:
  - If configured, it is provided by the Qos-Set-Name VSA (26–4874–130) in the Access-Accept from the RADIUS server.

- It is created from the $junos-phy-ifd-interface-set-name predefined variable by appending the SVLAN tag to the value.

Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82).

- Level 3 node—Corresponds to the subscriber's dynamic PPPoE session logical interface or static VLAN logical interface.
- Level 4 node—Corresponds to the scheduling queue for the subscriber.

For shared-media access, residential subscribers:

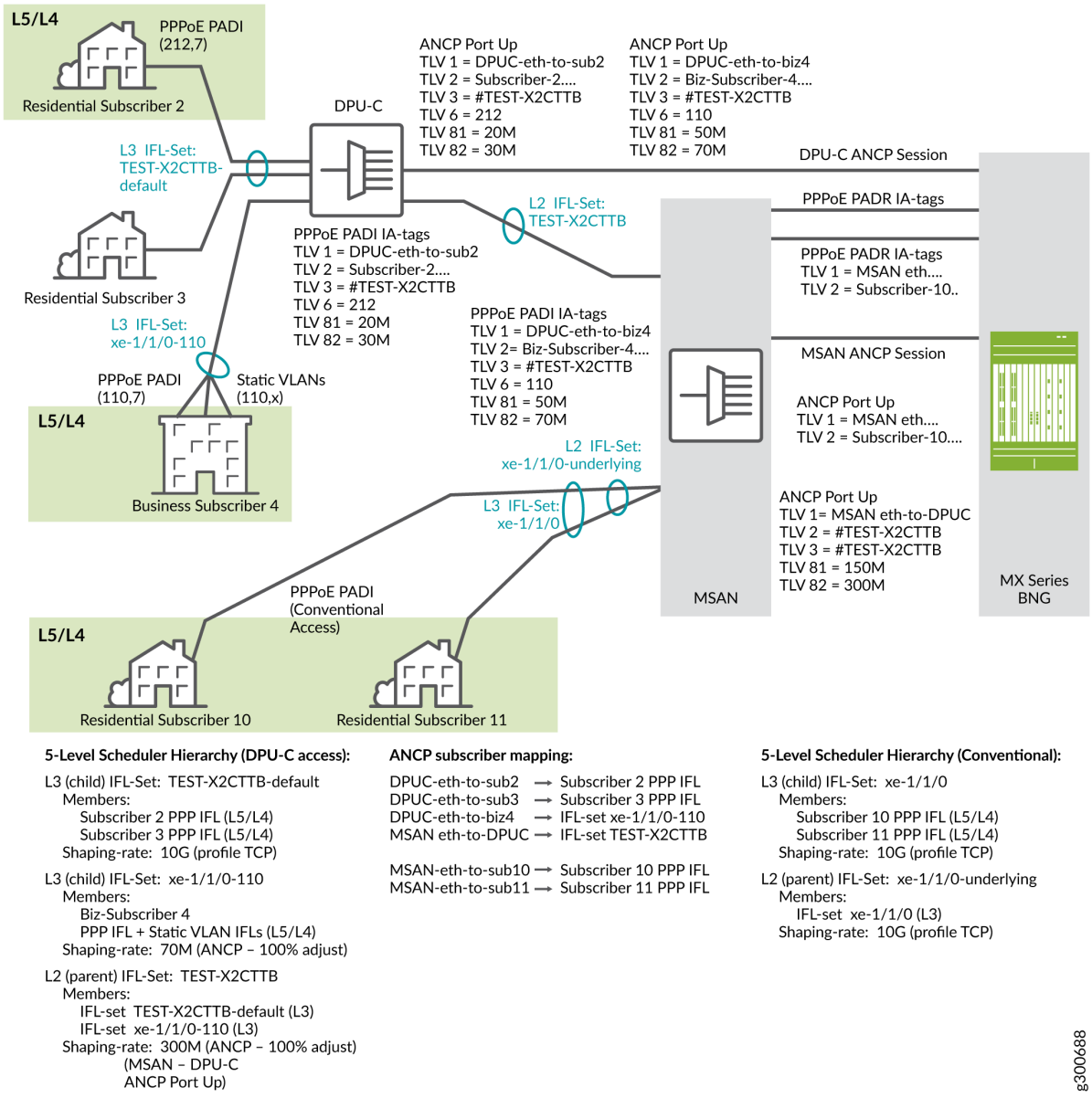
- Level 1 node—Corresponds to the access-facing physical interface.
- Level 2 node—Corresponds to a dynamic aggregation interface set that conserves Level 2 nodes. This interface set is based on the backhaul identifier from the Access-Aggregation-Circuit-Id-ASCII TLV (0x03), which represents the PON tree connection. The name is derived from the predefined-variable, $junos-aggregation-interface-set-name. Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82) for bonded copper connections and by the PON-Tree-Maximum-Data-Rate-Downstream TLV (0x98) for PON tree connections.
- Level 3 node—Corresponds to the subscriber's PPPoE session logical interface. Traffic shaping is determined by the Actual-Data-Rate-Downstream TLV (0x82) for bonded copper connections and by the ONT/ONU-Peak-Data-Rate-Downstream TLV (0x94) for PON tree connections.
- Level 4 node—Corresponds to the scheduling queue for the subscriber.

Business subscribers are not supported in a four-level, shared-media access network.

CuTTB Use Case Topology and CoS Hierarchy

Figure 12 on page 183 shows a heterogeneous CuTTB topology that includes both shared -media (bonded copper through a DPU-C) and conventional, (nonbonded copper) access for PPPoE subscribers.

Figure 12: CuTTB CoS Hierarchy Example



This topology has the following subscribers:

- Two residential subscribers, 2 and 3, and a business subscriber, 4, have a shared-media access to the network through a DPU-C to the MSAN and then to the BNG.
- Two residential subscribers, 10 and 11, have conventional access to the network through an MSAN to the BNG.
- Residential subscriber 3 is not currently logged in.
- When residential subscriber 2 and business subscriber 4 log in:

1. PPPoE sends a PADI message to the DPU-C that includes the outer VLAN tag for each.

2. The DPU-C sends an ANCP Port Up message to the BNG for each subscriber. ANCP TLVs in the message identify the access line, the subscriber, the ASCII identifier for the access line, the VLAN outer tag as the binary identifier for the access line, the upstream rate, and the downstream rate.

   The ASCII identifier (TLV 0x03) begins with the # character, signifying that the remainder of the value identifies the backhaul (bonded copper, shared media) line. TLV 0x03 is the same for both subscribers, because they connect through the same DPU-C.

3. The DPU-C sends a PADI message for each subscriber to the MSAN. The PADI conveys the PPPoE-IA tags that identify the same attributes as the ANCP TLVs.

4. The MSAN sends a PADR message with the PPPoE tags to the BNG. The MSAN also opens an ANCP session to the BNG by sending an ANCP Port Up message for the MSAN-to-DPU-C connection. The rates in TLVs 0x81 and 0x82 are the values for the MSAN-to-DPU-C line, represented by the L2 interface set. In other words, these are the rates for the bonded copper line itself rather than the subscriber access lines. TLV 0x03 value is also reported in TLV 0x02 to indicate the bonded copper line.

- When residential subscribers 10 and 11 log in:

1. PPPoE sends a PADI message for each subscriber to the MSAN. The PADI conveys the PPPoE-IA tags for the individual subscriber access lines.

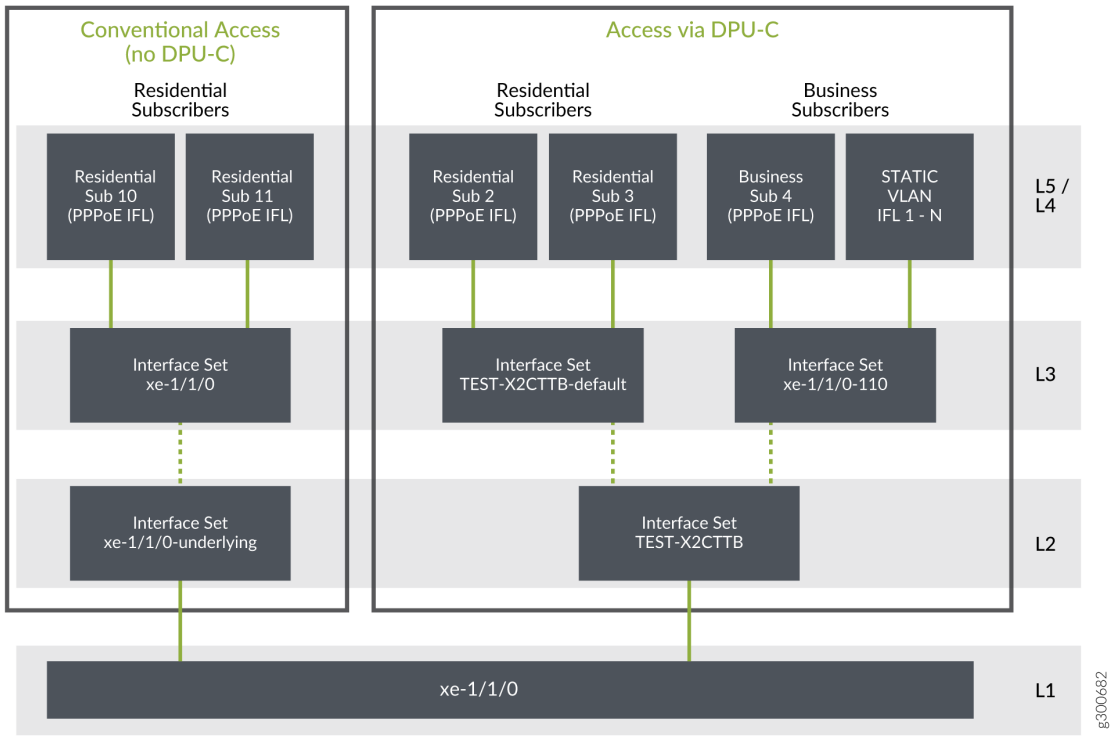
2. The MSAN sends a PADR message with the PPPoE tags for each subscriber line to the BNG.

3. The MSAN also sends an ANCP Port Up message to the BNG for each subscriber. ANCP TLVs in the message identify the access line, the subscriber, the ASCII identifier for the access line, the VLAN outer tag as the binary identifier for the access line, the upstream rate, and the downstream rate.

   Because these subscribers use conventional access rather than shared-media access through the DPU-C, the ASCII identifier (TLV 0x03) does not begin with the # character. In this case, the value is just the ASCII equivalent of the binary value conveyed in TLV 0x06.

Figure 13 on page 185 shows the five-level CoS hierarchy that corresponds to the CuTTB topology in Figure 12 on page 183.

Figure 13: CoS Hierarchy for CuTTB Topology



The following stanzas are part of the use case configuration that creates the Level 2 and Level 3 interface sets. The `stacked-interface-set` statement sets the Level 2 interface set to the $junos-aggregation-interface-set-name predefined variable. The stanza also specifies the Level 3 interface set as $junos-interface-set-name. It establishes the Level 2 set as the parent of the Level 3 set.

```
dynamic-profiles test-prof
    interfaces {
        stacked-interface-set {
            interface-set "$junos-aggregation-interface-set-name" {
                interface-set $junos-interface-set-name;
            }
        }
    }
}
```

The predefined-variable-defaults stanza uses variable expressions that set conditions to establish the names of the Level 2 and Level 3 interface sets. The default values are used only when RADIUS does not supply values for $junos-aggregation-interface-set-name and $junos-interface-set-name.

```
dynamic-profiles test-prof
    predefined-variable-defaults {
        aggregation-interface-set-name equals "$junos-phy-ifd-underlying-intf-set-name";
        interface-set-name equals "ifZero($junos-default-interface-set-name, $junos-phy-ifd-
interface-set-name)";
        default-interface-set-name equals "ifZero($junos-interface-set-name, ifNotZero($junos-
aggregation-interface-set-name, $junos-aggregation-interface-set-name##'-default'))";
    }
}
```

The following list describes the hierarchical CoS scheduler nodes for the CuTTB topology. It explains how the names of the interface sets are derived from predefined variables.

- Level 1 corresponds to the access-facing physical interface for all subscribers, xe-1/1/0.
- Level 2 corresponds to a parent interface set that has child interface sets as its members. The name of the interface set is supplied by the $junos-aggregation-interface-set-name predefined variable in the dynamic profile.
  - TEST-X2CTTB is the Level 2 interface set for all shared-media access subscribers. Its members are the Level 3 interface sets for residential subscribers 2 and 3 and for business subscriber 4.

    TLV 0x03 includes the # character, which identifies the line as shared. $junos-aggregation-interface-set-name takes the value of TLV 0x03.
  - xe-1/1/0-underlying is the Level 2 interface set for conventional access. Its member is the Level 3 interface set for residential subscribers 10 and 11.

    TLV 0x03 does not include the # character and so does not identify a shared line. $junos-aggregation-interface-set-name is dynamically taken from $junos-phy-ifd-underlying-intf-set-name. The value of $junos-phy-ifd-underlying-intf-set-name is simply the physical interface name with a suffix of “-underlying”.
- Level 3 corresponds to a child interface set that has subscriber logical interfaces as its members. The name of the interface set is supplied by the $junos-interface-set-name predefined variable in the dynamic profile.
  - TEST-X2CTTB-default is the Level 3 interface set for residential subscribers 2 and 3. These subscribers were identified as residential because the RADIUS server did not return VSA 26-4874-130, QoS-Set-Name. TLV 0x03 includes the # character, which identifies the line as

shared. $junos-interface-set-name is set to the value of $junos-aggregation-interface-set-name with a suffix of “default”.

- xe-1/1/0-110 is the Level 3 interface set for business subscriber 4. This subscriber was identified as business because the RADIUS server returned VSA 26-4874-130. TLV 0x03 includes the # character, which identifies the line as shared. $junos-interface-set-name is set to the value of VSA 26-4874-130. The VSA value is a concatenation of the physical interface name ($junos-phy-ifd-intf-set-name) and the outer VLAN tag.

- xe-1/1/0 is the Level 3 interface set for residential subscribers 10 and 11, which use conventional access. These subscribers were identified as residential because the RADIUS server did not return VSA 26-4874-130. $junos-interface-set-name is set to the value of $junos-phy-ifd-intf-set-name.

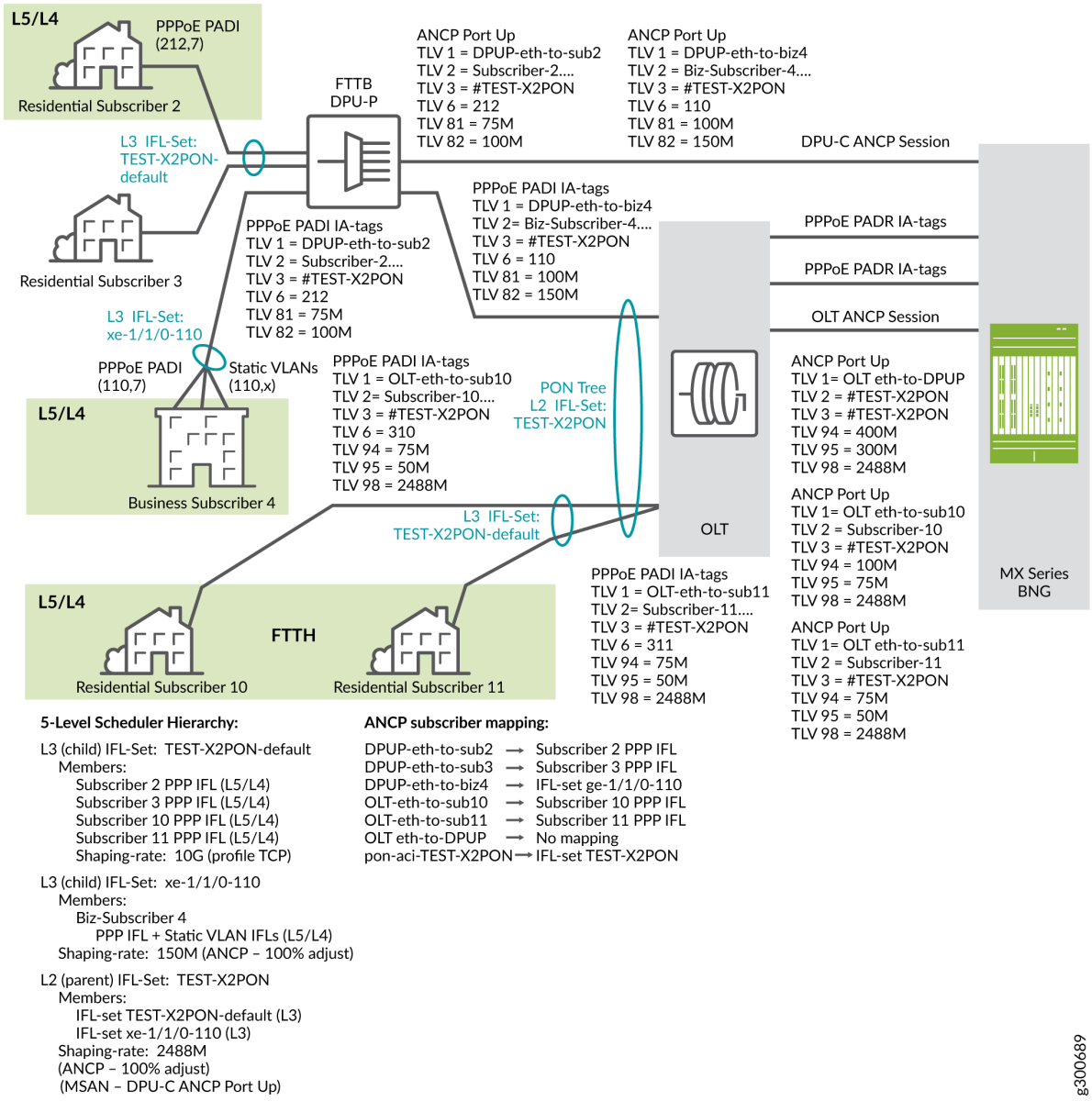
- Level 4 corresponds to the logical interface for individual subscribers. This includes PPPoE logical interfaces for residential and business subscribers, as well as static VLAN logical interfaces for business subscribers.

- Level 5 corresponds to the scheduling queue for each subscriber, regardless of subscriber type or access type. One or more queues are present per subscriber to provide subscriber services.

FTTB/FTTH Use Case Topology and CoS Hierarchy

Figure 14 on page 188 shows a heterogeneous FTTB/FTTH topology that includes both shared -media (PON through a DPU-P) and conventional, (directly connected) access for PPPoE subscribers.

Figure 14: FTTB/FTTH CoS Hierarchy Example



This topology has the following subscribers:

- Two residential subscribers, 2 and 3, and a business subscriber, 4, have a shared-media access to the network through a DPU-P to the OLT and then to the BNG. These are FTTB subscribers.
- Two residential subscribers, 10 and 11, have conventional access to the network through the same OLT to the BNG. These are FTTH subscribers.

NOTE: All the FTTB and FTTH subscribers connect to the BNG by means of the same PON tree at the OLT.

- Residential subscriber 3 is not currently logged in.
- When residential subscriber 2 and business subscriber 4 log in:

  1. PPPoE sends a PADI message to the DPU-P that includes the outer VLAN tag for each.
  2. The DPU-P sends an ANCP Port Up message to the BNG for each subscriber. ANCP TLVs in the message identify the access line, the subscriber, the ASCII identifier for the access line, the VLAN outer tag as the binary identifier for the access line, the upstream rate, and the downstream rate.

     The ASCII identifier (TLV 0x03) begins with the # character, signifying that the remainder of the value identifies the backhaul (PON tree) line. TLV 0x03 is the same for both subscribers, because they connect through the same PON tree.
  3. The DPU-P sends a PADI message for each subscriber to the OLT. The PADI conveys the PPPoE-IA tags that identify the same attributes as the ANCP TLVs.
  4. The OLT sends a PADR message with the PPPoE tags to the BNG. The OLT also opens an ANCP session to the BNG by sending an ANCP Port Up message for the OLT-to-DPU-P connection. The rates in TLVs 0x81 and 0x82 are the values for the OLT-to-DPU-P line, represented by the L2 interface set. In other words, these are the rates for the PON tree itself rather than the subscriber access lines. Although this use case example shows that TLV 0x03 value is also reported in TLV 0x02 to indicate the PON tree line, this is not a requirement for PON networks.

     NOTE: The FTTB portion of this network connects G.fast DSL subscribers to the PON tree shared media backhaul. Consequently the DPU-P reports DSL TLVs for these subscribers rather than PON TLVs.

- When residential subscribers 10 and 11 log in:

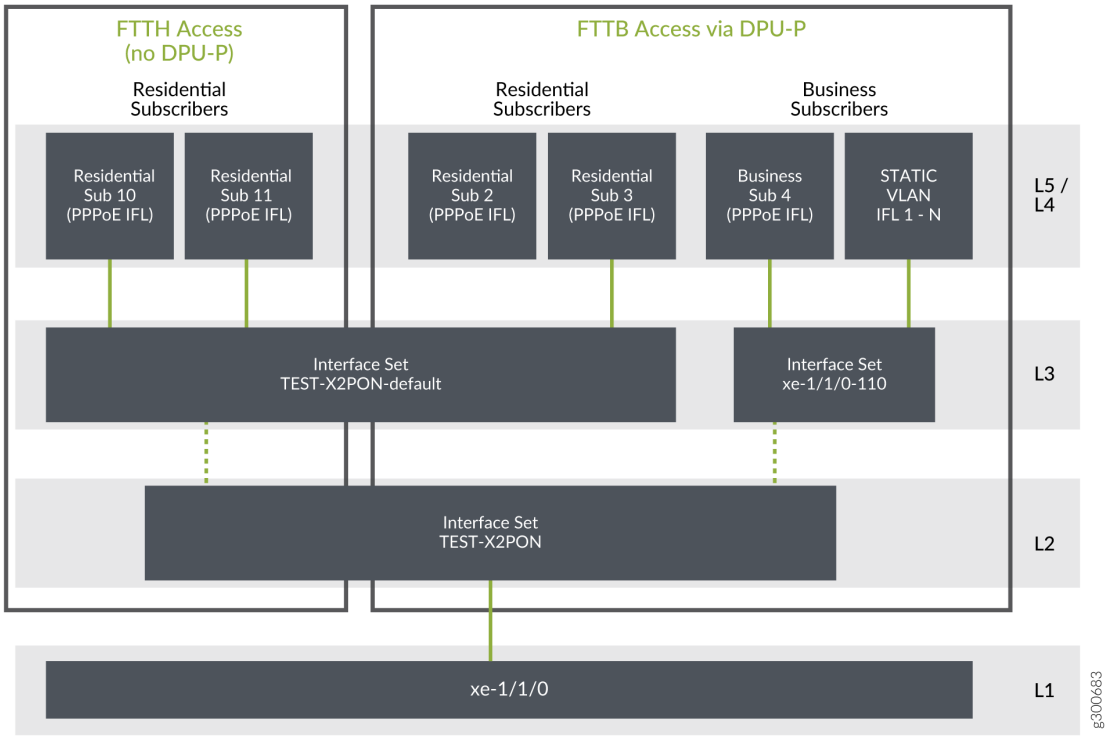
  1. PPPoE sends a PADI message for each subscriber to the OLT. The PADI conveys the PPPoE-IA tags for the individual subscriber access lines.
  2. The OLT sends a PADR message with the PPPoE tags for each subscriber line to the BNG.
  3. The OLT also sends an ANCP Port Up message to the BNG for each subscriber. ANCP TLVs in the message identify the access line, the subscriber, the ASCII identifier for the access line, the VLAN outer tag as the binary identifier for the access line, the upstream rate, and the downstream rate.

The ASCII identifier (TLV 0x03) begins with the # character, signifying that the remainder of the value identifies the backhaul (fiber PON tree, shared media) line. TLV 0x03 is the same for both subscribers, because they connect through the same DPU-P.

Because subscribers 10 and 11 connect to the same PON tree as the FTTB subscribers, the ASCII identifier (TLV 0x03) also begins with the # character, signifying that the remainder of the value identifies the backhaul (fiber PON tree, shared media) line. TLV 0x03 is the same for both subscribers.

Figure 15 on page 190 shows the five-level CoS hierarchy that corresponds to the FTTB/FTTH topology in Figure 14 on page 188.

Figure 15: CoS Hierarchy for FTTB/FTTH Topology



The following stanzas are part of the use case configuration that creates the Level 2 and Level 3 interface sets. The `stacked-interface-set` statement sets the Level 2 interface set to the $junos-aggregation-interface-set-name predefined variable. The stanza also specifies the Level 3 interface set as $junos-interface-set-name. It establishes the Level 2 set as the parent of the Level 3 set.

```
dynamic-profiles test-prof
    interfaces {
```

```
        stacked-interface-set {
            interface-set "$junos-aggregation-interface-set-name" {
                interface-set $junos-interface-set-name;
            }
        }
    }
}
```

The predefined-variable-defaults stanza uses variable expressions that set conditions to establish the names of the Level 2 and Level 3 interface sets. The default values are used only when RADIUS does not supply values for $junos-aggregation-interface-set-name and $junos-interface-set-name.

```
dynamic-profiles test-prof
    predefined-variable-defaults {
        aggregation-interface-set-name equals "$junos-phy-ifd-underlying-intf-set-name";
        interface-set-name equals "ifZero($junos-default-interface-set-name, $junos-phy-ifd-
interface-set-name)";
        default-interface-set-name equals "ifZero($junos-interface-set-name, ifNotZero($junos-
aggregation-interface-set-name, $junos-aggregation-interface-set-name##'-default'))";
    }
}
```

The following list describes the hierarchical CoS scheduler nodes for the FTTB/FTTH topology. It explains how the names of the interface sets are derived from predefined variables.

- Level 1 corresponds to the access-facing physical interface for all subscribers, xe-1/1/0.
- Level 2 corresponds to a parent interface set that has child interface sets as its members. The name of the interface set is supplied by the $junos-aggregation-interface-set-name predefined variable in the dynamic profile.

  TEST-X2PON is the Level 2 interface set for all PON subscribers, both conventional access and DPU-P access. Its members are the Level 3 interface set for the FTTB/FTTH residential subscribers and the Level 3 interface set for business subscriber 4. TLV 0x03 includes the # character, which identifies the PON tree line as the backhaul. $junos-aggregation-interface-set-name takes the value of TLV 0x03.
- Level 3 corresponds to an interface set that has subscriber logical interfaces as its members.
  - TEST-X2PON-default is the Level 3 interface set for FTTB residential subscribers 2 and 3, as well as FTTH residential subscribers 10 and 11. These subscribers all use the same PON tree and therefore are included in the same interface set.

These subscribers were identified as residential because the RADIUS server did not return VSA 26-4874-130, QoS-Set-Name. TLV 0x03 includes the # character, which identifies the PON tree line as the backhaul. $junos-interface-set-name is set to the value of $junos-aggregation-interface-set-name with a suffix of “default”.

- xe-1/1/0-110 is the Level 3 interface set for business subscriber 4, which uses shared-media access.

  This subscriber was identified as business because the RADIUS server returned VSA 26-4874-130. TLV 0x03 includes the # character, which identifies the PON tree line as the backhaul. $junos-interface-set-name is set to the value of VSA 26-4874-130. The VSA value is a concatenation of the physical interface name ($junos-phy-ifd-intf-set-name) and the outer VLAN tag.

- Level 4 corresponds to the logical interface for individual subscribers. This includes PPPoE logical interfaces for residential and business subscribers, as well as static VLAN logical interfaces for business subscribers.

- Level 5 corresponds to the scheduling queue for each subscriber, regardless of subscriber type or access type. One or more queues are present per subscriber to provide subscriber services.

Automatic Creation of Business Subscriber Interface Sets

For business subscribers in an access network, four-level scheduler hierarchies use static interface sets to represent the subscriber access line. The members of the interface set are static VLAN logical interfaces. This configuration is performed by Extensible Subscriber Services Manager (ESSM) operation scripts (op-scripts).

The op-scripts base the name on the outer VLAN tag of the subscriber interface, because the tag is unique per subscriber. The interface set name is in the format *physical_interface_name-outer_vlan_tag*. For example, an Ethernet interface ge-1/1/0, with a dual-tagged VLAN interface that has an outer tag of 111, results in an interface set name of ge-1/1/0-111. This format is the same as that used by the $junos-svlan-interface-set-name predefined variable.

In five-level scheduler hierarchies for business subscribers, each business session includes a dynamic PPPoE control session (and thus a dynamic PPPoE logical interface) and two or more static business VLAN logical interfaces. These interfaces need to be shaped as an aggregate in an interface set. The dynamic logical interfaces cannot be assigned to a static interface set. This means that this deployment design requires dynamic interface sets for logical intermediate (Level 3) CoS nodes to accommodate both the dynamic PPPoE logical interfaces and the static interfaces.

BEST PRACTICE: We recommend that you use dynamic interface sets to provide a uniform solution for both four-level and five-level hierarchies. This method ensures that all the logical

interfaces, both dynamic and static, are members of the same interface set. This is not a requirement. You can continue to configure only static interface sets for business subscribers in four-level hierarchies.

The op-scripts need to reference the business subscriber dynamic interface set name during subscriber configuration. This means that the format of the dynamic interface set name must be the same format that the script uses for static interface sets. The interface set name is provided by the RADIUS server during subscriber authentication, because the server has to determine whether the subscriber logging in is a business subscriber or a residential subscriber. This means that you have to configure your RADIUS software to specify the interface set for each subscriber. This requirement adds initial and maintenance configuration overhead to your operations, especially as your networks scales to higher numbers of subscribers.

Starting in Junos OS Release 19.3R1, you can configure the BNG to dynamically create the interface set name and propose that name to the RADIUS server in the Access-Request message for the subscriber. This method reduces the complexity of the RADIUS configuration, because you avoid having to configure your RADIUS software to specify interface sets for each subscriber. To enable dynamic creation of the interface set name for business subscribers, use the `source-interface-set-at-login svlan` statement at the `[edit protocols ppp-service]` hierarchy level.

The interface set name that the BNG proposes is carried by the Juniper Networks VSA, Qos-Set-Name (26-130) in the RADIUS Access-Request message. The set name consists of the name of access-facing physical interface appended with the VLAN tag. This is the same format that is used by the op scripts:

- The outer vlan tag is used for a dual-tagged VLAN. For a business subscriber on xe-1/1/0 with VLAN tags (110,7), the name has this format:

  xe-1/1/0-110

- The lone vlan tag is used for a single-tagged VLAN. The single-tagged VLAN is used when the CPE device connects directly to the access node. For a business subscriber on xe-2/2/1 with VLAN tag (33), the name has this format:

  xe-2/2/1-33

When the subscriber logs in, the RADIUS server evaluates the Access-Request and determines whether the subscriber is business or residential:

- When the RADIUS server determines that the subscriber is a business subscriber, it returns the VSA with the name in the Access-Accept message to the BNG, where the name is used to create a dynamic interface set for the business subscriber.

- If the RADIUS server determines during authentication that the subscriber is residential, then the server does not return the VSA in the Access-Accept message. In this case, the dynamic PPPoE IFL is added to a default dynamic interface set to conserve L3 CoS nodes for a five-level hierarchy or L2

CoS nodes for a four-level hierarchy. The dynamic interface set for residential subscribers always resolves to the default interface set. The default dynamic interface set is determined by how you configure the `predefined-variable-defaults` statement with expressions in the dynamic profile. See Dynamic Level 2 and Level 3 Interface Set Naming with Predefined Variables for information about configured the defaults.

How to Configure the Automatic Creation of Business Subscriber Interface Sets

In heterogeneous access networks, you can reduce some of the complexity of your RADIUS configuration by having PPP on the BNG dynamically create the interface set name for business subscribers and propose that name to the RADIUS server in the Access-Request message for the subscriber. This method reduces complexity because you do not have to configure all the possible interface set names on the RADIUS server. The proposed name is carried by the Qos-Set-Name VSA (26-4874–130).

If the server determines that the subscriber is a business subscriber, it returns the name in the Access-Accept message to the BNG. PPP on the BNG then uses the name to create a dynamic interface set for the business subscriber. This interface set is for an intermediate CoS node; for example, Level 3 in a five-level hierarchy. This interface set includes the business subscriber PPPoE IFL and the static VLAN IFLs created by ESSMD op-scripts. It is the child interface set of the Level 2 parent interface set.

For information about how the interface set names are formed, see Automatic Creation of Business Subscriber Interface Sets.

If the RADIUS server determines that the subscriber is residential, then the server does not return the VSA in the Access-Accept message. In this case, the dynamic PPPoE IFL is added to a default dynamic interface set.

To configure dynamic creation of business subscriber interface sets with the same format as $junos-svlan-interface-set-name:

- Enable PPP to dynamic creation.

```
[edit protocols ppp-service]
user@host# set source-interface-set-at-loginsvlan
```

Dynamic Level 2 and Level 3 Interface Set Naming with Predefined Variables

IN THIS SECTION

In heterogeneous access networks, Juniper Networks predefined variables supply the names of the interface sets for the Level 2 and Level 3 CoS nodes:

- Level 2—$junos-aggregation-interface-set-name
- Level 3—$junos-interface-set-name

You specify these variables in the dynamic client profile at the `[edit dynamic-profiles profile-name interfaces]` hierarchy level as follows:

```
stacked-interface-set {
    interface-set "$junos-aggregation-interface-set-name" {
        interface-set “$junos-interface-set-name”;
    }
}
```

These interfaces are said to be stacked. Level 2 is the parent interface set and Level 3 is the child interface set.

You can optionally configure default values for the predefined variables. The default value must be appropriate to the variable, such as an integer or an alphanumeric string. The Junos OS uses the default value when the variable is not resolved, meaning that it does not have a value. The predefined variable might not be resolved for several reasons, depending on the access type (conventional or shared-media) and the subscriber type (residential or business), such as the following:

- The Access-Aggregation-Circuit-Id-ASCII TLV (0x03) is not present or does not include the # character that indicates it carries the backhaul identifier).
- The external RADIUS server does not return the QoS-Set-Name VSA (26-4874-130).

Starting in Junos OS Release 19.3R1, you can configure the default value of a predefined variable to be another predefined variable by using a variable expression. In earlier releases, the default value must be fixed; it cannot be a variable.

NOTE: Expressions are typically configured for user-defined variables and dynamic service profiles. See *Using Variable Expressions in User-Defined Variables* for more information.

When you use a variable expression, you are setting up a condition that determines the default value of the predefined variable. The value of the default is different when the condition is matched than when it is not matched. This capability enables you to configure a single dynamic client profile for a heterogeneous network. The profile can instantiate the proper interface sets for business subscribers and residential subscribers on both conventional access lines and shared-media access lines.

In dynamic client profiles, you can configure variable expressions that use any of the following:

- `equals`—Assigns a predefined variable or expression as the default value.
- `ifNotZero(`*`parameter-1`*`, `*`parameter-2`*`)`—Sets a condition to be matched. Assigns the value from *parameter-2* as the default value only when *parameter-1* is nonzero, meaning that the parameter resolved to some value.
- `ifZero(`*`parameter-1`*`, `*`parameter-2`*`)`—Sets a condition to be matched. Assigns the value from *parameter-2* as the default value only when *parameter-1* is zero, meaning that the parameter did not resolve to any value. If *parameter-1* did resolve to a value (therefore it is not zero), then the value from *parameter-1* is assigned as the default.

You can also nest expressions, which provides additional conditions for setting the variable value. For a heterogeneous network, you use the following expressions to determine the name for the Level 2 and Level 3 CoS nodes:

```
dynamic-profiles name {
    predefined-variable-defaults {
        interface-set-name equals "ifZero($junos-default-interface-set-name, $junos-phy-ifd-
interface-set-name)";
        default-interface-set-name equals "ifZero($junos-interface-set-name, ifNotZero($junos-
aggregation-interface-set-name, $junos-aggregation-interface-set-name##'-default'))";
    }
}
```

The following sections explain how to evaluate each of these expressions.

Predefined Variable Default for the Level 2 Node Interface Set

The following definition simply assigns a predefined variable as the default value for $junos-aggregation-interface-set-name:

```
aggregation-interface-set-name equals “$junos-phy-ifd-underlying-intf-set-name”
```

The expression has no conditions to evaluate. The $junos-phy-ifd-underlying-intf-set-name predefined variable has the format *physical-interface-name*-underlying. For example, if the physical interface is xe-1/1/0, then $junos-phy-ifd-underlying-intf-set-name resolves to xe-1/1/0-underlying. That becomes the default value for $junos-aggregation-interface-set-name:

$junos-aggregation-interface-set-name = $junos-phy-ifd-underlying-intf-set-name = xe-1/1/0-underlying

The default value is not used when $junos-aggregation-interface-set-name is already resolved. If the Access-Aggregation-Circuit-ID-ASCII attribute (TLV 0x03) begins with a # character (the backhaul identifier), then the variable takes the value of the remainder of the string after the # character. It is therefore resolved and the default is not used.

The following table shows the value of $junos-aggregation-interface-set-name when TLV 0x03 identifies the backhaul node and when it is not present. The physical interface is xe-1/1/0.

TLV 0x03 (Access Type)	$junos-aggregation-interface-set-name
#TEST-X2PON (DPU-C/DPU-P)	TEST-X2PON
Not present in PPPoE-IA tags (Conventional)	xe-1/1/0-underlying

Predefined Variable Default for the Level 3 Node Interface Set

You have to use multiple expressions to provide a default value for $junos-interface-set-name:

```
interface-set-name equals "ifZero($junos-default-interface-set-name, $junos-phy-ifd-interface-
set-name)";
default-interface-set-name equals "ifZero($junos-interface-set-name, ifNotZero($junos-
aggregation-interface-set-name, $junos-aggregation-interface-set-name##'-default'))";
```

1. The first expression means that it has to check whether $junos-default-interface-set-name is resolved.

   ```
   interface-set-name equals "ifZero($junos-default-interface-set-name, $junos-phy-ifd-interface-
   set-name)";
   ```

   - If it is not resolved, then the default value for $junos-interface-set-name is set to the value of $junos-phy-ifd-interface-set-name:

     $junos-interface-set-name = $junos-phy-ifd-interface-set-name

- If it is resolved, then the default value for $junos-interface-set-name is set to the resolved value of $junos-default-interface-set-name:

  $junos-interface-set-name = $junos-default-interface-set-name

2. The value of $junos-default-interface-set-name is determined by a nested expression.

```
default-interface-set-name equals "ifZero($junos-interface-set-name, ifNotZero($junos-
aggregation-interface-set-name, $junos-aggregation-interface-set-name##'-default'))";
```

   a. If $junos-interface-set-name is not resolved, then $junos-interface-set-name is set to the result of the nested expression (ifNotZero). However, the predefined variable defaults are used only if $junos-interface-set-name is not resolved. Consequently, the expression must reduce to this:

```
default-interface-set-name equals “ifNotZero($junos-aggregation-interface-set-name, $junos-
aggregation-interface-set-name##'-default')"
```

   b. The ifNotZero expression is solved by evaluating whether $junos-aggregation-interface-set-name is resolved. $junos-aggregation-interface-set-name is resolved only when TLV 0x03 includes the backhaul identifier (#).

      - If $junos-aggregation-interface-set-name is resolved, then `-default` is appended to that name and that becomes the default value for $junos-default-interface-set-name:

        $junos-default-interface-set-name = $junos-aggregation-interface-set-name+ “-default”

      - If $junos-aggregation-interface-set-name is not resolved, then $junos-default-interface-set-name is also not resolved.

3. Now the value for $junos-interface-set-name can be determined:

```
interface-set-name equals "ifZero($junos-default-interface-set-name, $junos-phy-ifd-interface-
set-name)";
```

   - If $junos-default-interface-set-name is resolved, then that is also the value of $junos-interface-set:

     $junos-interface-set-name = $junos-default-interface-set-name = $junos-aggregation-interface-set-name+ “-default”

   - If $junos-default-interface-set-name is not resolved, then:

     $junos-interface-set-name = $junos-phy-ifd-interface-set-name

The following table shows the possible values of the predefined variables based on the expressions described above. It can be helpful to refer to the figures and text in CoS Node Shaping in Four-Level and Five-Level Heterogeneous Networks, CuTTB Use Case Topology and CoS Hierarchy, andFTTB/FTTH Use Case Topology and CoS Hierarchy

TLV 0x03 (Access Type)	VSA 26–4874–130 (Subscriber Type)	$junos-phy-ifd-interface-set-name	$junos-default-interface-set-name	$junos-interface-set-name
#TEST-X2PON (DPU-C/DPU-P)	Not returned (Residential)	xe-1/1/0	Not resolved	TEST-X2PON-default
#TEST-X2PON (DPU-C/DPU-P)	Returned as xe-1/1/0 (Business)	xe-1/1/0	xe-1/1/0	xe-1/1/0-110
Not present in PPPoE-IA tags (Conventional)	Not returned (Residential)	xe-1/1/0	Not resolved	xe-1/1/0
Not present in PPPoE-IA tags (Conventional)	Returned as xe-1/1/0 (Business)	xe-1/1/0	xe-1/1/0	xe-1/1/0-110

Release History Table

Release	Description
19.3R1	Starting in Junos OS Release 19.3R1, you can configure the BNG to dynamically create the interface set name and propose that name to the RADIUS server in the Access-Request message for the subscriber.
19.3R1	Starting in Junos OS Release 19.3R1, you can configure the default value of a predefined variable to be another predefined variable by using a variable expression.

RELATED DOCUMENTATION

- *ANCP Agent and AAA*
- *ANCP Agent Traffic Shaping and CoS*
- *DSL Forum Vendor-Specific Attributes*

OLT Migration to Using PON TLVs Instead of DSL TLVs

IN THIS SECTION

Support for OLT Migration to PON TLVs

Before the introduction of PON-specific TLVs (see the Internet draft, *Access Extensions for the Access Node Control Protocol*), OLTs passed information about PON access line rates in the ANCP DSL TLVs. The DSL TLVs are *overloaded* with the PON data. In this situation, the access line type is classified as OTHER in the DSL-Type TLV (0x91). The raw PON line rates are conveyed in the Actual-Net-Data-Rate-Upstream TLV (0x81) and the Actual-Net-Data-Rate-Downstream TLV (0x82). For example, this is the behavior used for FTTH networks.

With the availability of the PON TLVs, OLTs provide PON access line information in one of the following ways:

- Only in DSL TLVs—OLTs that do not support the PON TLVs continue to send PON rates in DSL TLVs. This is the same situation as before the introduction of PON TLVs.
- Only in PON TLVs—OLTs that support the PON TLVs might use them exclusively to convey attributes for the subscriber access line and PON tree.
- In both DSL and PON TLVs—OLTs that support the PON TLVs might send them and also, redundantly, overload the DSL TLVs with the PON rates. This behavior enables the OLT to successfully provide rate information both to BNGs that support PON TLVs and BNGs that do not. The OLT is expected to provide both types of TLVs in both the ANCP port status messages and the PPPoE-IA tags.

The following expectations apply to OLTs that provide both DSL TLVs and PON TLVs:

- The OLT uses both types of TLVs for both ANCP port status messages and PPPoE-IA tags.

- The ANCP line attribute TLVs carry only the TLVs that match that line:
  - The DSL-Line-Attributes TLV (0x04) carries only DSL TLVs, including G.fast TLVs.
  - The PON-Access-Line-Attributes TLV (0x12) carries only PON TLVs.
  - The Access-Loop Encapsulation TLV (0x90) is independent of the transport method. The ANCP agent accepts and saves 0x90 when it is present in either the PON-Access-Line-Attributes TLV (0x12) or in PPPoE-IA tags.
- The access-line identification attributes are common to both DSL and PON access lines and convey the same information. This set of attributes consists of the following:
  - Access-Loop-Circuit-ID (0x01)
  - Access-Loop-Remote-ID (0x02)
  - Access-Aggregation-Circuit-ID-ASCII(0x03)
  - Access-Aggregation-Circuit-ID-Binary (0x04)

When the OLT sends both types of TLVs, the router accepts, saves, and process only one type or the other, according to a preference setting. The router saves or discards the corresponding line attribute that carries the TLVs for that line type. By default, the router prefers the PON TLVs over the DSL TLVs. This means that the router accepts the PON-Line-Attributes TLV (0x12) and discards the DSL-Line-Attributes-TLV (0x04).

You can change the preference with the `preference (dsl | pon)` option at the `[edit system access-line attributes]` hierarchy level. For example, when the PON TLVs are unreliable, perhaps because of an OLT issue, you might configure the router prefer the DSL TLVs for improved reliability.

How to Configure Preference for DSL or PON TLVs When an OLT Sends Both

You can configure which set of TLVs is saved and processed when the OLT sends both DSL TLVs and PON TLVs in ANCP port status messages or in PPPoE-IA tags. The TLVs that you do not select are discarded. OLTs provide PON access line information in one of the following ways:

- Only in DSL TLVs—OLTs that do not support the PON TLVs continue to use the method available before PON TLVs were available. These OLTs send PON rates in DSL TLVs, overloading the DSL TLVs with the PON information. In this case, the DSL-Type TLV (0x91) is set to OTHER and PON rates for the subscriber access line are presented in the Actual-Net-Data-Rate-Upstream TLV (0x81) and the Actual-Net-Data-Rate-Downstream TLV (0x82).
- Only in PON TLVs—OLTs that support the PON TLVs might use them exclusively to convey attributes for the subscriber access line and PON tree.
- In both DSL and PON TLVs—OLTs that support the PON TLVs might send them and also, redundantly, overload the DSL TLVs with the PON rates. This behavior enables the OLT to successfully provide

rate information both to BNGs that support PON TLVs and BNGs that do not. The OLT is expected to provide both types of TLVs in both the ANCP port status messages and the PPPoE-IA tags.

NOTE: The default preference on the router is to accept and process PON TLVs when both are received. This means that you typically use the `preference` option to prioritize DSL TLVs over PON TLVs. For example, if the PON TLVs are unreliable, perhaps because of an OLT issue, you can prioritize the DSL TLVs for reliability.

To select the type of access line TLVs to accept:

- Configure the preference.

```
[edit system access-line]
user@host# set preference (dsl | pon)
```

RELATED DOCUMENTATION

DSL Forum Vendor-Specific Attributes

DSL Forum VSAs Support in AAA Access and Accounting Messages for Junos OS

Five-Level and Four-Level Heterogeneous Networks | 177

PART 5

Configuration Statements and Operational Commands

CHAPTER 12

Configuration Statements

IN THIS CHAPTER

accept

IN THIS SECTION

Syntax

```
accept (any | dhcp-v4 | dhcp-v6 | inet | inet6 | pppoe);
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure stacked-vlan-ranges dynamic-profile profile-name],
[edit interfaces interface-name auto-configure vlan-ranges dynamic-profile profile-name]
```

Description

Specify the type of VLAN Ethernet packet accepted by an interface that is associated with a VLAN dynamic profile or stacked VLAN dynamic profile.

Options

`any`—Any packet type. Specifies that any incoming packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes. This option is used when configuring wholesaling in a Layer 2 network.

`dhcp-v4`—IPv4 DHCP packet type. Specifies that incoming IPv4 DHCP discover packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes

> **NOTE**: The DHCP-specific `mac-address` and `option-82` options are rejected if the `accept` statement is not set to `dhcp-v4`.

`dhcp-v6`—IPv6 DHCP packet type. Specifies that incoming IPv6 DHCP discover packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes.

`inet`—IPv4 Ethernet and ARP packet type.

`inet6`—IPv6 Ethernet packet type.

`pppoe`—Point-to-Point Protocol over Ethernet packet type.

> **NOTE**: The `pppoe` VLAN Ethernet packet type option is supported only for MPC/MIC interfaces.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

`dhcp-v4` option added in Junos OS Release 10.0.

dhcp-v6, inet6 and pppoe options added in Junos OS Release 10.2.

any option added in Junos OS Release 10.4.

RELATED DOCUMENTATION

- *Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs*
- *Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs*
- Configuring VLAN Interfaces for the Layer 2 Wholesale Solution | **105**
- *Configuring Subscriber Packet Types to Trigger VLAN Authentication*

accept-out-of-band

IN THIS SECTION

Syntax

```
accept-out-of-band protocol;
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure vlan-ranges dynamic-profile profile-name]
```

Description

Configure the protocol for which packets are accepted as out-of-band traffic to trigger instantiation or deletion of autosensed dynamic VLANs.

NOTE: A given physical interface can support VLANs created by either conventional packet-triggering or out-of-band triggering, but not both at the same time.

Options

protocol Out-of-band protocol. The following out-of-band protocol is supported:

- ancp—ANCP Port Up and Port Down messages trigger instantiation and deletion, respectively, of autosensed, dynamic VLAN.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring Out-of-Band ANCP Messages to Trigger Dynamic VLAN Instantiation | 150

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

access-profile

IN THIS SECTION

Syntax

```
access-profile profile-name;
```

Hierarchy Level

```
[edit],
[edit forwarding-options dhcp-relay]
[edit forwarding-options dhcp-relay dual-stack-group dual-stack-group-name],
[edit forwarding-options dhcp-relay group group-name]
[edit forwarding-options dhcp-relay dhcpv6]
[edit forwarding-options dhcp-relay dhcpv6 group group-name]
[edit logical-systems logical-system-name routing-instances routing-instance-name]
[edit interfaces interface-name auto-configure vlan-ranges],
[edit interfaces interface-name auto-configure stacked-vlan-ranges],
[edit routing-instances routing-instances-name]
[edit system services dhcp-local-server]
[edit system services dhcp-local-server group group-name]
[edit system services dhcp-local-server dhcpv6]
[edit system services dhcp-local-server dhcpv6 group group-name]
[edit system services dhcp-local-server dual-stack-group dual-stack-group-name]
```

Description

After you have created the access profile that specifies authentication and accounting parameters, you must specify where the profile is used. Authentication and accounting will not run unless you specify the profile. You can attach access profiles globally at the `[edit]` hierarchy level, or you can apply them to DHCP clients or subscribers, VLANs, or to a routing instance.

Options

profile-name—Name of the access profile that you configured at the `[edit access profile name]` hierarchy level.

Required Privilege Level

access—To view this statement in the configuration.

access-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.1.

RELATED DOCUMENTATION

RADIUS Servers and Parameters for Subscriber Access

Attaching Access Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces

Configuring Access Components for the DHCP Layer 3 Wholesale Network Solution | 18

Configuring Access Components for the PPPoE Wholesale Network Solution | 76

access-profile (Dynamic VLAN)

IN THIS SECTION

Syntax

```
access-profile vlan-access-profile-name;
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure vlan-ranges dynamic-profile profile-name]
```

Description

Access profiles contain subscriber access authentication, authorization and accounting (AAA) configuration parameters. You can create an access profiles and then attach it at various configuration levels. When you attach an access profile to an interface configured for dynamic VLAN or stacked VLAN, all the VLANs and stacked VLANs use the same set of AAA parameters configured in that access profile. The different access profiles can have different authentication/authorization settings so you can, for example, have authentication on some VLAN or stacked VLAN ranges but no authentication on other ranges.

You can assign different access profiles to different dynamic profiles on the same interface. If you assign an access profile at the global level, but a different access profile is assigned at the interface level, the access profile at the interface level authenticates all dynamic VLANs and stacked VLANs on the interface. Access profiles can be assigned at various levels, but the most specific access profile takes precedence over any other profile assignments.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.2.

RELATED DOCUMENTATION

Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs

access-profile (Dynamic Stacked VLAN)

IN THIS SECTION

Syntax

```
access-profile svlan-access-profile-name;
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure stacked-vlan-ranges dynamic-profile profile-name]
```

Description

Access profiles contain subscriber access authentication, authorization and accounting (AAA) configuration parameters. You can create an access profiles and then attach it at various configuration levels. When you attach an access profile to an interface configured for dynamic VLAN or stacked VLAN, all the VLANs and stacked VLANs use the same set of AAA parameters configured in that access profile.

The different access profiles can have different authentication/authorization settings so you can, for example, have authentication on some VLAN and stacked VLAN ranges but no authentication on other ranges.

You can assign different access profiles to different dynamic profiles on the same interface. If you assign an access profile at the global level, but a different access profile is assigned at the interface level, the access profile at the interface level authenticates all dynamic VLANs and stacked VLANs on the interface. Access profiles can be assigned at various levels, but the most specific access profile takes precedence over any other profile assignments..

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.2.

RELATED DOCUMENTATION

Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs

active-server-group

IN THIS SECTION

Syntax

```
active-server-group server-group-name <allow-server-change>;
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay dhcpv6],
[edit forwarding-options dhcp-relay dhcpv6 group group-name],
[edit forwarding-options dhcp-relay group group-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relay],
[edit logical-systems logical-system-name forwarding-options dhcp-relay dhcpv6],
[edit logical-systems logical-system-name forwarding-options dhcp-relay dhcpv6 group group-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relaygroup group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay dhcpv6],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay dhcpv6 group group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay group group-name],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay]
[edit routing-instances routing-instance-name forwarding-options dhcp-relay dhcpv6],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay dhcpv6 group group-
name],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay group group-name]
```

Description

Apply a DHCP relay agent configuration to the named group of DHCP server addresses. The server group itself is configured with the `server-group` statement. You can apply an active server group globally or for specific groups of interfaces, configured with the `group` statement. An active server group applied to an interface group overrides a global configuration.

Options

allow-server-change (Optional) (DHCPv4 only) Enable the relay agent to accept and forward a DHCP request (renew or rebind) ACK message to the client from any DHCP local server in the active server group. Starting in Junos OS Release 18.4R1, this option also applies to DHCP information request (DHCPINFORM) ACK messages.

- **Default:** Forward ACK messages from only the original binding server.

server-group-name Name of the group of DHCP or DHCPv6 server addresses to which the DHCP or DHCPv6 relay agent configuration applies.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 8.3.

Support at the `[edit ... dhcpv6]` hierarchy levels introduced in Junos OS Release 11.4.

`allow-server-change` option added in Junos OS Release 16.2R1.

RELATED DOCUMENTATION

- *Extended DHCP Relay Agent Overview*
- *Configuring Active Server Groups to Apply a Common DHCP Relay Agent Configuration to Named Server Groups*
- *Configuring Group-Specific DHCP Relay Options*

address

IN THIS SECTION

Syntax

```
address address {
    arp ip-address (mac | multicast-mac) mac-address <publish>;
    broadcast address;
    destination address;
    destination-profile name;
    eui-64;
    subnet-router-anycast;
    ;
    primary-only;
    multipoint-destination address dlci dlci-identifier;
    multipoint-destination address {
        epd-threshold cells;
        inverse-arp;
        oam-liveness {
            up-count cells;
            down-count cells;
        }
        oam-period (disable | seconds);
        shaping {
            (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained
rate burst length);
            queue-length number;
        }
        vci vpi-identifier.vci-identifier;
```

```
    }
    primary;
    preferred;
    virtual-gateway-address address;
    (vrrp-group | vrrp-inet6-group) group-number {
        (accept-data | no-accept-data);
        advertise-interval seconds;
        authentication-type authentication;
        authentication-key key;
        fast-interval milliseconds;
        (preempt | no-preempt) {
            hold-time seconds;
        }
        priority-number number;
        track {
            priority-cost seconds;
            priority-hold-time interface-name {
                interface priority;
                bandwidth-threshold bits-per-second {
                    priority;
                }
            }
            route ip-address/mask routing-instance instance-name priority-cost cost;
        }
        virtual-address [ addresses ];
    }
}
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number family family],
[edit logical-systems logical-system-name interfaces interface-name  unit logical-unit-number
family  family]
```

Description

Configure the interface address.

NOTE: If you configure the same address on multiple interfaces in the same routing instance, Junos OS uses only the first configuration, and the remaining address configurations are ignored and can leave interfaces without an address. Interfaces that do not have an assigned address cannot be used as a donor interface for an unnumbered Ethernet interface.

For example, in the following configuration the address configuration of interface xe-0/0/1.0 is ignored:

```
interfaces {
  xe-0/0/0 {
    unit 0 {
      family inet {
        address 192.168.1.1/8;
      }
    }
  }
  xe-0/0/1 {
    unit 0 {
     family inet {
       address 192.168.1.1/8;
     }
  }
}
```

For more information on configuring the same address on multiple interfaces, see Configuring the Interface Address.

- In Junos OS Release 13.3 and later, when you configure an IPv6 host address and an IPv6 subnet address on an interface, the commit operation fails.
- In releases earlier than Junos OS Release 13.3, when you use the same configuration on an interface, the commit operation succeeds, but only one of the IPv6 addresses that was entered is assigned to the interface. The other address is not applied.

Options

address—Address of the interface.

subnet-router-anycast—IPv6 host address to communicate with any of the routers present on the link.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

NOTE: The `edit logical-systems` hierarchy is not available on QFabric systems.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

RELATED DOCUMENTATION

- Configuring the Protocol Family
- family
- negotiate-address
- unnumbered-address (Ethernet) | **518**

address-assignment (Address-Assignment Pools)

IN THIS SECTION

Syntax

```
address-assignment {
    abated-utilization percentage;
    abated-utilization-v6 percentage;
    high-utilization percentage;
    high-utilization-v6 percentage;
    neighbor-discovery-router-advertisement ndra-pool-name;
    pool pool-name {
        active-drain;
        family family {
            dhcp-attributes {
                protocol-specific attributes;
            }
            excluded-address ip-address;
            excluded-range name low minimum-value high maximum-value;
            host hostname {
                hardware-address mac-address;
                ip-address ip-address;
            }
            network ip-prefix/<prefix-length>;
            prefix ipv6-prefix;
            range range-name {
                high upper-limit;
                low lower-limit;
                prefix-length prefix-length;
            }
        }
        hold-down;
        link pool-name;
    }
}
```

Hierarchy Level

```
[edit access]
```

Description

Configure address-assignment pools that can be used by different client applications.

NOTE: Support for subordinate statements is platform-specific. See individual statement topics for support information.

Options

abated-utilization Generate SNMP traps for DHCP address pools or linked set of address pools. No SNMP traps are generated unless a value is configured. Default: Abated utilization is not set. Delete the abated-utilization value to unset.

- **Values:** *percentage*—Threshold below which an SNMP trap clear is generated. Range: 1 through 98.

abated-utilization-v6 Generate SNMP traps for DHCPv6 address pools or linked set of address pools. No SNMP traps are generated unless a value is configured. Default: Abated utilization is not set. Delete the abated-utilization value to unset.

- **Values:** *percentage*—Threshold below which an SNMP trap clear is generated. Range: 1 through 98.

high-utilization Generate an SNMP trap when the DHCP address pool or linked set of address pools use surpasses the specified percentage. Default: High utilization is not set. Delete the high-utilization value to unset.

- **Values:** *percentage*—Percentage used to generate a trap. Range: 2 through 99.

high-utilization-v6 Generate an SNMP trap when the DHCPv6 address pool or linked set of address pools use surpasses the specified percentage. Default: High utilization is not set. Delete the high-utilization value to unset.

- **Values:** *percentage*—Percentage used to generate a trap. Range: 2 through 99.

neighbor-discovery-router-advertisement Configure the name of the address-assignment pool used to assign the router advertisement prefix.

- **Values:** *ndra-pool-name*—Name of the address-assignment pool.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

RELATED DOCUMENTATION

Address-Assignment Pools for Subscriber Management

L2TP LNS Inline Service Interfaces

Configuring an Address-Assignment Pool Used for Router Advertisements

adjacency-loss-hold-time (ANCP)

IN THIS SECTION

Syntax

```
adjacency-loss-hold-time seconds;
```

Hierarchy Level

```
[edit protocols ancp],
[edit protocols ancp neighbor ip-address]
```

Description

Configure the ANCP agent to monitor, either globally or for a specified neighbor, how long an ANCP adjacency is down and to trigger a state change for the subscriber access line if the hold timer expires before the adjacency comes back up, as indicated by a Port Up message on the access line. By default, there is no delay between detecting an adjacency loss and triggering the state change.

Options

seconds Duration of period that the ANCP agent monitors loss of adjacency.

- **Default:** 0 seconds
- **Range:** 0 through 1800 seconds

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring the ANCP Agent to Dampen the Effects of Short-Term Adjacency Losses | 154

Configuring ANCP Neighbors

Configuring the ANCP Agent

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

ancp

IN THIS SECTION

Syntax

```
ancp {
    adjacency-loss-hold-time seconds;
    adjacency-timer seconds;
    gsmp-syn-timeout seconds;
    gsmp-syn-wait;
    interfaces {
        interface-set interface-set-name {
            access-identifier identifier-string;
            underlying-interface underlying-interface-name;
        }
        interface-name {
            access-identifier identifier-string;
        }
    }
    maximum-discovery-table-entries entry-number;
    maximum-helper-restart-time;
    neighbor ip-address {
        adjacency-loss-hold-time seconds;
        adjacency-timer;
        auto-configure-trigger interface interface-name;
        ietf-mode;
        maximum-discovery-table-entries entry-number;
        pre-ietf-mode;
    }
    pre-ietf-mode;
```

```
    qos-adjust {
        adsl-bytes bytes;
        adsl2-bytes bytes;
        adsl2-plus-bytes bytes;
        other-bytes bytes;
        other-overhead-adjust percentage;
        sdsl-bytes bytes;
        sdsl-overhead-adjust percentage;
        vdsl-bytes bytes;
        vdsl-overhead-adjust percentage;
        vdsl2-bytes bytes;
        vdsl2-overhead-adjust percentage;
    }
    qos-adjust-adsl adjustment-factor;
    qos-adjust-adsl2 adjustment-factor;
    qos-adjust-adsl2-plus adjustment-factor;
    qos-adjust-other adjustment-factor;
    qos-adjust-sdsl adjustment-factor;
    qos-adjust-vdsl adjustment-factor;
    qos-adjust-vdsl2 adjustment-factor;
    traceoptions {
        file filename <files number> <match regular-expression > <size maximum-file-size> <world-
readable | no-world-readable>;
        flag flag;
        level (all | error | info | notice | verbose | warning);
        no-remote-trace;
    }
}
```

Hierarchy Level

```
[edit protocols]
```

Description

Configure Junos OS ANCP agent features.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

NOTE: When you deactivate the ANCP protocol, the router does not perform a commit check to determine whether any ANCP or L2-BSA subscribers are present (active or inactive). Any subscribers that are active at the time of deactivation remain active.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.4.

RELATED DOCUMENTATION

Configuring the ANCP Agent

authentication

IN THIS SECTION

Syntax

```
authentication {
    packet-types  [packet-types];
    password password-string;
    username-include {
        circuit-id;
        circuit-type;
        delimiter delimiter-character;
        domain-name domain-name-string;
        interface-name;
        mac-address;
        option-18;
        option-37;
        option-82 <circuit-id> <remote-id>;
        radius-realm radius-realm-string;
        remote-id;
        user-prefix user-prefix-string;
        vlan-tags;
    }
}
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure vlan-ranges],
[edit interfaces interface-name auto-configure stacked-vlan-ranges]
```

Description

Specify the authentication parameters that trigger the Access-Request message to AAA for the interface.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.0.

RELATED DOCUMENTATION

Subscribers over Static Interfaces Configuration Overview

Configuring the Static Subscriber Global Authentication Password

Configuring a Username for Authentication of Out-of-Band Triggered Dynamic VLANs | **149**

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | **126**

authentication (DHCP Local Server)

IN THIS SECTION

Syntax

```
authentication {
    password password-string;
    username-include {
        circuit-type;
        client-id;
        delimiter delimiter-character;
        domain-name domain-name-string;
        interface-description  (device-interface | logical-interface);
        interface-name ;
        logical-system-name;
```

```
        mac-address;
        option-60;
        option-82 <circuit-id> <remote-id>;
        relay-agent-interface-id;
        relay-agent-remote-id;
        relay-agent-subscriber-id;
        routing-instance-name;
        user-prefix user-prefix-string;
        vlan-tags;
    }
}
```

Hierarchy Level

```
[edit system services dhcp-local-server],
[edit system services dhcp-local-server dual-stack-group dual-stack-group-name],
[edit system services dhcp-local-server dhcpv6],
[edit system services dhcp-local-server dhcpv6 group group-name],
[edit system services dhcp-local-server group group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server ...],
[edit logical-systems logical-system-name system services dhcp-local-server ...],
[edit routing-instances routing-instance-name system services dhcp-local-server ...]
```

Description

Configure the parameters the router sends to the external AAA server. A group configuration takes precedence over a global DHCP relay or DHCP local server configuration.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.1.

RELATED DOCUMENTATION

Specifying Authentication Support

authentication (DHCP Relay Agent)

IN THIS SECTION

Syntax

```
authentication {
    password password-string;
    username-include {
        circuit-type;
        client-id;
        delimiter delimiter-character;
        domain-name domain-name-string;
        interface-description  (device-interface | logical-interface);
        interface-name;
        logical-system-name;
        mac-address;
        option-60;
        option-82 <circuit-id> <remote-id>;
        relay-agent-interface-id;
```

```
        relay-agent-remote-id;
        relay-agent-subscriber-id;
        routing-instance-name;
        user-prefix user-prefix-string;
        vlan-tags;
    }
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay dhcpv6],
[edit forwarding-options dhcp-relay dhcpv6 group group-name],
[edit forwarding-options dhcp-relay dual-stack-group dual-stack-group-name],
[edit forwarding-options dhcp-relay group group-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]
```

Description

Configure the parameters the router sends to the external AAA server. A group configuration takes precedence over a global DHCP relay configuration. Use the statement at the `[edit...dhcpv6]` hierarchy levels to configure DHCPv6 support.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.1.

Support at the `[edit ... dhcpv6]` hierarchy levels introduced in Junos OS Release 11.4.

Support at the [edit ... dual-stack-group *dual-stack-group-name*] hierarchy level introduced in Junos OS Release 15.1.

RELATED DOCUMENTATION

dhcp-relay

Specifying Authentication Support

authentication-order

IN THIS SECTION

Syntax

```
authentication-order [ authentication-methods ];
```

Hierarchy Level

```
[edit access profile profile-name]
```

Description

Set the order in which AAA tries different authentication methods when verifying that a client can access the router or switch. For each login attempt, AAA tries the authentication methods in order, from first to last.

A given subscriber does not undergo both authentication and authorization as separate steps. When both `authentication-order` and `authorization-order` are specified, DHCP subscribers honor the configured authorization order, all other subscribers use the configured authentication-order.

Starting in Junos OS Release 18.2R1, the `password` option can also be used to specify that local authentication and local authorization is attempted for individual subscribers that are configured with the `subscriber` statement at the `[edit access profile` *`profile-name`*`]` hierarchy level.

Options

authentication-methods Ordered list of methods to use for authentication attempts. The list includes one or more of the following methods in any combination:

- `nasreq`—Verify subscribers using the Diameter-based Network Access Server Requirements (NASREQ) protocol.
- `none`—No authentication is performed. Grants authentication without examining the client credentials. Can be used, for example, when the Diameter function Gx-Plus is employed for notification during subscriber provisioning.

  NOTE: Subscriber access management does not support the `none` option; authentication fails when this option is specified.

- `password`—Verify the client using the information configured at the `[edit access profile` *`profile-name`* `client` *`client-name`*`]` hierarchy level.

  Subscriber access management does not support the `password` option until Junos OS Release 18.2R1. Starting in Junos OS Release 18.2R1, this option is used to enable local authentication and optionally local authorization for individual subscribers. Local authentication is typically used when you do not have external authentication and authorization servers. The password itself must be configured with the `subscriber` statement in the same access profile. Local authentication is performed when a subscriber logs in with a matching username; it succeeds if the subscribers login password matches the password in the profile.

If you have external authentication and authorization servers, you can use local authentication as a backup authentication method. In this case, configure `password` other than first in the list of methods.

- `radius`—Verify the client using RADIUS authentication services.
- `s6a`—Verify subscribers using the Diameter-based s6a protocol.
- **Default:** `password`

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

`none` option added in Junos OS Release 11.2.

`nasreq` option added in Junos OS Release 16.1.

`s6a` option added in Junos OS Release 19.3R1.

RELATED DOCUMENTATION

Example: Configuring CHAP Authentication with RADIUS

RADIUS Authentication and Accounting Basic Configuration

Example: Configure S6a Application

auto-configure

IN THIS SECTION

Syntax

```
auto-configure {
    vlan-ranges {
        access-profile profile-name;
        authentication {
            packet-types  [packet-types];
            password password-string;
            username-include{
                circuit-id;
                circuit-type;
                delimiter delimiter-character;
                domain-name domain-name-string;
                interface-name;
                mac-address;
                option-18;
                option-37;
                option-82 <circuit-id> <remote-id>;
                radius-realm radius-realm-string;
                remote-id;
                user-prefix user-prefix-string;
                vlan-tags;
            }
        }
        dynamic-profile profile-name {
            accept  (any | dhcp-v4 | dhcp-v6 | inet | inet6 | pppoe);
            accept-out-of-band protocol;
            ranges (any | low-tag)-(any | high-tag);
        }
        override;
    }
    stacked-vlan-ranges {
        access-profile profile-name;
```

```
        authentication {
            packet-types  [packet-types];
            password password-string;
            username-include {
                circuit-type;
                delimiter delimiter-character;
                domain-name domain-name-string;
                interface-name;
                mac-address;
                option-18;
                option-37;
                option-82 <circuit-id> <remote-id>;
                radius-realm radius-realm-string;
                user-prefix user-prefix-string;
                vlan-tags;
            }
        }
        dynamic-profile profile-name {
            accept (any | dhcp-v4 | dhcp-v6 | inet | inet6 | pppoe);
            ranges (any | low-tag-high-tag),(any | low-tag-high-tag);
        }
        override;
    }
    remove-when-no-subscribers;
}
```

Hierarchy Level

```
[edit interfaces interface-name]
```

Description

Enable the configuration of dynamic, auto-sensed VLANs.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

RELATED DOCUMENTATION

Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs

Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs

auto-configure-trigger interface (ANCP)

IN THIS SECTION

Syntax

```
auto-configure-trigger interface interface-name;
```

Hierarchy Level

```
[edit protocols ancp neighbor ip-address]
```

Description

Map an ANCP neighbor to a subscriber-facing physical interface on the router, so that ANCP Port Up and Port Down messages trigger notifications to the auto-configuration daemon (autoconfd) to initiate VLAN creation (Port Up) or removal (Port Down).

Options

interface-name Name of the physical interface. Can be any of the following interface types: ae, ge, xe, et, demux, ps.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

ps interface type support added in Junos OS Release 19.3R1.

RELATED DOCUMENTATION

Configuring ANCP Neighbors

Configuring the ANCP Agent

backup-on-failure (Accounting Options)

IN THIS SECTION

Syntax

```
backup-on-failure (master-and-slave | master-only);
```

Hierarchy Level

[edit accounting-options file *filename*]

Description

Configure the router to save a copy of the accounting file locally, to the **/var/log/pfedBackup** directory of the relevant Routing Engine, in the event that file transfer to the remote archive sites cannot be completed.

Options

master-and-slave Back up accounting files from both the primary Routing Engine and the backup Routing Engine.

master-only Back up accounting files from only the primary Routing Engine.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

Configuring Accounting-Data Log Files

Configuring Flat-File Accounting for Layer 2 Wholesale | 162

Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167

Flat-File Accounting Overview | 158

circuit-id (VLAN Authentication Username)

IN THIS SECTION

Syntax

```
circuit-id;
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure vlan-ranges authentication username-include]
```

Description

Include the agent circuit identifier (ACI) in the username sent to RADIUS for authentication of the dynamic VLAN. The ACI is conveyed by the Access-Loop-Circuit-ID TLV in an out-of-band ANCP Port Up message.

NOTE: This statement is not supported for stacked VLANs.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring a Username for Authentication of Out-of-Band Triggered Dynamic VLANs | **149**

Configuring VLAN Interface Username Information for AAA Authentication

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | **126**

cleanup-interval (Accounting Options)

IN THIS SECTION

Syntax

```
cleanup-interval days;
```

Hierarchy Level

```
[edit accounting-options]
```

Description

Configure the interval to delete files from the local backup directory.

Options

days Number of days after which accounting-options files are to be deleted from the backup directory.

- **Range:** 1 through 31 days
- **Default:** 1 day

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

Configuring Accounting-Data Log Files

Configuring Flat-File Accounting for Layer 2 Wholesale | **162**

Configuring Flat-File Accounting for Extensible Subscriber Services Management | **167**

Flat-File Accounting Overview | **158**

compress (Accounting Options)

IN THIS SECTION

Syntax

```
compress;
```

Hierarchy Level

```
[edit accounting-options file filename]
```

Description

Compress the accounting file during file transfer to the backup site.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

- Configuring Accounting-Data Log Files
- Configuring Flat-File Accounting for Layer 2 Wholesale | 162
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167
- Flat-File Accounting Overview | 158

connectivity-type

IN THIS SECTION

Syntax

```
connectivity-type (ce | irb | permanent);
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols
vpls],
[edit routing-instances routing-instance-name protocols vpls]
```

Description

Specify when a VPLS connection is taken down depending on whether or not the interface for the VPLS routing instance is customer-facing or integrated routing and bridging (IRB).

NOTE: The `connectivity-type` statement is not supported for FEC 129 VPLS (also known as LDP VPLS with BGP-based autodiscovery).

Default

`ce`

Options

`ce`—Require that for the VPLS connection to be up, the customer-facing interface for the VPLS routing instance must also be up. If the customer-facing interface fails, the VPLS connection is taken down.

`irb`—Allow a VPLS connection to remain up so long as an IRB interface is configured for the VPLS routing instance.

`permanent`—Allow a VPLS connection to remain up until specifically taken down. This option is reserved for use in configuring Layer 2 Wholesale subscriber networks. See the *Broadband Subscriber Management Solutions Guide* for details about configuring a Layer 2 Wholesale network.

NOTE: To specifically take down a VPLS routing instance that is using the `permanent` option, all associated static logical interfaces must also be down.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.1.

`irb` option introduced in Junos OS Release 9.3.

`permanent` option introduced in Junos OS Release 10.4.

RELATED DOCUMENTATION

Configuring VPLS Routing Instance and VPLS Interface Connectivity

Configuring Separate NNI Routing Instances for Layer 2 Wholesale Service Retailers

core-facing

IN THIS SECTION

Syntax

```
core-facing;
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number family family],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number
family family]
```

Description

Specifies that the VLAN is physically connected to a core-facing ISP router and ensures that the network does not improperly treat the interface as a client interface. When specified, the interface is inserted into the core-facing default mesh group where traffic from pseudowires that belong to the default mesh group is not forwarded on the core-facing link.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 11.2.

RELATED DOCUMENTATION

Configuring Direct ISP-Facing Interfaces for the Layer 2 Wholesale Solution | 110

demux0 (Dynamic Interface)

IN THIS SECTION

Syntax

```
demux0 {
    unit logical-unit-number {
        demux-options {
            underlying-interface interface-name
        }
        family family {
            access-concentrator name;
            address address;
```

```
            demux-source {
                source-prefix;
            }
            direct-connect;
            duplicate-protection;
            dynamic-profile profile-name;
            filter {
                input filter-name;
                output filter-name;
            }
            mac-validate (loose | strict):
            max-sessions number;
            max-sessions-vsa-ignore;
            rpf-check {
                fail-filter filter-name;
                mode loose;
            }
            service-name-table table-name
            short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max maximum-
seconds>;
            unnumbered-address interface-name <preferred-source-address address>;
        }
        filter {
            input filter-name;
            output filter-name;
        }
        vlan-id number;
    }
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces]
```

Description

Configure the logical demultiplexing (demux) interface in a dynamic profile.

Logical IP demux interfaces do not support IPv4 and IPv6 dual stack.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.3.

RELATED DOCUMENTATION

> *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles*
>
> Demultiplexing Interface Overview

demux-options (Dynamic Interface)

IN THIS SECTION

Syntax

```
demux-options {
    underlying-interface interface-name
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces demux0 interface-name unit logical-unit-number]
```

Description

Configure logical demultiplexing (demux) interface options in a dynamic profile.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.3.

RELATED DOCUMENTATION

> *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles*
>
> Demultiplexing Interface Overview

demux-source (Dynamic IP Demux Interface)

IN THIS SECTION

Syntax

```
demux-source {
    source-address;
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces demux0 unit logical-unit-number family family]
```

Description

Configure a logical demultiplexing (demux) source address for a subscriber in a dynamic profile.

Options

source-address—Either the specific source address you want to assign to the subscriber interface or the source address variable. For IPv4, specify `$junos-subscriber-ip-address`; for IPv6, specify `$junos-subscriber-ipv6-address`. The source address for the interface is dynamically supplied by DHCP when the subscriber accesses the router.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.3.

RELATED DOCUMENTATION

Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles

Demultiplexing Interface Overview

demux-source (Dynamic Underlying Interface)

IN THIS SECTION

Syntax

```
demux-source family;
```

Hierarchy Level

```
[edit dynamic-profiles interfaces interface-name unit logical-unit-number]
```

Description

Configure the logical demultiplexing (demux) source family type on the IP demux underlying interface within a dynamic profile.

NOTE: The IP demux interface feature currently supports only Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.

Options

family—Protocol family:

- `inet`—Internet Protocol version 4 suite
- `inet6`—Internet Protocol version 6 suite

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.6.

demux-source (Underlying Interface)

IN THIS SECTION

Syntax

```
demux-source family;
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number],
[edit logical-systems logical-system-name routing-instances routing-instance-name interfaces
interface-name unit logical-unit-number]
```

Description

Configure the logical demultiplexing (demux) source family type on the IP demux underlying interface.

NOTE: The IP demux interface feature currently supports only Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.

Options

family—Protocol family:

- inet—Internet Protocol version 4 suite
- inet6—Internet Protocol version 6 suite

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

Support for aggregated Ethernet added in Junos OS Release 9.4.

RELATED DOCUMENTATION

- Configuring an IP Demultiplexing Interface
- Configuring a VLAN Demultiplexing Interface

dhcp-attributes (Address-Assignment Pools)

IN THIS SECTION

Syntax

```
dhcp-attributes {
    boot-file filename;
    boot-server (address | hostname);
    dns-server [ ipv6-address ];
    domain-name domain-name;
    exclude-prefix-len exclude-prefix-length;
    grace-period seconds;
    maximum-lease-time seconds;
    name-server [ server-list ];
    netbios-node-type node-type;
    option {
        [ (id-number option-type option-value)
        (id-number array option-type option-value) ];
    }
    option-match {
        option-82 {
            circuit-id value range named-range;
```

```
            remote-id value range named-range;
        }
    }
    preferred-lifetime seconds;
    router [ router-address ];
    server-identifier ip4-address;
    sip-server-address [ ipv6-address ];
    sip-server-domain-name domain-name;
    t1-percentage percentage;
    t1-renewal-time;
    t2-percentage percentage;
    t2-rebinding-time;
    tftp-server address;
    valid-lifetime seconds;
    wins-server [ servers ];
}
```

Hierarchy Level

```
[edit access address-assignment pool pool-name family family]
```

Description

Configure DHCP attributes for the protocol family in a specific address pool. The attributes determine options and behaviors for the DHCP clients.

Options

boot-file Set the boot file advertised to DHCP clients. After the client receives an IP address and the boot file location from the DHCP server, the client uses the boot image stored in the boot file to complete DHCP setup. This configuration is equivalent to DHCP option 67.

- **Values:** *filename*—Location of the boot file on the boot server. The filename can include a pathname.

boot-server Configure the name of the boot server advertised to DHCP clients. The client uses a boot file located on the boot server to complete DHCP setup. This configuration is equivalent to DHCP option 66.

- Values:
  - *address*—IPv4 address of a boot server.
  - *hostname*—Fully qualified hostname of a boot server.

dns-server Specify a DNS server to which clients can send DNS queries. This is equivalent to DHCPv6 option 23. To specify multiple DNS servers, add multiple `dns-server` statements in order of preference.

- **Values:** *ipv6-address*—IPv6 address of a DNS server.

domain-name Configure the name of the domain in which clients search for a DHCP server host. This is the default domain name that is appended to hostnames that are not fully qualified. This is equivalent to DHCP option 15.

- **Values:** *domain-name*—Name of the domain.

exclude-prefix-len *exclude-prefix-length* Specify the length of the IPv6 prefix to be excluded from the delegated prefix. Range: 1 through 128.

grace-period Configure the amount of time that the client retains the address lease after the lease expires. The address cannot be reassigned to another client during the grace period.

- **Values:** *seconds*—Number of seconds the lease is retained.
- **Range:** 0 through 4,294,967,295 seconds.
- **Default:** 0 (no grace period).

maximum-lease-time Specify the maximum length of time, in seconds, that the lease is held for a client if the client does not renew the lease. This is equivalent to DHCP option 51. The `maximum-lease-time` is mutually exclusive with both the `preferred-lifetime` and the `valid-lifetime`, and cannot be configured with either timer.

- **Values:** *seconds*—Maximum number of seconds the lease can be held.
- **Range:** 30 through 4,294,967,295 seconds.
- **Default:** 86,400 (24 hours).

name-server Configure one or more Domain Name System (DNS) name servers available to the client to resolve hostname-to-client mappings. This is equivalent to DHCP option 6.

- **Values:** *server-names*—IP addresses of the domain name servers, listed in order of preference.

netbios-node-type

Specify the NetBIOS node type. This is equivalent to DHCP option 46.

- **Values:** *node-type*—One of the following node types:
  - b-node—Broadcast node.
  - h-node—Hybrid node.
  - m-node—Mixed node.
  - p-node—Peer-to-peer node.

option

Specify user-defined options that are added to client packets. Starting in Junos OS Release 13.3, the `hex-string` option type was introduced.

- Values:
  - *array*—An option can include an array of option types.
  - *id-number*—Any whole number. The ID number is used to index the option and must be unique across a DHCP server.
  - *option-type*—Any of the following types: byte, byte-stream, flag, hex-string, integer, ip-address, short, string, unsigned-integer, or unsigned-short.
  - *option-value*—Value associated with an option. The option value must be compatible with the option type (for example, an On or Off value for a flag type).

preferred-lifetime

Specify the length of time, in seconds, that the DHCPv6 server keeps the IPv6 prefix active. When the lifetime expires, the address is deprecated. If the `valid-lifetime` is also configured, the `preferred-lifetime` must be less than the `valid-lifetime`. The `preferred-lifetime` and the `maximum-lease-time` are mutually exclusive and cannot both be configured.

- **Values:** *seconds*—Number of seconds that the IPv6 prefix is active.
- **Range:** 30 through 4,294,967,295 seconds.
- **Default:** 86,400 (24 hours).

router

Specify one or more routers located on the client's subnet. This statement is the equivalent of DHCP option 3.

- **Values:** *router-address*—IP address of one or more routers.

server-identifier

Specify the IP address that is used as the source address the DHCP server includes in IP packets when communicating with clients. The address is included in the DHCP packet in option 54.

- **Values:** *ipv4-address*—IP address.

sip-server-address

Specify a SIP outbound proxy server that DHCPv6 local server clients can use. This is equivalent to DHCPv6 option 22. To specify multiple servers, add multiple `sip-server-address` statements in order of preference.

- **Values:** *ipv6-address*—IPv6 address of a SIP outbound proxy server.

sip-server-domain-name

Configure the domain name of the SIP outbound proxy server that DHCPv6 local server clients can use. This is equivalent to DHCPv6 option 21.

- **Values:** *domain-name*—Name of the domain.

t1-percentage

Specify a percentage of the `preferred-lifetime` value. After this percentage of the `preferred-lifetime` value elapses, the DHCPv4 or DHCPv6 client requests an extension on its lease from the originating DHCP local server. The `t1-percentage` is also referred to as the renewal time. The `t1-percentage` value must be less than the `t2-percentage` value. DHCPv4 server support was added in Junos OS Release 17.2.

- **Values:** *percentage*—Percentage of the `preferred-lifetime` value.
- **Range:** 0 through 100.
- **Default:** If the `t1-percentage` value is not configured, the default is based on the `preferred-lifetime` value:
  - If the `preferred-lifetime` value is finite, the default is 50 percent of the `preferred-lifetime` value.
  - If the `preferred-lifetime` value is infinite, the default is also infinite.

t1-renewal-time

Specify the time (T1) at which the DHCPv4 or DHCPv6 client requests an extension (renewal) of the existing lease. This time is expressed as the number of seconds since the beginning of the lease. Using this statement to configure a duration in seconds is an alternative to using the `t1-percentage` statement.

- **Values:** *seconds*—Number of seconds.
- **Range:** 30 through 4,294,967,295 seconds.
- **Default:** 50 percent of the lease duration (`preferred-lifetime`).

t2-percentage

Specify a percentage of the `preferred-lifetime` value. After this percentage of the `preferred-lifetime` value elapses, the DHCPv4 or DHCPv6 client requests an extension on its lease from any available DHCPv4 or DHCPv6 server. The `t2-percentage` is also referred

to as the rebinding time. The `t2-percentage` value must be greater than the `t1-percentage` value. DHCPv4 server support was added in Junos OS Release 17.2.

- **Values:** *percentage*—Percentage of the `preferred-lifetime` value.
- **Range:** 0 through 100.
- **Default:** Default: If the `t2-percentage` value is not configured, the default is based on the `preferred-lifetime` value:
  - If the `preferred-lifetime` value is finite, the default is 80 percent of the `preferred-lifetime` value.
  - When the `preferred-lifetime` value is infinite, the default is also infinite.

t2-rebinding-time

Specify the time (T2) at which the DHCPv4 or DHCPv6 client attempts to contact any DHCP server to request an extension (rebinding) of the existing lease. This time is expressed as the number of seconds since the beginning of the lease. Using this statement to configure a duration in seconds is an alternative to using the `t2-percentage` statement.

- **Values:** *seconds*—Number of seconds.
- **Range:** 30 through 4,294,967,295 seconds.
- **Default:** The default value depends on the client:
  - (DHCPv4 clients) 87.5 percent of the lease duration (`preferred-lifetime`).
  - (DHCPv6 clients) 80 percent of the lease duration (`preferred-lifetime`).

tftp-server

Specify the Trivial File Transfer Protocol (TFTP) server that the client uses to obtain the client configuration file. This is equivalent to DHCP option 150.

- **Values:** *ip-address*—IP address of the TFTP server.

valid-lifetime

Specify the length of time, in seconds, that the DHCPv6 server keeps the IPv6 prefix valid. When the lifetime expires, the address becomes invalid. If the `preferred-lifetime` is also configured, the `valid-lifetime` must be greater than the `preferred-lifetime`. The `valid-lifetime` and the `maximum-lease-time` are mutually exclusive and cannot both be configured.

- **Values:** *seconds*—Number of seconds that the IPv6 prefix is valid.
- **Range:** 30 through 4,294,967,295 seconds.
- **Default:** 86,400 (24 hours).

wins-server Specify one or more NetBIOS name servers (NBNS) that the client uses to resolve NetBIOS names. This is equivalent to DHCP option 44.

- **Values:** *ipv4-address*—IP address of each NetBIOS name server. Add them to the configuration in order of preference.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

`exclude-prefix-len` statement introduced in Junos OS Release 17.3 for MX Series.

RELATED DOCUMENTATION

Address-Assignment Pools for Subscriber Management

DHCP Client Attribute and Address Assignment

DHCP Lease Times for IP Addresses

dhcp-local-server

IN THIS SECTION

Syntax

```
dhcp-local-server {
    access-profile profile-name;
    allow-active-leasequery {
        idle-timeout seconds;
        peer-address address;
        timeout seconds;
    }
    allow-bulk-leasequery {
        max-connections number-of-connections;
        max-empty-replies number-of-replies;
        restricted-requestor;
        timeout seconds;
    }
    allow-leasequery {
        restricted-requestor;
    }
    authentication {
        password password-string;
        username-include {
            circuit-type;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description  (device-interface | logical-interface);
            interface-name ;
            logical-system-name;
            mac-address;
            option-60;
            option-82 <circuit-id> <remote-id>;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    dhcpv6 {
        access-profile profile-name;
        allow-active-leasequery {
            idle-timeout seconds;
            peer-address address;
            timeout seconds;
        }
```

```
allow-bulk-leasequery {
    max-connections number-of-connections;
    max-empty-replies number-of-replies;
    restricted-requestor;
    timeout seconds;
}
allow-leasequery {
    restricted-requestor;
}
authentication {
    ...
}
duplicate-clients incoming-interface;
group group-name {
    access-profile profile-name;
    authentication {
        ...
    }
    interface interface-name {
        access-profile profile-name;
        exclude;
        overrides {
            asymmetric-lease-time seconds;
            asymmetric-prefix-lease-time seconds;
            delay-advertise {
                based-on (option-15 | option-16 | option-18 | option-37) {
                    equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    not-equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    starts-with {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                }
                delay-time seconds;
            }
            dual-stack dual-stack-group-name;
            interface-client-limit number;
```

```
                multi-address-embedded-option-response;
                process-inform {
                    pool pool-name;
                }
                protocol-attributes attribute-set-name;
                rapid-commit;
            }
            service-profile dynamic-profile-name;
            short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
            trace;
            upto upto-interface-name;
        }
        liveness-detection {
            failure-action (clear-binding | clear-binding-if-interface-up | log-only);
            method {
                bfd {
                    version (0 | 1 | automatic);
                    minimum-interval milliseconds;
                    minimum-receive-interval milliseconds;
                    multiplier number;
                    no-adaptation;
                    transmit-interval {
                        minimum-interval milliseconds;
                        threshold milliseconds;
                    }
                    detection-time {
                        threshold milliseconds;
                    }
                    session-mode (automatic | multihop | singlehop);
                    holddown-interval milliseconds;
                }
                layer2-liveness-detection {
                    max-consecutive-retries number;
                    transmit-interval interval;
                }
            }
        }
        overrides {
            asymmetric-lease-time seconds;
            asymmetric-prefix-lease-time seconds;
            delay-advertise {
                based-on (option-15 | option-16 | option-18 | option-37) {
                    equals {
```

```
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    not-equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    starts-with {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                }
                delay-time seconds;
            }
            delegated-pool;
            dual-stack dual-stack-group-name;
            interface-client-limit number;
            multi-address-embedded-option-response;
            process-inform {
                pool pool-name;
            }
            protocol-attributes attribute-set-name;
            rapid-commit;
        }
        route-suppression;
        server-duid-type type;
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    }
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            bfd {
                version (0 | 1 | automatic);
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                multiplier number;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                detection-time {
```

```
                    threshold milliseconds;
                }
                session-mode (automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
        }
    }
    overrides {
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        delay-advertise {
            based-on (option-15 | option-16 | option-18 | option-37) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        delegated-pool;
        dual-stack dual-stack-group-name;
        include-option-82 {
            forcerenew;
            nak;
        }
        interface-client-limit number;
        multi-address-embedded-option-response;
        process-inform {
            pool pool-name;
        }
        protocol-attributes attribute-set-name;
```

```
            rapid-commit;
        }
        reconfigure {
            attempts attempt-count;
            clear-on-terminate;
            strict;
            support-option-pd-exclude;
            timeout timeout-value;
            token token-value;
             trigger {
                radius-disconnect;
            }
        }
        reauthenticate (<lease-renewal> <remote-id-mismatch >);
        requested-ip-network-match subnet-mask;
        route-suppression;
        server-duid-type type;
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    }
    dual-stack-group name {
        access-profile access-profile;
        authentication {
            password password-string;
            username-include {
                circuit-type;
                delimiter delimiter-character;
                domain-name domain-name-string;
                interface-description  (device-interface | logical-interface);
                interface-name ;
                logical-system-name;
                mac-address;
                relay-agent-interface-id;
                relay-agent-remote-id;
                routing-instance-name;
                user-prefix user-prefix-string;
                vlan-tags;
            }
        }
        classification-key {
            circuit-id circuit-id;
            mac-address mac-address;
            remote-id remote-id;
```

```
        }
        dual-stack-interface-client-limit number;
        dynamic-profile profile-name {
            aggregate-clients (merge | replace);
            use-primary primary-profile-name;
        }
        liveness-detection {
            failure-action (clear-binding | clear-binding-if-interface-up | log-only);
            method {
                layer2-liveness-detection {
                    max-consecutive-retries number;
                    transmit-interval interval;
                }
            }
        }
        on-demand-address-allocation;
        protocol-primary (inet | inet6);
        reauthenticate (<lease-renewal> <remote-id-mismatch >);
        service-profile service-profile;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    }
    duplicate-clients-in-subnet  (incoming-interface | option-82);
    dynamic-profile profile-name <aggregate-clients (merge | replace) | use-primary primary-profile-
name>;
    forward-snooped-clients (all-interfaces | configured-interfaces | non-configured-interfaces);
    group group-name {
        authentication {
            ...
        }
        dynamic-profile profile-name <aggregate-clients (merge | replace) | use-primary primary-
profile-name>;
        interface interface-name {
            exclude;
            overrides {
                asymmetric-lease-time seconds;
                client-discover-match (option60-and-option82 | incoming-interface);
                delay-offer {
                    based-on (option-60 | option-77 | option-82) {
                        equals {
                            ascii ascii-string;
                            hexadecimal hexadecimal-string;
                        }
                        not-equals {
```

```
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    starts-with {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                }
                delay-time seconds;
            }
            include-option-82 {
                forcerenew;
                nak;
            }
            dual-stack dual-stack-group-name;
            interface-client-limit number;
            process-inform {
                pool pool-name;
            }
            protocol-attributes attribute-set-name;
        }
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
        trace;
        upto upto-interface-name;
    }
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            bfd {
                version (0 | 1 | automatic);
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                multiplier number;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                detection-time {
                    threshold milliseconds;
                }
                session-mode(automatic | multihop | singlehop);
```

```
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
        }
    }
    overrides {
        asymmetric-lease-time seconds;
        client-discover-match  (option60-and-option82 | incoming-interface);
        delay-offer {
            based-on (option-60 | option-77 | option-82) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        include-option-82 {
            forcerenew;
            nak;
        }
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        process-inform {
            pool pool-name;
        }
        protocol-attributes attribute-set-name;
    }
    requested-ip-network-match subnet-mask
    route-suppression;
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
```

```
    }
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            bfd {
                version (0 | 1 | automatic);
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                multiplier number;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                detection-time {
                    threshold milliseconds;
                }
                session-mode (automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
        }
    }
    on-demand-address-allocation;
    overrides {
        asymmetric-lease-time seconds;
        client-discover-match  <option60-and-option82 | incoming-interface>;
        delay-offer {
            based-on (option-60 | option-77 | option-82) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
```

```
                }
            }
            delay-time seconds;
        }
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        process-inform {
            pool pool-name;
        }
        protocol-attributes attribute-set-name;
    }
    pool-match-order {
        external-authority;
        ip-address-first;
        option-82;
    }
    protocol-primary;
    reauthenticate (<lease-renewal> <remote-id-mismatch >);
    reconfigure {
        attempts attempt-count;
        clear-on-terminate;
        strict;
        timeout timeout-value;
        token token-value;
         trigger {
            radius-disconnect;
        }
    }
    requested-ip-network-match subnet-mask;
    route-suppression;
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services],
[edit logical-systems logical-system-name system services],
```

```
[edit routing-instances routing-instance-name system services],
[edit system services]
```

Description

Configure Dynamic Host Configuration Protocol (DHCP) local server options on the router or switch to enable the router or switch to function as an extended DHCP local server. The DHCP local server receives DHCP request and reply packets from DHCP clients and then responds with an IP address and other optional configuration information to the client.

The extended DHCP local server is incompatible with the DHCP server on J Series routers and, therefore, is not supported on J Series routers. Also, the DHCP local server and the DHCP/BOOTP relay server, which are configured under the `[edit forwarding-options helpers]` hierarchy level, cannot both be enabled on the router or switch at the same time. The extended DHCP local server is fully compatible with the extended DHCP relay feature.

The `dhcpv6` stanza configures the router or switch to support Dynamic Host Configuration Protocol for IPv6 (DHCPv6). The DHCPv6 local server is fully compatible with the extended DHCP local server and the extended DHCP relay feature.

NOTE: When you configure the `dhcp-local-server` statement at the routing instance hierarchy level, you must use a routing instance type of `virtual-router`.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

RELATED DOCUMENTATION

> *Understanding Differences Between Legacy DHCP and Extended DHCP*
>
> *DHCPv6 Local Server Overview*

dhcp-relay

IN THIS SECTION

Syntax

```
dhcp-relay {
    access-profile profile-name;
    active-leasequery {
        idle-timeout seconds;
        peer-address address;
        timeout seconds;
        topology-discovery;
    }
    active-server-group server-group-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description  (device-interface | logical-interface);
            interface-name;
            logical-system-name;
            mac-address;
            option-60;
            option-82 <circuit-id> <remote-id>;
            routing-instance-name;
            user-prefix user-prefix-string;
stale-timer            vlan-tags;
        }
```

```
    }
    bulk-leasequery {
        attempts number-of-attempts;
        timeout seconds;
    }
    dhcpv6 {
        access-profile profile-name;
        active-leasequery {
            idle-timeout seconds;
            peer-address address;
            timeout seconds;
            topology-discovery;
        }
        active-server-group server-group-name;
        }
        authentication {
            password password-string;
            username-include {
                circuit-type;
                client-id;
                delimiter delimiter-character;
                domain-name domain-name-string;
                interface-description  (device-interface | logical-interface);
                interface-name interface-name;
                logical-system-name;
                mac-address mac-address;
                relay-agent-interface-id;
                relay-agent-remote-id;
                relay-agent-subscriber-id;
                routing-instance-name;
                user-prefix user-prefix-string;
                vlan-tags;
            }
        }
        bulk-leasequery {
            attempts number-of-attempts;
            timeout seconds;
            trigger automatic;
        }
        duplicate-clients incoming-interface;
        dynamic-profile profile-name {
            aggregate-clients (merge | replace);
            use-primary primary-profile-name;
```

```
        }
        forward-only {
            logical-system <current | default | logical-system-name>;
            routing-instance <current | default | routing-instance-name>;
        }
        forward-only-replies;
        }
        forward-snooped-clients (all-interfaces | configured-interfaces | non-configured-
interfaces);
        group group-name {
            access-profile profile-name;
            active-server-group server-group-name;
            authentication {
                password password-string;
                username-include {
                    circuit-type;
                    client-id;
                    delimiter delimiter-character;
                    domain-name domain-name-string;
                    interface-description  (device-interface | logical-interface);
                    interface-name interface-name;
                    logical-system-name;
                    mac-address mac-address;
                    relay-agent-interface-id;
                    relay-agent-remote-id;
                    relay-agent-subscriber-id;
                    routing-instance-name;
                    user-prefix user-prefix-string;
                    vlan-tags;
                }
            }
            dynamic-profile profile-name {
                aggregate-clients (merge | replace);
                use-primary primary-profile-name;
            }
            forward-only {
                logical-system <current | default | logical-system-name>;
                routing-instance <current | default | routing-instance-name>;
            }
            interface interface-name {
                access-profile profile-name;
                dynamic-profile profile-name {
                    aggregate-clients (merge | replace);
```

```
                use-primary primary-profile-name;
            }
            exclude;
            overrides {
                allow-snooped-clients;
                asymmetric-lease-time seconds;
                asymmetric-prefix-lease-time seconds;
                client-negotiation-match incoming-interface;
                delay-authentication;
                delete-binding-on-renegotiation;
                dual-stack dual-stack-group-name;
                interface-client-limit number;
                no-allow-snooped-clients;
                no-bind-on-request;
                relay-source interface-name;
                send-release-on-delete;
            }
            service-profile dynamic-profile-name;
            short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
            trace;
            upto upto-interface-name;
        }
        }
        lease-time-validation {
            lease-time-threshold seconds;
            violation-action action;
        }
        liveness-detection {
            failure-action (clear-binding | clear-binding-if-interface-up | log-only);
            method {
                bfd {
                    version (0 | 1 | automatic);
                    minimum-interval milliseconds;
                    minimum-receive-interval milliseconds;
                    multiplier number;
                    no-adaptation;
                    transmit-interval {
                        minimum-interval milliseconds;
                        threshold milliseconds;
                    }
                    detection-time {
                        threshold milliseconds;
                    }
```

```
                session-mode(automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
        }
    }
    overrides {
        allow-snooped-clients;
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-negotiation-match incoming-interface;
        delay-authentication;
        delete-binding-on-renegotiation;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        no-allow-snooped-clients;
        no-bind-on-request;
        relay-source interface-name;
        send-release-on-delete;
    }
    relay-agent-interface-id {
        include-irb-and-l2;
        keep-incoming-interface-id ;
        no-vlan-interface-name;
        prefix prefix;
        use-interface-description (logical | device);
        use-option-82 <strict>;
        use-vlan-id;
    }
    relay-agent-remote-id {
        include-irb-and-l2;
        keep-incoming-interface-id ;
        no-vlan-interface-name;
        prefix prefix;
        use-interface-description (logical | device);
        use-option-82 <strict>;
        use-vlan-id;
    }
    relay-option {
        option-number option-number;
```

```
                default-action {
                    drop;
                    forward-only;
                    relay-server-group relay-server-group;
                }
                equals (ascii ascii-string | hexadecimal hexadecimal-string) {
                    drop;
                    forward-only;
                    relay-server-group relay-server-group;
                }
                starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
                    drop;
                    forward-only;
                    relay-server-group relay-server-group;
                }
            }
            remote-id-mismatch disconnect;
            route-suppression;
            service-profile dynamic-profile-name;
            short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
        }
        leasequery {
            attempts number-of-attempts;
            timeout seconds;
        }
        lease-time-validation {
            lease-time-threshold seconds;
            violation-action action;
        }
        liveness-detection {
            failure-action (clear-binding | clear-binding-if-interface-up | log-only);
            method {
                bfd {
                    version (0 | 1 | automatic);
                    minimum-interval milliseconds;
                    minimum-receive-interval milliseconds;
                    multiplier number;
                    no-adaptation;
                    transmit-interval {
                        minimum-interval milliseconds;
                        threshold milliseconds;
                    }
                    detection-time {
```

```
                    threshold milliseconds;
                }
                session-mode(automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
            route-suppression;
            service-profile dynamic-profile-name;
        }
    }
    no-snoop;
    overrides {
        allow-snooped-clients;
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-negotiation-match incoming-interface;
        delay-authentication;
        delete-binding-on-renegotiation;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        no-allow-snooped-clients;
        no-bind-on-request;
        relay-source interface-name;
        send-release-on-delete;
    }
    relay-agent-interface-id {
        include-irb-and-l2;
        keep-incoming-interface-id ;
        no-vlan-interface-name;
        prefix prefix;
        use-interface-description (logical | device);
        use-option-82 <strict>;
        use-vlan-id;
    }
    relay-agent-remote-id {
        include-irb-and-l2;
        keep-incoming-remote-id ;
        no-vlan-interface-name;
        prefix prefix;
        use-interface-description (logical | device);
```

```
            use-option-82 <strict>;
            use-vlan-id;
        }
        relay-option {
            option-number option-number;
            default-action {
                drop;
                forward-only;
                relay-server-group relay-server-group;
            }
            equals (ascii ascii-string | hexadecimal hexadecimal-string) {
                drop;
                forward-only;
                relay-server-group relay-server-group;
            }
            starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
                drop;
                forward-only;
                relay-server-group relay-server-group;
            }
        }
        relay-option-vendor-specific{
            host-name;
            location;
        remote-id-mismatch disconnect;
        route-suppression;
        server-group {
            server-group-name {
                server-ip-address;
            }
        }
        server-response-time seconds;
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    }
    dual-stack-group dual-stack-group-name {
        access-profile profile-name;
        authentication {
            password password-string;
            username-include {
                circuit-type;
                delimiter delimiter-character;
                domain-name domain-name-string;
```

```
            interface-description  (device-interface | logical-interface);
            interface-name;
            logical-system-name;
            mac-address;
            relay-agent-interface-id;
            relay-agent-remote-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    classification-key {
        circuit-id circuit-id;
        mac-address mac-address;
        remote-id remote-id;
    }
    dual-stack-interface-client-limit number;
    dynamic-profile profile-name {
        aggregate-clients (merge | replace);
        use-primary primary-profile-name;
    }
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
        }
    }
    protocol-primary (inet | inet6);
    relay-agent-interface-id {
        include-irb-and-l2;
        keep-incoming-interface-id ;
        no-vlan-interface-name;
        prefix prefix;
        use-interface-description (logical | device);
        use-option-82 <strict>;
        use-vlan-id;
    }
    relay-agent-remote-id {
        include-irb-and-l2;
        keep-incoming-remote-id ;
```

```
            no-vlan-interface-name;
            prefix prefix;
            use-interface-description (logical | device);
            use-option-82 <strict>;
            use-vlan-id;
        }
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    }
    duplicate-clients-in-subnet (incoming-interface | option-82):
    dynamic-profile profile-name {
        aggregate-clients (merge | replace);
        use-primary primary-profile-name;
    }
    forward-only {
        logical-system <current | default | logical-system-name>;
        routing-instance <current | default | routing-instance-name>;
    }
    forward-only-replies;
    forward-snooped-clients (all-interfaces | configured-interfaces | non-configured-interfaces);
    group group-name {
        access-profile profile-name;
        active-server-group server-group-name;
        authentication {
            password password-string;
            username-include {
                circuit-type;
                delimiter delimiter-character;
                domain-name domain-name-string;
                interface-description  (device-interface | logical-interface);
                interface-name interface-name;
                logical-system-name;
                mac-address;
                option-60;
                option-82 [circuit-id] [remote-id];
                routing-instance-name;
                user-prefix user-prefix-string;
                }
            vlan-tags;
        }
        dynamic-profile profile-name {
            aggregate-clients (merge | replace);
            use-primary primary-profile-name;
```

```
        }
        forward-only {
            logical-system <current | default | logical-system-name>;
            routing-instance <current | default | routing-instance-name>;
        }
        forward-only {
            logical-system <current | default | logical-system-name>;
            routing-instance <current | default | routing-instance-name>;
        }
        interface interface-name {
            access-profile profile-name;
            exclude;
            liveness-detection {
                failure-action (clear-binding | clear-binding-if-interface-up | log-only);
                method {
                    bfd {
                        version (0 | 1 | automatic);
                        minimum-interval milliseconds;
                        minimum-receive-interval milliseconds;
                        multiplier number;
                        no-adaptation;
                        transmit-interval {
                            minimum-interval milliseconds;
                            threshold milliseconds;
                        }
                        detection-time {
                            threshold milliseconds;
                        }
                        session-mode (automatic | multihop | singlehop);
                        holddown-interval milliseconds;
                    }
                }
            }
            overrides {
                allow-no-end-option;
                allow-snooped-clients;
                always-write-giaddr;
                always-write-option-82;
                asymmetric-lease-time seconds;
                client-discover-match <option60-and-option82 | incoming-interface>;
                delay-authentication;
                delete-binding-on-renegotiation;
                disable-relay;
```

```
            dual-stack dual-stack-group-name;
            interface-client-limit number;
            layer2-unicast-replies;
            no-allow-snooped-clients;
            no-bind-on-request;
            proxy-mode;
            relay-source
            replace-ip-source-with;
            send-release-on-delete;
            trust-option-82;
        }
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
        trace;
        upto upto-interface-name;
    }
    overrides {
        allow-no-end-option
        allow-snooped-clients;
        always-write-giaddr;
        always-write-option-82;
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match (option60-and-option82 | incoming-interface);
        delay-authentication;
        delete-binding-on-renegotiation;
        disable-relay;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        layer2-unicast-replies;
        no-allow-snooped-clients;
        no-bind-on-request;
        proxy-mode;
        relay-source
        replace-ip-source-with;
        send-release-on-delete;
        trust-option-82;
    }
    relay-option {
        option-number option-number;
        default-action {
            drop;
            forward-only;
```

```
                relay-server-group group-name;
            }
            equals (ascii ascii-string | hexadecimal hexadecimal-string) {
                drop;
                forward-only;
                relay-server-group relay-server-group;
            }
            starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
                drop;
                forward-only;
                local-server-group local-server-group;
                relay-server-group relay-server-group;
            }
        }
        relay-option-82 {
            circuit-id {
                prefix prefix;
                use-interface-description (logical | device);
            }
            remote-id {
                prefix prefix;
                use-interface-description (logical | device);
            }
            server-id-override
        }
        remote-id-mismatch disconnect;
        route-suppression:
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    }
    leasequery {
        attempts number-of-attempts;
        timeout seconds;
    }
    lease-time-validation {
        lease-time-threshold seconds;
        violation-action action;
    }
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            bfd {
                version (0 | 1 | automatic);
```

```
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                multiplier number;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                detection-time {
                    threshold milliseconds;
                }
                session-mode (automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
        }
    }
    no-snoop;
    overrides {
        allow-no-end-option
        allow-snooped-clients;
        always-write-giaddr;
        always-write-option-82;
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match (option60-and-option82 | incoming-interface);
        delay-authentication;
        delete-binding-on-renegotiation;
        disable-relay;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        layer2-unicast-replies;
        no-allow-snooped-clients;
        no-bind-on-request;
        proxy-mode;
        relay-source
        replace-ip-source-with;
        send-release-on-delete;
        trust-option-82;
    }
```

```
    relay-option {
        option-number option-number;
        default-action {
            drop;
            forward-only;
            relay-server-group group-name;
        }
        equals (ascii ascii-string | hexadecimal hexadecimal-string) {
            drop;
            forward-only;
            relay-server-group relay-server-group;
        }
        starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
            drop;
            forward-only;
            local-server-group local-server-group;
            relay-server-group relay-server-group;
        }
    }
    relay-option-82 {
        circuit-id {
            prefix prefix;
            use-interface-description (logical | device);
        }
        remote-id {
            prefix prefix;
            use-interface-description (logical | device);
        }
        server-id-override
    }
    }
    remote-id-mismatch disconnect;
    route-suppression:
    server-group {
        server-group-name {
            server-ip-address;
        }
    }
    server-response-time seconds;
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
```

Hierarchy Level

```
[edit forwarding-options],
[edit logical-systems logical-system-name forwarding-options],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options],
[edit routing-instances routing-instance-name forwarding-options]
```

Description

Configure extended Dynamic Host Configuration Protocol (DHCP) relay and DHCPv6 relay options on the router or switch to enable the router (or switch) to function as a DHCP relay agent. A DHCP relay agent forwards DHCP request and reply packets between a DHCP client and a DHCP server.

DHCP relay supports the attachment of dynamic profiles and also interacts with the local AAA Service Framework to use back-end authentication servers, such as RADIUS, to provide subscriber authentication or client authentication. You can attach dynamic profiles and configure authentication support on a global basis or for a specific group of interfaces.

The extended DHCP and DHCPv6 relay agent options configured with the `dhcp-relay` and `dhcpv6` statements are incompatible with the DHCP/BOOTP relay agent options configured with the `bootp` statement. As a result, the extended DHCP or DHCPv6 relay agent and the DHCP/BOOTP relay agent cannot both be enabled on the router (or switch) at the same time.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 8.3.

RELATED DOCUMENTATION

> *Extended DHCP Relay Agent Overview*
>
> *DHCPv6 Relay Agent Overview*

DHCP Relay Proxy Overview

Specifying Authentication Support

dhcpv6 (DHCP Local Server)

IN THIS SECTION

Syntax

```
dhcpv6 {
    access-profile profile-name;
    allow-active-leasequery {
        idle-timeout seconds;
        peer-address address;
        timeout seconds;
    }
    allow-bulk-leasequery {
        max-connections number-of-connections;
        max-empty-replies number-of-replies;
        restricted-requestor;
        timeout seconds;
    }
    allow-leasequery {
        restricted-requestor;
    }
    authentication {
        password password-string;
        username-include {
            circuit-type;
```

```
            client-id;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description  (device-interface | logical-interface);
            logical-system-name;
            mac-address;
            relay-agent-interface-id;
            relay-agent-remote-id;
            relay-agent-subscriber-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    duplicate-clients incoming-interface;
    group group-name {
        access-profile profile-name;
        authentication {
        ...
        interface interface-name {
            access-profile profile-name;
            exclude;
            liveness-detection {
                failure-action (clear-binding | clear-binding-if-interface-up | log-only);
                method {
                    bfd {
                        version (0 | 1 | automatic);
                        minimum-interval milliseconds;
                        minimum-receive-interval milliseconds;
                        multiplier number;
                        no-adaptation;
                        transmit-interval {
                            minimum-interval milliseconds;
                            threshold milliseconds;
                        }
                        detection-time {
                            threshold milliseconds;
                        }
                        session-mode(automatic | multihop | singlehop);
                        holddown-interval milliseconds;
                    }
                }
            }
```

```
            overrides {
                asymmetric-lease-time seconds;
                asymmetric-prefix-lease-time seconds;
                client-negotiation-match incoming-interface;
                delay-advertise {
                    based-on (option-15 | option-16 | option-18 | option-37) {
                        equals {
                            ascii ascii-string;
                            hexadecimal hexadecimal-string;
                        }
                        not-equals {
                            ascii ascii-string;
                            hexadecimal hexadecimal-string;
                        }
                        starts-with {
                            ascii ascii-string;
                            hexadecimal hexadecimal-string;
                        }
                    }
                    delay-time seconds;
                }
                delete-binding-on-renegotiation;
                interface-client-limit number;
                multi-address-embedded-option-response;
                process-inform {
                    pool pool-name;
                }
                protocol-attributes attribute-set-name;
                rapid-commit;
            }
            service-profile dynamic-profile-name;
            short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
            trace;
            upto upto-interface-name;
        }
        liveness-detection {
            failure-action (clear-binding | clear-binding-if-interface-up | log-only);
            method {
                bfd {
                    version (0 | 1 | automatic);
                    minimum-interval milliseconds;
                    minimum-receive-interval milliseconds;
                    multiplier number;
```

```
                    no-adaptation;
                    transmit-interval {
                        minimum-interval milliseconds;
                        threshold milliseconds;
                    }
                    detection-time {
                        threshold milliseconds;
                    }
                    session-mode(automatic | multihop | singlehop);
                    holddown-interval milliseconds;
                }
                layer2-liveness-detection {
                    max-consecutive-retries number;
                    transmit-interval interval;
                }
            }
        }
        overrides {
            asymmetric-lease-time seconds;
            asymmetric-prefix-lease-time seconds;
            client-negotiation-match incoming-interface;
            delay-advertise {
                based-on (option-15 | option-16 | option-18 | option-37) {
                    equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    not-equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    starts-with {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                }
                delay-time seconds;
            }
            delegated-pool;
            delete-binding-on-renegotiation;
            interface-client-limit number;
            multi-address-embedded-option-response;
            process-inform {
```

```
                pool pool-name;
            }
            protocol-attributes attribute-set-name;
            rapid-commit;
        }
        route-suppression;
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    }
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            bfd {
                version (0 | 1 | automatic);
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                multiplier number;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                detection-time {
                    threshold milliseconds;
                }
                session-mode(automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
        }
    }
    overrides {
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-negotiation-match incoming-interface;
        delay-advertise {
            based-on (option-15 | option-16 | option-18 | option-37) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
```

```
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        delegated-pool;
        delete-binding-on-renegotiation;
        interface-client-limit number;
        multi-address-embedded-option-response;
        process-inform {
            pool pool-name;
        }
        protocol-attributes attribute-set-name;
        rapid-commit;
        reconfigure {
            attempts attempt-count;
            clear-on-terminate;
            strict;
            timeout timeout-value;
            token token-value;
             trigger {
                radius-disconnect;
            }
        }
    }
    reauthenticate (<lease-renewal> <remote-id-mismatch >);
    reconfigure {
        attempts attempt-count;
        clear-on-terminate;
        strict;
        support-option-pd-exclude;
        timeout timeout-value;
        token token-value;
         trigger {
            radius-disconnect;
        }
```

```
    }
    requested-ip-network-match subnet-mask;
    route-suppression;
    server-duid-type type;
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server],
[edit logical-systems logical-system-name system services dhcp-local-server],
[edit routing-instances routing-instance-name system services dhcp-local-server],
[edit system services dhcp-local-server]
```

Description

Configure DHCPv6 local server options on the router or switch to enable the router or switch to function as a server for the DHCP protocol for IPv6. The DHCPv6 local server sends and receives packets using the IPv6 protocol and informs IPv6 of the routing requirements of router clients. The local server works together with the AAA service framework to control subscriber access (or DHCP client access) and accounting.

The DHCPv6 local server is fully compatible with the extended DHCP local server and DHCP relay agent.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.6.

RELATED DOCUMENTATION

DHCPv6 Local Server Overview

dynamic-profile (DHCP Local Server)

IN THIS SECTION

Syntax

```
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
```

Hierarchy Level

```
[edit system services dhcp-local-server],
[edit system services dhcp-local-server dual-stack-group dual-stack-group-name],
[edit system services dhcp-local-server dhcpv6],
[edit system services dhcp-local-server dhcpv6 group group-name],
[edit system services dhcp-local-server dhcpv6 group group-name interface interface-name],
[edit system services dhcp-local-server group group-name],
[edit system services dhcp-local-server group group-name interface interface-name],
[edit logical-systems logical-system-name system services dhcp-local-server ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
```

```
services dhcp-local-server ...],
[edit routing-instances routing-instance-name system services dhcp-local-server ...]
```

Description

Specify the dynamic profile that is attached to all interfaces, a named group of interfaces, or a specific interface.

Options

profile-name—Name of the dynamic profile.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.2.

Options `aggregate-clients` and `use-primary` introduced in Junos OS Release 9.3.

Support at the `[edit ... interface]` hierarchy levels introduced in Junos OS Release 11.2.

RELATED DOCUMENTATION

> *Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces*
>
> *Configuring a Default Subscriber Service*

dynamic-profile (DHCP Relay Agent)

IN THIS SECTION

Syntax

```
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay dhcpv6],
[edit forwarding-options dhcp-relay dhcpv6 group group-name],
[edit forwarding-options dhcp-relay dhcpv6 group group-name interface interface-name],
[edit forwarding-options dhcp-relay dual-stack-group dual-stack-group-name],
[edit forwarding-options dhcp-relay group group-name],
[edit forwarding-options dhcp-relay group group-name interface interface-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]
```

Description

Specify the dynamic profile that is attached to all interfaces, to a named group of interfaces, or to a specific interface.

M120 and M320 routers do not support DHCPv6.

Options

profile-name—Name of the dynamic profile.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.2.

Support at the `[edit ... dhcpv6]` hierarchy levels introduced in Junos OS Release 11.4.

Support at the `[edit ... dual-stack-group` *`dual-stack-group-name`*`]` hierarchy level introduced in Junos OS Release 15.1.

RELATED DOCUMENTATION

- *dhcp-relay*
- *Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces*
- *Grouping Interfaces with Common DHCP Configurations*
- *Configuring a Default Subscriber Service*

dynamic-profile (Dynamic PPPoE)

IN THIS SECTION

Syntax

```
dynamic-profile profile-name;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces demux0 unit logical-unit-number family pppoe],
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number family
pppoe],
[edit interfaces interface-name unit logical-unit-number family pppoe],
[edit interfaces interface-name unit logical-unit-number pppoe-underlying-options],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number
family pppoe],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number
pppoe-underlying-options]
```

Description

Attach a PPPoE dynamic profile to an underlying Ethernet interface. This underlying interface is configured with either the `encapsulation ppp-over-ether` statement or the `family pppoe` statement; the two statements are mutually exclusive. When the router creates a dynamic PPPoE logical interface on the underlying interface, it uses the information in the dynamic profile to determine the properties of the dynamic PPPoE logical interface.

NOTE: The `[edit ... family pppoe]` hierarchies are supported only on MX Series routers with MPCs.

Starting in Junos OS Release 17.2R1, you can configure converged services for MS-MPCs and MS-MICs. You can configure captive portal content delivery (CPCD) profiles for MS-MICs and MS-MPCs by including the service interface ms-fpc/pic/port statement at the `edit service-set` *`service set name`* `captive-portal-content-delivery-profile` *`profile name`* `interface-service` heirarchy level.

Options

`profile-name`—Name of a previously configured PPPoE dynamic profile, up to 64 characters in length, defined at the `[edit dynamic-profiles` *`profile-name`* `interfaces pp0]` hierarchy level.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.1.

Support for the `[edit ... family pppoe]` hierarchies introduced in Junos OS Release 11.2.

RELATED DOCUMENTATION

- *Configuring an Underlying Interface for Dynamic PPPoE Subscriber Interfaces*
- *Configuring the PPPoE Family for an Underlying Interface*
- *Dynamic PPPoE Subscriber Interfaces over Static Underlying Interfaces Overview*

dynamic-profile (Stacked VLAN)

IN THIS SECTION

Syntax

```
dynamic-profile profile-name {
    accept  (any | dhcp-v4 |dhcp-v6| inet | inet6 | pppoe);
    access-profile vlan-dynamic-profile-name;
    ranges (any | low-tag-high-tag),(any | low-tag-high-tag);
}
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure stacked-vlan-ranges]
```

Description

Configure a dynamic profile for use when configuring dynamic stacked VLANs.

Options

profile-name—Name of the dynamic profile that you want to use when configuring dynamic stacked VLANs.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

RELATED DOCUMENTATION

- *Dynamic Profiles Overview*
- *Configuring a Basic Dynamic Profile*
- *Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs*

dynamic-profile (VLAN)

IN THIS SECTION

Syntax

```
dynamic-profile profile-name {
    accept  (any | dhcp-v4 |dhcp-v6| inet | inet6 | pppoe);
    accept-out-of-band protocol;
    access-profile vlan-dynamic-profile-name;
```

```
    ranges (any | low-tag)-(any | high-tag);
}
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure vlan-ranges]
```

Description

Configure a dynamic profile for use when configuring dynamic VLANs.

Options

profile-name—Name of the dynamic profile that you want to use when configuring dynamic VLANs.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

RELATED DOCUMENTATION

> *Dynamic Profiles Overview*
>
> *Configuring a Basic Dynamic Profile*
>
> *Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs*

dynamic-profiles

IN THIS SECTION

Syntax

```
dynamic-profiles {
    profile-name {
        class-of-service {
            dynamic-class-of-service-options {
                vendor-specific-tags tag;
            }
            interfaces {
                interface-name ;
                }
                unit logical-unit-number {
                    classifiers {
                        type (classifier-name | default);
                    }
                    output-traffic-control-profile (profile-name | $junos-cos-traffic-control-
profile);
                    report-ingress-shaping-rate bps;
                    rewrite-rules {
                        dscp (rewrite-name | default);
                        dscp-ipv6 (rewrite-name | default);
                        ieee-802.1 (rewrite-name | default) vlan-tag (outer | outer-and-inner);
                        inet-precedence (rewrite-name | default);
                        }
                    }
                }
```

```
            }
            scheduler-maps {
                map-name {
                    forwarding-class class-name scheduler scheduler-name;
                }
            }
            schedulers {
                (scheduler-name) {
                    buffer-size (seconds | percent percentage | remainder | temporal
microseconds);
                    drop-profile-map loss-priority (any | low | medium-low | medium-high | high)
protocol (any | non-tcp | tcp) drop-profile profile-name;
                    excess-priority (low | high | $junos-cos-scheduler-excess-priority);
                    excess-rate (percent percentage | percent $junos-cos-scheduler-excess-rate);
                    overhead-accounting (shaping-mode) <bytes (byte-value>;
                    priority priority-level;
                    shaping-rate (rate | predefined-variable);
                    transmit-rate (percent percentage | rate | remainder) <exact | rate-limit>;
                }
            }
            traffic-control-profiles profile-name {
                adjust-minimum rate;
                delay-buffer-rate (percent percentage | rate);
                excess-rate (percent percentage | proportion value | percent $junos-cos-excess-
rate);
                excess-rate-high (percent percentage | proportion value);
                excess-rate-low (percent percentage | proportion value);
                guaranteed-rate (percent percentage | rate) <burst-size  bytes>;
                max-burst-size cells;
                overhead-accounting (frame-mode | cell-mode) <bytes byte-value>;
                peak-rate rate;
                scheduler-map map-name;
                shaping-rate (percent percentage | rate | predefined-variable) <burst-size
bytes>;
                shaping-rate-excess-high (percent percentage | rate) <burst-size bytes>;
                shaping-rate-excess-medium-high (percent percentage | rate) <burst-size bytes>;
                shaping-rate-excess-medium-low (percent percentage | rate) <burst-size bytes>;
                shaping-rate-excess-low (percent percentage | rate) <burst-size bytes>;
                shaping-rate-priority-high (percent percentage | rate) <burst-size bytes>;
                shaping-rate-priority-low (percent percentage | rate) <burst-size bytes>;
                shaping-rate-priority-medium (percent percentage | rate) <burst-size bytes>;
                shaping-rate-priority-medium-low (percent percentage | rate) <burst-size bytes>;
                shaping-rate-priority-strict-high (percent percentage | rate) <burst-size bytes>;
```

```
            sustained-rate rate;
        }
    }
    firewall {
        family family {
            fast-update-filter filter-name {
                interface-specific;
                match-order [match-order];
                term term-name {
                    from {
                        match-conditions;
                    }
                    then {
                        action;
                        action-modifiers;
                    }
                    only-at-create;
                }
            }
            filter filter-name {
                enhanced-mode-override;
                instance-shared;
                interface-shared;
            interface-specific;
                term term-name {
                    from {
                        match-conditions;
                    }
                    then {
                        action;
                        action-modifiers;
                    }
                only-at-create;
            filter filter-name {
            interface-specific;
                term term-name {
                    from {
                        match-conditions;
                    }
                    then {
                        action;
                        action-modifiers;
                    }
```

```
        }
    hierarchical-policer uid {
        aggregate {
            if-exceeding {
                bandwidth-limit-limit bps;
                burst-size-limit bytes;
            }
            then {
                policer-action;
            }
        }
        premium {
            if-exceeding {
                bandwidth-limit bps;
                burst-size-limit bytes;
            }
            then {
                policer-action;
            }
        }
    }
    policer uid {
        filter-specific;
        if-exceeding {
            (bandwidth-limit bps | bandwidth-percent percentage);
            burst-size-limit bytes;
        }
        logical-bandwidth-policer;
        logical-interface-policer;
        physical-interface-policer;
        then {
            policer-action;
        }
    }
    three-color-policer uid {
        action {
            loss-priority high then discard;
        }
        logical-interface-policer;
        single-rate {
            (color-aware | color-blind);
            committed-burst-size bytes;
            committed-information-rate bps;
```

```
                    excess-burst-size bytes;
                }
                two-rate {
                    (color-aware | color-blind);
                    committed-burst-size bytes;
                    committed-information-rate bps;
                    peak-burst-size bytes;
                    peak-information-rate bps;
                    }
                }
            }
        }
        interfaces interface-name {
            interface-set interface-set-name {
                interface interface-name {
                    unit logical unit number {
                        advisory-options {
                            downstream-rate rate;
                            upstream-rate rate;
                        }
                    }
                }
            }
            unit logical-unit-number {
                actual-transit-statistics;
                auto-configure {
                    agent-circuit-identifier {
                        dynamic-profile profile-name;
                    }
                    line-identity {
                        include {
                            accept-no-ids;
                            circuit-id;
                            remote-id;

                        }
                        dynamic-profile profile-name;
                    }
                }
                encapsulation  (atm-ccc-cell-relay | atm-ccc-vc-mux | atm-cisco-nlpid | atm-tcc-
vc-mux | atm-mlppp-llc | atm-nlpid | atm-ppp-llc | atm-ppp-vc-mux | atm-snap | atm-tcc-snap |
atm-vc-mux | ether-over-atm-llc | ether-vpls-over-atm-llc | ether-vpls-over-fr | ether-vpls-over-
ppp | ethernet | frame-relay-ccc | frame-relay-ppp | frame-relay-tcc | frame-relay-ether-type |
```

```
frame-relay-ether-type-tcc | multilink-frame-relay-end-to-end | multilink-ppp | ppp-over-ether |
ppp-over-ether-over-atm-llc | vlan-bridge | vlan-ccc | vlan-vci-ccc | vlan-tcc | vlan-vpls);
                family family {
                    address address;
                    filter {
                        adf {
                            counter;
                            input-precedence precedence;
                            not-mandatory;
                            output-precedence precedence;
                            rule rule-value;
                        }
                        input filter-name (
                            precedence precedence;
                            shared-name filter-shared-name;
                        }
                        output filter-name {
                            precedence precedence;
                            shared-name filter-shared-name;
                        }
                    }
                    rpf-check {
                        fail-filter filter-name;
                        mode loose;
                    }
                    service {
                         input {
                             service-set service-set-name {
                                 service-filter filter-name;
                            }
                            post-service-filter filter-name;
                        }
                        input-vlan-map {
                            inner-tag-protocol-id tpid;
                            inner-vlan-id number;
                            (push | swap);
                            tag-protocol-id tpid;
                            vlan-id number;
                        }
                        output {
                             service-set service-set-name {
                                 service-filter filter-name;
                            }
```

```
                }
                output-vlan-map {
                    inner-tag-protocol-id tpid;
                    inner-vlan-id number;
                    (pop | swap);
                    tag-protocol-id tpid;
                    vlan-id number;
                }
                pcef  pcef-profile-name {
                    activate rule-name | activate-all;
                }
            }
            unnumbered-address interface-name <preferred-source-address address>;
        }
        filter {
            input filter-name (
                shared-name filter-shared-name;
            }
            output filter-name {
                shared-name filter-shared-name;
            }
        }
        host-prefix-only;
        ppp-options {
            aaa-options aaa-options-name;
            authentication [ authentication-protocols ];
            chap {
                challenge-length minimum minimum-length maximum maximum-length;
                local-name name;
            }
            ignore-magic-number-mismatch;
            initiate-ncp (dual-stack-passive | ipv6 | ip)
            ipcp-suggest-dns-option;
            mru size;
            mtu (size | use-lower-layer);
            on-demand-ip-address;
            pap;
            peer-ip-address-optional;
            local-authentication {
                password password;
                username-include {
                    circuit-id;
                    delimiter character;
```

```
                        domain-name name;
                        mac-address;
                        remote-id;
                    }
                }
            }
            reassemble-packets;
            targeted-options {
                backup backup;
                group group;
                primary primary;
                weight ($junos-interface-target-weight | weight-value);
            }
            telemetry {
                subscriber-statistics;
                queue-statistics {
                    interface $junos-interface-name {
                        refresh rate;
                        queues queue set;
                    }
                    interface-set $junos-interface-set-name {
                        refresh rate;
                        queues queue set;
                    }
                }
            }
            vlan-id number;
            vlan-tags outer  [tpid].vlan-id [inner [tpid].vlan-id];
        }
    }
    interfaces {
        demux0 {...}
    }
    interfaces {
        pp0 {...}
    }
    policy-options {
        prefix-list uid {
            ip-addresses;
            dynamic-db;
        }
    }
    predefined-variable-defaults predefined-variable <variable-option> default-value;
```

```
profile-type remote-device-service;
protocols {
    igmp {
        interface interface-name {
            accounting;
            disable;
            group-limit limit;
            group-policy;
            group-threshold value;
            immediate-leave
            log-interval seconds;
            no-accounting;
            oif-map;
            passive;
            promiscuous-mode;
            ssm-map ssm-map-name;
            ssm-map-policy ssm-map-policy-name
            static {
                group group {
                    source source;
                }
            }
            version version;
        }
    }
    mld {
         interface interface-name {
            (accounting | no-accounting);
            disable;
            group-limit limit;
            group-policy;
            group-threshold value;
            immediate-leave;
            log-interval seconds;
            oif-map;
            passive;
            ssm-map ssm-map-name;
            ssm-map-policy ssm-map-policy-name;
            static {
                group multicast-group-address {
                    exclude;
                    group-count number;
                    group-increment increment;
```

```
                        source ip-address {
                            source-count number;
                            source-increment increment;
                        }
                    }
                }
                version version;
            }
        }
        router-advertisement {
            interface interface-name {
                 current-hop-limit number;
                default-lifetime seconds;
                dns-server-address
                (managed-configuration | no-managed-configuration);
                max-advertisement-interval seconds;
                min-advertisement-interval seconds;
                (other-stateful-configuration | no-other-stateful-configuration);
                prefixprefix {
                    (autonomous | no-autonomous);
                    (on-link | no-on-link);
                    preferred-lifetime seconds;
                    valid-lifetime seconds;
                }
                reachable-time milliseconds;
                retransmit-timer milliseconds;
            }
        }
    }
    routing-instances routing-instance-name {
        interface interface-name;
        routing-options {
            access {
                route prefix {
                    next-hop next-hop;
                    metric route-cost;
                    preference route-distance;
                    tag route-tag;
                    tag2 route-tag2;
                }
            }
            access-internal {
                route subscriber-ip-address {
```

```
                    qualified-next-hop underlying-interface {
                        mac-address address;
                    }
                }
            }
            multicast {
                interface interface-name {
                    no-qos-adjust;
                }
            }
        }
        rib routing-table-name {
            access {
                route prefix {
                    next-hop next-hop;
                    metric route-cost;
                    preference route-distance;
                    tag route-tag;
                    tag2 route-tag2;
                }
            }
            access-internal {
                route subscriber-ip-address {
                    qualified-next-hop underlying-interface {
                        mac-address address;
                    }
                }
            }
        }
    }
    routing-options {
        access {
            route prefix {
                next-hop next-hop;
                metric route-cost;
                preference route-distance;
                tag route-tag;
                tag2 route-tag2;
            }
        }
        access-internal {
            route subscriber-ip-address {
                qualified-next-hop underlying-interface {
```

```
                        mac-address address;
                    }
                }
            }
            multicast {
                interface interface-name {
                    no-qos-adjust;
                }
            }
        }
        services {
            captive-portal-content-delivery {
                auto-deactivate value;
                rule name {
                    match-direction (input | input-output | output);
                    term name {
                        then {
                            accept;
                            redirect url;
                            rewrite destination-address address <destination-port port-number>;
                            syslog;
                        }
                    }
                }
            }
        }
        variables {
            variable-name {
                default-value default-value;
                equals expression;
                mandatory;
                uid;
                uid-reference;
            }
        }
        version-alias profile-alias-string;
    }
}
```

Hierarchy Level

```
[edit]
```

Description

Create dynamic profiles for use with DHCP or PPP client access.

Options

profile-name Name of the dynamic profile; string of up to 80 alphanumeric characters.

reassemble-packets (Optional) Enables IPv4 reassembly of fragmented GRE packets conveyed across a soft GRE tunnel from a Wi-Fi access point to a Wi-Fi access gateway on a BNG. Reassembly is supported for fragments that range in size from 256 bytes through 8192 bytes.

NOTE:

- The maximum reassembled packet size is 13,310 bytes; this requires an MTU of 1500 bytes. The router drops reassembled packets that are larger than 13,310 bytes. The router also drops DHCP discover packets that are smaller than the MTU.
- Ordering is not maintained between fragmented packets and non-fragmented packets.
- The WAG does not support soft GRE packets with keys. Fragmented packets GRE with key are not reassembled.
- Soft GRE packet reassembly is not supported for pseudowires over redundant logical tunnels (RLT).
- The order of the last arriving fragment is not guaranteed when the reassembled packets are forwarded.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.2.

Support at the `filter, policer, hierarchical-policer, three-color-policer, and policy options` hierarchy levels introduced in Junos OS Release 11.4.

RELATED DOCUMENTATION

Configuring a Basic Dynamic Profile

Configuring Dynamic VLANs Based on Agent Circuit Identifier Information

Dynamic Profiles for Subscriber Management

egress-stats (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
egress-stats {
    all-fields;
    input-bytes;
    input-packets;
    output-bytes;
    output-packets;
```

```
    queue-id;
    red-drop-bytes;
    red-drop-packets;
    tail-drop-packets;
    total-drop-packets;
}
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name fields]
```

Description

Specify egress queue statistics to be collected for the interface.

Options

all-fields Collect all egress queue statistics available for the interface context, logical or physical.

input-bytes Collect the number of octets queued including traffic dropped because of congestion.

input-packets Collect the number of packets queued including traffic dropped because of congestion.

output-bytes Collect the number of octets transmitted by the egress queue.

output-packets Collect the number of packets transmitted by the egress queue.

queue-id Collect the logical identifier for the egress queue; identifies the traffic class.

red-drop-bytes Collect the number of octets dropped on the egress queue because of random early detection.

red-drop-packets Collect the number of packets dropped on the egress queue because of random early detection.

tail-drop-packets Collect the number of packets dropped in the egress queue because of tail drop.

total-drop-packets Collect the total number of packets dropped in the egress queue.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

- Configuring Flat-File Accounting for Layer 2 Wholesale | 162
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167
- Flat-File Accounting Overview | 158

encapsulation (Dynamic Interfaces)

IN THIS SECTION

Syntax

```
encapsulation (atm-ccc-cell-relay | atm-ccc-vc-mux | atm-cisco-nlpid | atm-tcc-vc-mux | atm-
mlppp-llc | atm-nlpid | atm-ppp-llc | atm-ppp-vc-mux | atm-snap | atm-tcc-snap | atm-vc-mux |
ether-over-atm-llc | ether-vpls-over-atm-llc | ether-vpls-over-fr | ether-vpls-over-ppp |
ethernet | frame-relay-ccc | frame-relay-ppp | frame-relay-tcc | frame-relay-ether-type | frame-
```

```
relay-ether-type-tcc | multilink-frame-relay-end-to-end | multilink-ppp | ppp-over-ether | ppp-over-ether-over-atm-llc | vlan-bridge | vlan-ccc | vlan-vci-ccc | vlan-tcc | vlan-vpls);
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number]
```

Description

Dynamic interface configuration of the logical link-layer encapsulation type.

Options

`atm-ccc-cell-relay`—Use ATM cell-relay encapsulation.

`atm-ccc-vc-mux`—Use ATM virtual circuit (VC) multiplex encapsulation on circuit cross-connect (CCC) circuits. When you use this encapsulation type, you can configure the `ccc` family only.

`atm-cisco-nlpid`—Use Cisco ATM network layer protocol ID (NLPID) encapsulation. When you use this encapsulation type, you can configure the `inet` family only.

`atm-mlppp-llc`—For ATM2 IQ interfaces only, use Multilink Point-to-Point Protocol (MLPPP) over AAL5 LLC. For this encapsulation type, your router must be equipped with a link services or voice services PIC. MLPPP over ATM encapsulation is not supported on ATM2 IQ OC48 interfaces.

`atm-nlpid`—Use ATM NLPID encapsulation. When you use this encapsulation type, you can configure the `inet` family only.

`atm-ppp-llc`—For ATM2 IQ interfaces only, use PPP over AAL5 LLC encapsulation.

`atm-ppp-vc-mux`—For ATM2 IQ interfaces only, use PPP over ATM AAL5 multiplex encapsulation.

`atm-snap`—Use ATM subnetwork attachment point (SNAP) encapsulation.

`atm-tcc-snap`—Use ATM SNAP encapsulation on translational cross-connect (TCC) circuits.

`atm-tcc-vc-mux`—Use ATM VC multiplex encapsulation on TCC circuits. When you use this encapsulation type, you can configure the `tcc` family only.

`atm-vc-mux`—Use ATM VC multiplex encapsulation. When you use this encapsulation type, you can configure the `inet` family only.

`ether-over-atm-llc`—For interfaces that carry IPv4 traffic, use Ethernet over ATM LLC encapsulation. When you use this encapsulation type, you cannot configure multipoint interfaces.

ether-vpls-over-atm-llc—For ATM2 IQ interfaces only, use the Ethernet virtual private LAN service (VPLS) over ATM LLC encapsulation to bridge Ethernet interfaces and ATM interfaces over a VPLS routing instance (as described in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*). Packets from the ATM interfaces are converted to standard ENET2/802.3 encapsulated Ethernet frames with the frame check sequence (FCS) field removed.

ether-vpls-over-fr—For E1, T1, E3, T3, and SONET interfaces only, use the Ethernet virtual private LAN service (VPLS) over Frame Relay encapsulation to support Bridged Ethernet over Frame Relay encapsulated TDM interfaces for VPLS applications, as per *Multiprotocol Interconnect over Frame Relay*(RFC 2427 [1490]).

ether-vpls-over-ppp—For E1, T1, E3, T3 and SONET interfaces only, use the Ethernet virtual private LAN service (VPLS) over PPP encapsulation to support Bridged Ethernet over PPP encapsulated TDM interfaces for VPLS applications.

ethernet—Use Ethernet II encapsulation (as described in RFC 894, *A Standard for the Transmission of IP Datagrams over Ethernet Networks*).

ethernet-vpls—Use Ethernet VPLS encapsulation on Ethernet interfaces that have VPLS enabled and that must accept packets carrying standard Tag Protocol ID (TPID) values.

extended-vlan-vpls—Use extended virtual LAN (VLAN) VPLS encapsulation on Ethernet interfaces that have VLAN 802.1Q tagging and VPLS enabled and that must accept packets carrying TPIDs 0x8100, 0x9100, and 0x9901.

NOTE: The built-in Gigabit Ethernet PIC on an M7i router does not support extended VLAN VPLS encapsulation.

frame-relay-ccc—Use Frame Relay encapsulation on CCC circuits. When you use this encapsulation type, you can configure the ccc family only.

frame-relay-ppp—Use PPP over Frame Relay circuits. When you use this encapsulation type, you can configure the ppp family only.

frame-relay-tcc—Use Frame Relay encapsulation on TCC circuits for connecting unlike media. When you use this encapsulation type, you can configure the tcc family only.

frame-relay-ether-type—Use Frame Relay ether type encapsulation for compatibility with Cisco Frame Relay. The physical interface must be configured with flexible-frame-relay encapsulation.

frame-relay-ether-type-tcc—Use Frame Relay ether type TCC for Cisco-compatible Frame Relay on TCC circuits to connect unlike media. The physical interface must be configured with flexible-frame-relay encapsulation.

multilink-frame-relay-end-to-end—Use MLFR FRF.15 encapsulation. This encapsulation is used only on multilink, link services,and voice services interfaces and their constituent T1 or E1 interfaces, and is supported on LSQ and redundant LSQ interfaces.

multilink-ppp—Use MLPPP encapsulation. This encapsulation is used only on multilink, link services, and voice services interfaces and their constituent T1 or E1 interfaces.

ppp-over-ether—You use PPP over Ethernet encapsulation to configure an underlying Ethernet interface for a dynamic PPPoE logical interface.

vlan-bridge—Use Ethernet VLAN bridge encapsulation on Ethernet interfaces that have IEEE 802.1Q tagging, flexible ethernet services, and bridging enabled, and that must accept packets carrying TPID 0x8100 or a user-defined TPID.

vlan-ccc—Use Ethernet virtual LAN (VLAN) encapsulation on CCC circuits. When you use this encapsulation type, you can configure the ccc family only.

vlan-vci-ccc—Use ATM-to-Ethernet interworking encapsulation on CCC circuits. When you use this encapsulation type, you can configure the ccc family only.

vlan-tcc—Use Ethernet VLAN encapsulation on TCC circuits. When you use this encapsulation type, you can configure the tcc family only.

vlan-vpls—Use Ethernet VLAN encapsulation on VPLS circuits.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.4.

RELATED DOCUMENTATION

Configuring a Retail Dynamic Profile for Use in the Layer 2 Wholesale Solution | **99**

Configuring PPP over ATM2 Encapsulation Overview

exclude (RADIUS Attributes)

IN THIS SECTION

Syntax

```
exclude {
    acc-aggr-cir-id-asc [ access-request | accounting-start | accounting-stop ];
    acc-aggr-cir-id-bin [ access-request | accounting-start | accounting-stop ];
    acc-loop-cir-id [ access-request | accounting-start | accounting-stop ];
    acc-loop-encap [ access-request | accounting-start | accounting-stop ];
    acc-loop-remote-id [ access-request | accounting-start | accounting-stop ];
    accounting-authentic [ accounting-off | accounting-on | accounting-start | accounting-stop ]
    accounting-delay-time [ accounting-off | accounting-on | accounting-start | accounting-
stop ];
    accounting-session-id access-request;
    accounting-terminate-cause accounting-off;
    acct-request-reason [ accounting-start | accounting-stop ];
    acct-tunnel-connection [ access-request | accounting-start | accounting-stop ];
    act-data-rate-dn [ access-request | accounting-start | accounting-stop ];
    act-data-rate-up [ access-request | accounting-start | accounting-stop ];
    act-interlv-delay-dn [ access-request | accounting-start | accounting-stop ];
    act-interlv-delay-up [ access-request | accounting-start | accounting-stop ];
    att-data-rate-dn [ access-request | accounting-start | accounting-stop ];
    att-data-rate-up [ access-request | accounting-start | accounting-stop ];
    called-station-id [ access-request | accounting-start | accounting-stop ];
    calling-station-id [ access-request | accounting-start | accounting-stop ];
    chargeable-user-identity access-request;
    class [ accounting-start | accounting-stop ];
    cos-shaping-rate [ accounting-start | accounting-stop ];
```

```
    delegated-ipv6-prefix [ accounting-start | accounting-stop ];
    dhcp-gi-address [ access-request | accounting-start | accounting-stop ];
    dhcp-header access-request;
    dhcp-mac-address [ access-request | accounting-start | accounting-stop ];
    dhcp-options [ access-request | accounting-start | accounting-stop ];
    dhcpv6-header access-request;
    dhcpv6-options [ access-request | accounting-start | accounting-stop ];
    downstream-calculated-qos-rate [ access-request | accounting-start | accounting-stop ];
    dsl-forum-attributes [ access-request | accounting-start | accounting-stop ];
    dsl-line-state [ access-request | accounting-start | accounting-stop ];
    dsl-type [ access-request | accounting-start | accounting-stop ];
    dynamic-iflset-name [ accounting-start | accounting-stop ];
    event-timestamp [ accounting-off | accounting-on | accounting-start | accounting-stop ];
    filter-id [ accounting-start | accounting-stop ];
    first-relay-ipv4-address [ access-request | accounting-start | accounting-stop ];
    first-relay-ipv6-address [ access-request | accounting-start | accounting-stop ];
    framed-interface-id [ access-request | accounting-start | accounting-stop ];
    framed-ip-address [ access-request | accounting-start | accounting-stop ];
    framed-ip-netmask [ access-request | accounting-start | accounting-stop ];
    framed-ip-route [ accounting-start | accounting-stop ];
    framed-ipv6-address [ access-request | accounting-start | accounting-stop ];
    framed-ipv6-pool [ accounting-start | accounting-stop ];
    framed-ipv6-prefix [ accounting-start | accounting-stop ];
    framed-ipv6-route [ accounting-start | accounting-stop ];
    framed-pool [ accounting-start | accounting-stop ]; input-ipv6-gigawords accounting-stop;
    input-filter [ accounting-start | accounting-stop ];
    input-gigapackets accounting-stop;
    input-gigawords accounting-stop;
    input-ipv6-octets accounting-stop;
    input-ipv6-packets accounting-stop;
    interface-description [ access-request | accounting-start | accounting-stop ];
    l2c-downstream-data [ access-request | accounting-start | accounting-stop ];
    l2c-upstream-data [ access-request | accounting-start | accounting-stop ];
    l2tp-rx-connect-speed [ access-request | accounting-start | accounting-stop ];
    l2tp-tx-connect-speed [ access-request | accounting-start | accounting-stop ];
    max-data-rate-dn [ access-request | accounting-start | accounting-stop ];
    max-data-rate-up [ access-request | accounting-start | accounting-stop ];
    max-interlv-delay-dn [ access-request | accounting-start | accounting-stop ];
    max-interlv-delay-up [ access-request | accounting-start | accounting-stop ];
    min-data-rate-dn [ access-request | accounting-start | accounting-stop ];
    min-data-rate-up [ access-request | accounting-start | accounting-stop ];
    min-lp-data-rate-dn [ access-request | accounting-start | accounting-stop ];
    min-lp-data-rate-up [ access-request | accounting-start | accounting-stop ];
```

```
    nas-identifier [ access-request | accounting-off | accounting-on | accounting-start |
accounting-stop ];
    nas-port [ access-request | accounting-start | accounting-stop ];
    nas-port-id [ access-request | accounting-start | accounting-stop ];
    nas-port-type [ access-request | accounting-start | accounting-stop ];
    output-filter [ accounting-start | accounting-stop ];
    output-gigapackets accounting-stop;
    output-gigawords accounting-stop;
    output-ipv6-gigawords accounting-stop;
    output-ipv6-octets accounting-stop;
    output-ipv6-packets accounting-stop;
    pppoe-description [ access-request | accounting-start | accounting-stop ];
    standard-attribute number {
        packet-type [ access-request | accounting-off | accounting-on | accounting-start |
accounting-stop ];
    }
    tunnel-assignment-id [ access-request | accounting-start | accounting-stop ];
    tunnel-client-auth-id [ access-request | accounting-start | accounting-stop ];
    tunnel-client-endpoint [ access-request | accounting-start | accounting-stop ];
    tunnel-medium-type [ access-request | accounting-start | accounting-stop ];
    tunnel-server-auth-id [ access-request | accounting-start | accounting-stop ];
    tunnel-server-endpoint [ access-request | accounting-start | accounting-stop ];
    tunnel-type [ access-request | accounting-start | accounting-stop ];
    upstream-calculated-qos-rate [ access-request | accounting-start | accounting-stop ];
    vendor-id id-number {
        vendor-attribute vsa-number {
            packet-type [ access-request | accounting-off | accounting-on | accounting-start |
accounting-stop ];
        }
    }
    virtual-router [ access-request | accounting-start | accounting-stop ];
}
```

Hierarchy Level

```
[edit access profile profile-name radius attributes]
```

Description

Configure the router or switch to exclude the specified attributes from being sent in the specified type of RADIUS message. Exclusion can be useful, for example, for attributes that do not change values over the lifetime of a subscriber. By not sending these attributes, you reduce the packet size without losing information. Contrast this behavior with that provided by the `ignore` statement.

You can specify attribute exclusion for multiple RADIUS message types by enclosing the message types, separated by spaces, within brackets ([ ]). You do not need brackets when specifying a single message type.

Starting in Junos OS Release 18.1R1, you can specify standard RADIUS attributes with the attribute number. You can specify VSAs with the IANA-assigned vendor ID and the VSA number. With this flexible configuration method, you can configure any standard attribute and VSA supported by your platform to be excluded. The configuration has no effect if you configure unsupported attributes, vendors, and VSAs.

The legacy method allows you to configure only those attributes and VSAs for which the statement syntax includes a specific option. Consequently, you can use the legacy method to exclude only a subset of all attributes that can be received in Access-Accept messages.

Not all attributes are available in all types of RADIUS messages.

NOTE: If you exclude an attribute from Acct-Off messages, the attributes are then excluded from Interim-Acct messages.

NOTE: VSAs with dedicated option names include Juniper Networks (IANA vendor ID 4874) and DSL Forum (vendor ID 3561) VSAs.

Options

RADIUS attribute—RADIUS standard attribute or VSA:

- `acc-aggr-cir-id-asc`—Exclude Juniper Networks VSA 26-112, Acc-Aggr-Cir-Id-Asc.
- `acc-aggr-cir-id-bin`—Exclude Juniper Networks VSA 26-111, Acc-Aggr-Cir-Id-Bin.
- `acc-loop-cir-id`—Exclude Juniper Networks VSA 26-110, Acc-Loop-Cir-Id.
- `acc-loop-encap`—Exclude Juniper Networks VSA 26-183, Acc-Loop-Encap.
- `acc-loop-remote-id`—Exclude Juniper Networks VSA 26-182, Acc-Loop-Remote-Id.

- accounting-authentic—Exclude RADIUS attribute 45, Acct-Authentic.
- accounting-delay-time—Exclude RADIUS attribute 41, Acct-Delay-Time.
- accounting-session-id—Exclude RADIUS attribute 44, Acct-Session-Id.
- accounting-terminate-cause—Exclude RADIUS attribute 49, Acct-Terminate-Cause.
- acct-request-reason—Exclude Juniper Networks VSA 26-210, Acct-Request-Reason.
- acct-tunnel-connection—Exclude RADIUS attribute 68, Acct-Tunnel-Connection.
- act-data-rate-dn—Exclude Juniper Networks VSA 26-114, Act-Data-Rate-Dn.
- act-data-rate-up—Exclude Juniper Networks VSA 26-113, Act-Data-Rate-Up.
- act-interlv-delay-dn—Exclude Juniper Networks VSA 26-126, Act-Interlv-Delay-Dn.
- act-interlv-delay-up—Exclude Juniper Networks VSA 26-124, Act-Interlv-Delay-Up.
- att-data-rate-dn—Exclude Juniper Networks VSA 26-118, Att-Data-Rate-Dn.
- att-data-rate-up—Exclude Juniper Networks VSA 26-117, Att-Data-Rate-Up.
- called-station-id—Exclude RADIUS attribute 30, Called-Station-Id.
- calling-station-id—Exclude RADIUS attribute 31, Calling-Station-Id.
- chargeable-user-identity—Exclude RADIUS attribute 89, Chargeable-User-Identity.
- class—Exclude RADIUS attribute 25, Class.
- cos-shaping-rate—Exclude Juniper Networks VSA 26-177, Cos-Shaping-Rate.
- delegated-ipv6-prefix—Exclude RADIUS attribute 123, Delegated-IPv6-Prefix.
- dhcp-gi-address—Exclude Juniper Networks VSA 26-57, DHCP-GI-Address.
- dhcp-header—Exclude Juniper Networks VSA 26-208, DHCP-Header.
- dhcp-mac-address—Exclude Juniper Networks VSA 26-56, DHCP-MAC-Address.
- dhcp-options—Exclude Juniper Networks VSA 26-55, DHCP-Options.
- dhcpv6-header—Exclude Juniper Networks VSA 26-209, DHCPv6-Header.
- dhcpv6-options—Exclude Juniper Networks VSA 26-207, DHCPv6-Options.
- dynamic-iflset-name—Exclude Juniper Networks VSA 26-130, Qos-Set-Name.
- downstream-calculated-qos-rate—Exclude Juniper Networks VSA 26-141.

- `dsl-forum-attributes`—Exclude DSL Forum VSA (vendor ID 3561) as described in RFC 4679, *DSL Forum Vendor-Specific RADIUS Attributes*.
- `dsl-line-state`—Exclude Juniper Networks VSA 26-127, DSL-Line-State.
- `dsl-type`—Exclude Juniper Networks VSA 26-128, DSL-Type.
- `event-timestamp`—Exclude RADIUS attribute 55, Event-Timestamp.
- `filter-id`—Exclude RADIUS attribute 11, Filter-Id.
- `first-relay-ipv4-address` —Exclude Juniper Networks VSA 26-189, DHCP-First-Relay-IPv4-Address.
- `first-relay-ipv6-address` —Exclude Juniper Networks VSA 26-190, DHCP-First-Relay-IPv6-Address.
- `framed-interface-id`—Exclude RADIUS attribute 96, Framed-Interface-ID.
- `framed-ip-address`—Exclude RADIUS attribute 8, Framed-IP-Address.
- `framed-ip-netmask`—Exclude RADIUS attribute 9, Framed-IP-Netmask.
- `framed-ip-route`—Exclude RADIUS attribute 22, Framed-Route.
- `framed-ipv6-address`—Exclude RADIUS attribute 168, Framed-IPv6-Address.
- `framed-ipv6-pool`—Exclude RADIUS attribute 100, Framed-IPv6-Pool.
- `framed-ipv6-prefix`—Exclude RADIUS attribute 97, Framed-IPv6-Prefix.
- `framed-ipv6-route`—Exclude RADIUS attribute 99, Framed-IPv6-Route.
- `framed-pool`—Exclude RADIUS attribute 88, Framed-Pool.
- `input-filter`—Exclude Juniper Networks VSA 26-10, Ingress-Policy-Name.
- `input-gigapackets`—Exclude Juniper Networks VSA 26-42, Acct-Input-Gigapackets.
- `input-gigawords`—Exclude RADIUS attribute 52, Acct-Input-Gigawords.
- `input-ipv6-gigawords`—Exclude Juniper Networks VSA 26-155, Acct-Input-IPv6-Gigawords.
- `input-ipv6-octets`—Exclude Juniper Networks VSA 26-151, Acct-Input-IPv6-Octets.
- `input-ipv6-packets`—Exclude Juniper Networks VSA 26-153, Acct-Input-IPv6-Packets.
- `interface-description`—Exclude Juniper Networks VSA 26-53, Interface-Desc.
- `l2c-downstream-data`—Exclude Juniper Networks VSA 26-93, L2C-Down-Stream-Data.
- `l2c-upstream-data`—Exclude Juniper Networks VSA 26-92, L2C-Up-Stream-Data.

- `l2tp-rx-connect-speed`—Exclude Juniper Networks VSA 26-163, Rx-Connect-Speed.
- `l2tp-tx-connect-speed`—Exclude Juniper Networks VSA 26-162, Tx-Connect-Speed.
- `max-data-rate-dn`—Exclude Juniper Networks VSA 26-120, Max-Data-Rate-Dn.
- `max-data-rate-up`—Exclude Juniper Networks VSA 26-119, Max-Data-Rate-Up.
- `max-interlv-delay-dn`—Exclude Juniper Networks VSA 26-125, Max-Interlv-Delay-Dn.
- `max-interlv-delay-up`—Exclude Juniper Networks VSA 26-123, Max-Interlv-Delay-Up.
- `min-data-rate-dn`—Exclude Juniper Networks VSA 26-116, Min-Data-Rate-Dn.
- `min-data-rate-up`—Exclude Juniper Networks VSA 26-115, Min-Data-Rate-Up.
- `min-lp-data-rate-dn`—Exclude Juniper Networks VSA 26-122, Min-Lp-Data-Rate-Dn.
- `min-lp-data-rate-up`—Exclude Juniper Networks VSA 26-121, Min-Lp-Data-Rate-Up.
- `nas-identifier`—Exclude RADIUS attribute 32, NAS-Identifier.
- `nas-port`—Exclude RADIUS attribute 5, NAS-Port.
- `nas-port-id`—Exclude RADIUS attribute 87, NAS-Port-Id.
- `nas-port-type`—Exclude RADIUS attribute 61, NAS-Port-Type.
- `output-filter`—Exclude Juniper Networks VSA 26-11, Egress-Policy-Name.
- `output-gigapackets`—Exclude Juniper Networks VSA 26-43, Acct-Output-Gigapackets.
- `output-gigawords`—Exclude RADIUS attribute 53, Acct-Output-Gigawords.
- `output-ipv6-gigawords`—Exclude Juniper Networks VSA 26-156, Acct-Output-IPv6-Gigawords.
- `output-ipv6-octets`—Exclude Juniper Networks VSA 26-152, Acct-Output-IPv6-Octets.
- `output-ipv6-packets`—Exclude Juniper Networks VSA 26-154, Acct-Output-IPv6-Packets.
- `packet-type`—Specify the RADIUS message type to exclude; term required when excluding a standard attribute or VSA by number rather than name. You can enclose multiple values in square brackets to specify a list of message types. Message types include Access-Request, Accounting-Off, Accounting-Off, Accounting-Start, and Accounting-Stop.
- `pppoe-description`—Exclude Juniper Networks VSA 26-24, PPPoE-Description.
- `standard-attribute` *`number`*—RADIUS standard attribute number supported by your platform. If you configure an unsupported attribute, that configuration has no effect. When you use this option, you must use the `packet-type` term to specify the message from which the attribute is excluded.

- `tunnel-assignment-id`—Exclude RADIUS attribute 82, Tunnel-Assignment-ID.
- `tunnel-client-auth-id`—Exclude RADIUS attribute 90. Tunnel-Client-Auth-ID.
- `tunnel-client-endpoint`—Exclude RADIUS attribute 66, Tunnel-Client-Endpoint.
- `tunnel-medium-type`—Exclude RADIUS attribute 65, Tunnel-Medium-Type.
- `tunnel-server-auth-id`—Exclude RADIUS attribute 91, Tunnel-Server-Auth-ID.
- `tunnel-server-endpoint`—Exclude RADIUS attribute 67, Tunnel-Server-Endpoint.
- `tunnel-type`—Exclude RADIUS attribute 64, Tunnel-Type.
- `upstream-calculated-qos-rate`—Exclude Juniper Networks VSA 26-142
- `vendor-attribute` *`vsa-number`*—Number identifying a VSA belonging to the specified vendor; both must be supported by your platform. If you configure an unsupported VSA, that configuration has no effect. When you use this option, you must use the `packet-type` term to specify the message from which the attribute is excluded.
- `vendor-id` *`id-number`*—IANA vendor ID supported by your platform. If you configure an unsupported vendor ID, that configuration has no effect.
- `virtual-router`—Exclude Juniper Networks VSA 26-1.

RADIUS message type:

- `access-request`—RADIUS Access-Request messages.
- `accounting-off`—RADIUS Accounting-Off messages.
- `accounting-on`—RADIUS Accounting-On messages.
- `accounting-start`—RADIUS Accounting-Start messages.
- `accounting-stop`—RADIUS Accounting-Stop messages.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.1.

downstream-calculated-qos-rate, dsl-forum-attributes, and upstream-calculated-qos-rate options added in Junos OS Release 11.4.

cos-shaping-rate and filter-id options added in Junos OS Release 13.2.

pppoe-description option added in Junos OS Release 14.2.

virtual-router option added in Junos OS Release 15.1.

first-relay-ipv4-address and first-relay-ipv6-address options added in Junos OS Release 16.1.

acc-loop-encap and acc-loop-remote-id options added in Junos OS Release 16.1R4.

access-request option support for all tunnel attributes added in Junos OS Release 15.1R7, 16.1R5, 16.2R2, 17.1R2, 17.2R2, and 17.3R1 for MX Series.

packet-type, standard-attribute, vendor-attribute, and vendor-id options added in Junos OS Release 18.1R1.

RELATED DOCUMENTATION

RADIUS Servers and Parameters for Subscriber Access

Standard and Vendor-Specific RADIUS Attributes

family (Address-Assignment Pools)

IN THIS SECTION

Syntax

```
family family {
    dhcp-attributes {
        [protocol-specific attributes]
    }
    excluded-address ip-address;
    excluded-range name low minimum-value high maximum-value;
    host hostname {
        hardware-address mac-address;
        ip-address ip-address;
    }
    network ip-prefix/<prefix-length>;
    prefix ipv6-prefix;
    range range-name {
        high upper-limit;
        low lower-limit;
        prefix-length prefix-length;
    }
}
```

Hierarchy Level

```
[edit access address-assignment pool pool-name]
```

Description

Configure the protocol family for the address-assignment pool.

NOTE: Subordinate statement support depends on the platform. See individual statement topics for more detailed support information.

Options

family—Protocol family:

- inet—Internet Protocol version 4 suite

- `inet6`—Internet Protocol version 6 suite

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

RELATED DOCUMENTATION

Address-Assignment Pools Overview

Address-Assignment Pool Configuration Overview

family (Dynamic Demux Interface)

IN THIS SECTION

Syntax

```
family family {
    access-concentrator name;
    address address;
    demux-source {
        source-address;
    }
    direct-connect;
    duplicate-protection;
    dynamic-profile profile-name;
    filter {
        input filter-name;
        output filter-name;
    }
    mac-validate (loose | strict);
    max-sessions number;
    max-sessions-vsa-ignore;
    service-name-table table-name;
    short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max maximum-seconds>
<filter [aci]>;
    unnumbered-address interface-name <preferred-source-address address>;
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces demux0 unit logical-unit-number]
```

Description

Configure protocol family information for the logical interface.

NOTE: Not all subordinate stanzas are available to every protocol family.

Options

family—Protocol family:

- `inet`—Internet Protocol version 4 suite
- `inet6`—Internet Protocol version 6 suite
- `pppoe`—(MX Series routers with MPCs only) Point-to-Point Protocol over Ethernet

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.3.

`pppoe` option added in Junos OS Release 11.2.

RELATED DOCUMENTATION

> *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles*
>
> *Subscriber Interfaces and Demultiplexing Overview*

family (Dynamic PPPoE)

IN THIS SECTION

Syntax

```
family family {
    unnumbered-address interface-name;
    address address;
    service {
        input {
            service-set service-set-name {
                service-filter filter-name;
            }
            post-service-filter filter-name;
        }
        output {
            service-set service-set-name {
                service-filter filter-name;
            }
        }
    }
    filter {
        input filter-name {
            precedence precedence;
        }
        output filter-name {
            precedence precedence;
        }
    }
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces pp0 unit “$junos-interface-unit”]
```

Description

Configure protocol family information for the logical interface.

Options

family—Protocol family:

- `inet`—Internet Protocol version 4 suite
- `inet6`—Internet Protocol version 6 suite

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.1.

RELATED DOCUMENTATION

Configuring a PPPoE Dynamic Profile

Dynamic PPPoE Subscriber Interfaces over Static Underlying Interfaces Overview

family (Dynamic Standard Interface)

IN THIS SECTION

Syntax

```
family family {
    access-concentrator name;
    address address;
    direct-connect;
    duplicate-protection;
    dynamic-profile profile-name;
    filter {
        adf {
            counter;
            input-precedence precedence;
            not-mandatory;
            output-precedence precedence;
            rule rule-value;
        }
        input filter-name {
            precedence precedence;
            shared-name filter-shared-name;
        }
        output filter-name {
            precedence precedence;
            shared-name filter-shared-name;
        }
    }
    mac-validate (loose | strict);
    max-sessions number;
    max-sessions-vsa-ignore;
    rpf-check {
        fail-filter filter-name;
        mode loose;
    }
    service {
         input {
             service-set service-set-name {
                 service-filter filter-name;
             }
             post-service-filter filter-name;
        }
        output {
             service-set service-set-name {
                 service-filter filter-name;
```

```
            }
        }
    }
    service-name-table table-name;
    short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max maximum-seconds>
<filter [aci]>;
    unnumbered-address interface-name <preferred-source-address address>;
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number]
```

Description

Configure protocol family information for the logical interface.

NOTE: Not all subordinate stanzas are available to every protocol family.

Options

family—Protocol family:

- `inet`—IP version 4 suite
- `inet6`—IP version 6 suite
- `pppoe`—(MX Series routers with MPCs only) Point-to-Point Protocol over Ethernet
- `vpls`—Virtual private LAN service

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.2.

pppoe option added in Junos OS Release 11.2.

RELATED DOCUMENTATION

- Static Routing on Logical Systems
- Configuring the Protocol Family

fields (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
fields {
    all-fields;
    egress-stats {
        all-fields;
        input-bytes;
        input-packets;
        output-bytes;
        output-packets;
        queue-id;
        red-drop-bytes;
```

```
        red-drop-packets;
        tail-drop-packets;
        total-drop-packets;
    }
    general-param {
        all-fields;
        accounting-type;
        descr;
        line-id;
        logical-interface;
        nas-port-id;
        physical-interface;
        routing-instance;
        timestamp;
        user-name;
        vlan-id;
    }
    ingress-stats {
        all-fields;
        drop-packets;
        input-bytes;
        input-packets;
        output-bytes;
        output-packets;
        queue-id;
    }
    l2-stats {
        all-fields;
        input-mcast-bytes;
        input-mcast-packets;
    }
    overall-packet {
        all-fields;
        input-bytes;
        input-discards;
        input-errors;
        input-packets;
        inputv6-bytes;
        inputv6-packets;
        output-bytes;
        output-errors;
        output-packets;
        outputv6-bytes;
```

```
        outputv6-packets;
        input-v4-bytes;
        input-v4-packets;
        output-v4-bytes;
        output-v4-packets;
        input-bytes-per-sec;
        input-packets-per-sec;
    }
    service-accounting;
}
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name]
```

Description

Specify the accounting statistics and the nonstatistical information to be collected for an interface and recorded in the accounting flat file created by the profile.

Options

all-fields Include all available statistical fields in the accounting file. Many fields are available for both logical interfaces and physical interfaces, but some fields are available only for one or the other interface type.

service-accounting Include the filter counts in bytes for the inet input filter, inet output filter, inet6 input filter, and inet6 output filter in the service accounting flat file. Statistics reported are the running total values.

> **NOTE**: Starting in Junos OS Release 18.4R1, the `service-accounting` option is no longer supported. If included in a configuration, it is ignored.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

- Configuring Flat-File Accounting for Layer 2 Wholesale | 162
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167
- Configuring Service Accounting in Local Flat Files | 172
- Flat-File Accounting Overview | 158

file (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
file filename;
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name]
```

Description

Specify the name of the accounting file created by a flat-file profile. By default, the filename becomes the name of the local directory where the accounting file is backed up: /var/log/pfedBackup/*filename*.

Options

filename Name of the accounting file. The complete output filename is in the format *filename*.*hostname*.*file-number*_*timestamp*.gz.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring Flat-File Accounting for Layer 2 Wholesale | **162**

Configuring Flat-File Accounting for Extensible Subscriber Services Management | **167**

Flat-File Accounting Overview | **158**

flat-file-profile (Accounting Options)

IN THIS SECTION

Syntax

```
flat-file-profile profile-name{
    fields {
        all-fields;
        egress-stats {
            all-fields;
            input-bytes;
            input-packets;
            output-bytes;
            output-packets;
            queue-id;
            red-drop-bytes;
            red-drop-packets;
            tail-drop-packets;
            total-drop-packets;
        }
        general-param {
            all-fields;
            accounting-type;
            descr;
            line-id;
            logical-interface;
            nas-port-id;
            physical-interface;
            routing-instance;
```

```
            timestamp;
            user-name;
            vlan-id;
        }
        ingress-stats {
            all-fields;
            drop-packets;
            input-bytes;
            input-packets;
            output-bytes;
            output-packets;
            queue-id;
        }
        l2-stats {
            all-fields;
            input-mcast-bytes;
            input-mcast-packets;
        }
        overall-packet {
            all-fields;
            input-bytes;
            input-discards;
            input-errors;
            input-packets;
            inputv6-bytes;
            inputv6-packets;
            output-bytes;
            output-errors;
            output-packets;
            outputv6-bytes;
            outputv6-packets;
            input-v4-bytes;
            input-v4-packets;
            output-v4-bytes;
            output-v4-packets;
            input-bytes-per-sec;
            input-packets-per-sec;
        }
        service-accounting;
    }
    file filename;
    format (csv | ipdr)
    interval minutes;
```

```
    start-time time;
     schema-version schema-name;
     use-fc-ingress-stats;
}
```

Hierarchy Level

[edit accounting-options]

Description

Configure a flat-file accounting profile that defines the contents of a flat file that records accounting statistics collected from the Packet Forwarding Engine for an interface at regular intervals. To be used, the profile is associated with a subscriber interface. The accounting flat file is archived by the accounting-options archiving mechanism.

Options

profile-name	Name of the flat-file profile.
start-time *time*	(Optional) Specify the start time in *yyyy-mm-dd.hh:mm* local time format for the accounting profile. Sometimes, if the time at which the records are written to the accounting file is beyond the transfer interval window of the file, drifting of accounting records occurs. To prevent drifting and to have predictable timestamps of when accounting data is written to an accounting file, we can specify the start time option for the accounting profile.
use-fc-ingress-stats	Enables forwarding class counters.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

`service-accounting` option added in Junos OS Release 17.1.

Support for the `service-accounting` option removed in Junos OS Release 18.1R4.

`use-fc-ingress-stats` option added in Junos OS Release 21.2R1.

RELATED DOCUMENTATION

- Configuring Accounting-Data Log Files
- Configuring Flat-File Accounting for Layer 2 Wholesale | **162**
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | **167**
- Configuring Service Accounting in Local Flat Files | **172**
- Flat-File Accounting Overview | **158**

flat-file-profile (Extensible Subscriber Services)

IN THIS SECTION

Syntax

```
flat-file-profile profile-name
```

Hierarchy Level

```
[edit system services extensible-subscriber-services]
```

Description

Specify the name of an accounting flat file profile that applies to an ESSM subscriber.

Options

profile name Name of an accounting flat file profile configured at the `[edit accounting-options]` hierarchy level.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167

flexible-vlan-tagging

IN THIS SECTION

Syntax

```
flexible-vlan-tagging;
```

Hierarchy Level

```
[edit interfaces aex],
[edit interfaces ge-fpc/pic/port],
[edit interfaces et-fpc/pic/port],
[edit interfaces ps0],
[edit interfaces xe-fpc/pic/port]
```

Description

Support simultaneous transmission of 802.1Q VLAN single-tag and dual-tag frames on logical interfaces on the same Ethernet port, and on pseudowire logical interfaces.

This statement is supported on M Series and T Series routers, for Fast Ethernet and Gigabit Ethernet interfaces only on Gigabit Ethernet IQ2 and IQ2-E, IQ, and IQE PICs, and for aggregated Ethernet interfaces with member links in IQ2, IQ2-E, and IQ PICs or in MX Series DPCs, or on Ethernet interfaces for PTX Series Packet Transport Routers or 100-Gigabit Ethernet Type 5 PIC with CFP.

This statement is supported on Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces on EX Series and QFX Series switches.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 8.1.

Support for aggregated Ethernet added in Junos OS Release 9.0.

RELATED DOCUMENTATION

- Enabling VLAN Tagging
- Configuring Flexible VLAN Tagging on PTX Series Packet Transport Routers
- Configuring Double-Tagged VLANs on Layer 3 Logical Interfaces

format (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
format (csv | ipdr);
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name]
```

Description

Specify the format for logging the flat-file accounting statistics.

Options

csv Comma-separated values (CSV) format.

ipdr IP Detail Record (IPDR) format.

- **Default:** `ipdr`

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring Flat-File Accounting for Layer 2 Wholesale | **162**

Configuring Flat-File Accounting for Extensible Subscriber Services Management | **167**

Flat-File Accounting Overview | **158**

forwarding-options

IN THIS SECTION

Syntax

```
forwarding-options {
    access-security ...
    accounting name ...
    dhcp-relay ...
    enhanced-hash-key ...
    family family-name ...
    fast-reroute-priority (high | low | medium);
    helpers ...
    ip-options-protocol-queue   protocol-name ...
    link-layer-broadcast-inet-check;
    load-balance ...
    load-balance-label-capability;
    multicast-replication ...
    next-hop-group group-name ...
    no-load-balance-label-capability;
    port-mirroring ...
    rpf-loose-mode-discard ...
    sampling ...
    storm-control No Link Title;
    storm-control-profiles profile-name  ...
}
```

Hierarchy Level

```
[edit]
[edit routing-instance routing-instance-name]
```

Description

Configure traffic forwarding options. For more information about each option, click a linked statement in the Syntax section.

Options

access-security Configure IPv6 access security options.

accounting	Specify the discard accounting instance name and options.
dhcp-relay	Configure extended Dynamic Host Configuration Protocol (DHCP) relay and DHCPv6 relay options on the router or switch to enable the router (or switch) to function as a DHCP relay agent.
enhanced-hash-key	(MX Series routers with MPCs, T4000 routers with Type 5 FPCs, and EX9200 switches) Select data used in the hash key for enhanced IP forwarding engines.
family	Specify address family for filters.
fast-reroute-priority	Specify the fast reroute priority for a VPLS routing instance. You can configure `high`, `medium`, or `low` fast reroute priority to prioritize specific VPLS routing instances for faster convergence and traffic restoration.
helpers	Enable TFTP or DNS request packet forwarding, or configure the router, switch, or interface to act as a DHCP/BOOTP relay agent. Enable forwarding LAN broadcast traffic on custom UDP ports to particular servers as unicast traffic.
ip-options-protocol-queue	Configure logical queue-depth in the PFE for ip-options packets for a given protocol such as TCP, UDP, ICMP, and so on, except IGMP.
link-layer-broadcast-inet-check	Enable destination MAC and IP address check to prevent the router from forwarding IPv4 packets that have link layer destination address set to `broadcast` or `multicast`, unless directed to an IPv4 multicast address.
load-balance	Enable per-prefix or per-flow load balancing so that the router or switch elects a next hop independently of the route selected by other routers or switches.
load-balance-label-capability	Enable the router to push and pop the load balancing label and causes LDP and RSVP to advertise the entropy label TLV to neighboring routers.
multicast-replication	Configure the mode of multicast replication that helps to optimize multicast latency.
next-hop-group	Specify the next-hop address for sending copies of packets to an analyzer.
no-load-balance-label-capability	Disable advertisement of entropy label capability in LDP and RSVP.
port-mirroring	Specify the input, output, and traceoptions properties for sending copies of packets to an analyzer.
rpf-loose-mode-discard	Configure unicast reverse path forwarding (unicast RPF) loose mode with the ability to discard packets with the source address pointing to the discard next hop.

sampling	Configure traffic sampling.
storm-control-profiles	Configure a storm control profile on a switch or router. Storm control is used to prevent network outages that are caused by broadcast traffic storms.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

RELATED DOCUMENTATION

- Configuring Stateless IPv6 Router Advertisement Guard
- Configuring Stateful IPv6 Router Advertisement Guard
- Configuring Discard Accounting
- *Extended DHCP Relay Agent Overview*
- Configuring Symmetrical Load Balancing on an 802.3ad Link Aggregation Group on MX Series Routers
- Applying Forwarding Table Filters
- *Configuring VPLS Fast Reroute Priority*
- Configuring DNS and TFTP Packet Forwarding
- Configuring Port-based LAN Broadcast Packet Forwarding
- Configuring Per-Flow Load Balancing Based on Hash Values
- Configuring Per-Prefix Load Balancing
- Configuring the Entropy Label for LSPs
- Configuring Port Mirroring on M, T MX, ACX, and PTX Series Routers
- Understanding Unicast RPF (Routers)
- Configuring Traffic Sampling on MX, M and T Series Routers
- OBSOLETE: Understanding Storm Control for Managing Traffic Levels

general-param (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
general-param {
    all-fields;
    accounting-type;
    descr;
    line-id;
    logical-interface;
    nas-port-id;
    physical-interface;
    routing-instance;
    timestamp;
    user-name;
    vlan-id;
}
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name fields]
```

Description

Specify general, nonstatistical interface parameters that are displayed as part of the header for the accounting file.

Options

all-fields Display all available nonstatistical fields. Many fields are available for both logical interfaces and physical interfaces, but some fields are available for only one interface type.

accounting-type (Logical interfaces only) Display the accounting status type.

descr Display the description of the interface as configured.

line-id (Logical interfaces only) Display the access line identifier.

logical-interface (Logical interfaces only) Display the name of the logical interface.

nas-port-id (Logical interfaces only) Display the NAS port ID.

physical-interface (Physical interfaces only) Display the name of the physical interface.

routing-instance Display the name of the routing instance to which the interface belongs.

timestamp Display the timestamp of the accounting record.

user-name Display the name of the subscriber.

vlan-id (Logical interfaces only) Display the VLAN identifier.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

`user-name` option added in Junos OS Release 17.1.

RELATED DOCUMENTATION

- Configuring Flat-File Accounting for Layer 2 Wholesale | 162
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167
- Configuring Service Accounting in Local Flat Files | 172
- Flat-File Accounting Overview | 158

group (DHCP Local Server)

IN THIS SECTION

Syntax

```
group group-name {
    access-profile profile-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            client-id;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description  (device-interface | logical-interface);
            logical-system-name;
            mac-address;
            option-60;
            option-82 <circuit-id> <remote-id>;
            relay-agent-interface-id
```

```
            relay-agent-remote-id;
            relay-agent-subscriber-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    dynamic-profile profile-name <aggregate-clients (merge | replace) | use-primary primary-profile-
name>;
    interface interface-name {
        access-profile profile-name;
        exclude;
        overrides {
            asymmetric-lease-time seconds;
            asymmetric-prefix-lease-time seconds;
            client-discover-match <option60-and-option82>;
            client-negotiation-match incoming-interface;
            delay-advertise {
                based-on (option-15 | option-16 | option-18 | option-37) {
                    equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    not-equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    starts-with {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                }
                delay-time seconds;
            }
            delay-offer {
                based-on (option-60 | option-77 | option-82) {
                    equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    not-equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
```

```
                    }
                    starts-with {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                }
                delay-time seconds;
            }
            dual-stack dual-stack-group-name;
            interface-client-limit number;
            process-inform {
                pool pool-name;
            }
            rapid-commit;
        }
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
        trace;
        upto upto-interface-name;
    }
    interface-tag (DHCP Local Server);
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            bfd {
                version (0 | 1 | automatic);
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                multiplier number;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                detection-time {
                    threshold milliseconds;
                }
                session-mode(automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
```

```
            }
        }
    }
    overrides {
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match <option60-and-option82>;
        client-negotiation-match incoming-interface;
        delay-advertise {
            based-on (option-15 | option-16 | option-18 | option-37) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        delay-offer {
            based-on (option-60 | option-77 | option-82) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        delegated-pool;
```

```
        delete-binding-on-renegotiation;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        process-inform {
            pool pool-name;
        }
        protocol-attributes attribute-set-name;
        rapid-commit;
    }
    reconfigure {
        attempts attempt-count;
        clear-on-terminate;
        strict;
        timeout timeout-value;
        token token-value;
         trigger {
            radius-disconnect;
        }
    }
    route-suppression;
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
```

Hierarchy Level

```
[edit system services dhcp-local-server],
[edit system services dhcp-local-server dhcpv6],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server ...],
[edit logical-systems logical-system-name system services dhcp-local-server ...],
[edit routing-instances routing-instance-name system services dhcp-local-server ...]
```

Description

Configure a group of interfaces that have a common configuration, such as authentication parameters. A group must contain at least one interface.

Options

group-name	Name of the group.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

`interface-tag` option introduced in Junos OS Release 23.2R1

RELATED DOCUMENTATION

- *Understanding Differences Between Legacy DHCP and Extended DHCP*
- *Grouping Interfaces with Common DHCP Configurations*
- *Specifying Authentication Support*
- *Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces*
- DHCP Liveness Detection Using ARP and Neighbor Discovery Packets

group (DHCP Relay Agent)

IN THIS SECTION

Syntax

```
group group-name {
    access-profile profile-name;
    active-server-group server-group-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            client-id;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description  (device-interface | logical-interface);
            interface-name interface-name;
            logical-system-name;
            mac-address mac-address;
            relay-agent-interface-id;
            relay-agent-remote-id;
            relay-agent-subscriber-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    dynamic-profile profile-name {
        aggregate-clients (merge | replace);
        use-primary primary-profile-name;
    }
    forward-only {
        logical-system <current | default | logical-system-name>;
        routing-instance <current | default | routing-instance-name>;
    }
    interface interface-name {
        access-profile profile-name;
        exclude;
```

```
        liveness-detection {
            failure-action (clear-binding | clear-binding-if-interface-up | log-only);
            method {
                bfd {
                    version (0 | 1 | automatic);
                    minimum-interval milliseconds;
                    minimum-receive-interval milliseconds;
                    multiplier number;
                    no-adaptation;
                    transmit-interval {
                        minimum-interval milliseconds;
                        threshold milliseconds;
                    }
                    detection-time {
                        threshold milliseconds;
                    }
                    session-mode (automatic | multihop | singlehop);
                    holddown-interval milliseconds;
                }
            }
        }
        overrides {
            allow-no-end-option;
            allow-snooped-clients;
            always-write-giaddr;
            always-write-option-82;
            asymmetric-lease-time seconds;
            asymmetric-prefix-lease-time seconds;
            client-discover-match <option60-and-option82 | incoming-interface>;
            client-negotiation-match incoming-interface;
            delay-authentication;
            delete-binding-on-renegotiation;
            disable-relay;
            dual-stack dual-stack-group-name;
            interface-client-limit number;
            layer2-unicast-replies;
            no-allow-snooped-clients;
            no-bind-on-request;
            proxy-mode;
            relay-source
            replace-ip-source-with;
            send-release-on-delete;
            trust-option-82;
```

```
        }
        service-profile dynamic-profile-name;
        short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
        trace;
        upto upto-interface-name;
    }
    interface-tag (DHCP Relay Server)
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            bfd {
                version (0 | 1 | automatic);
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                multiplier number;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                detection-time {
                    threshold milliseconds;
                }
                session-mode (automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
            layer2-liveness-detection {
                max-consecutive-retries number;
                transmit-interval interval;
            }
        }
    }
    overrides {
        allow-snooped-clients;
        always-write-giaddr;
        always-write-option-82;
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match <option60-and-option82>;
        client-negotiation-match incoming-interface;
        disable-relay;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
```

```
        layer2-unicast-replies;
        no-allow-snooped-clients;
        no-bind-on-request;
        proxy-mode;
        relay-source
        replace-ip-source-with;
        send-release-on-delete;
        trust-option-82;
    }
    relay-agent-interface-id {
        include-irb-and-l2;
        keep-incoming-interface-id ;
        no-vlan-interface-name;
        prefix prefix;
        use-interface-description (logical | device);
        use-option-82 <strict>;
        use-vlan-id;
    }
    relay-agent-remote-id {
        include-irb-and-l2;
        keep-incoming-remote-id ;
        no-vlan-interface-name;
        prefix prefix;
        use-interface-description (logical | device);
        use-option-82 <strict>;
        use-vlan-id;
    }
    relay-option {
        option-number option-number;
        default-action {
            drop;
            forward-only;
            local-server-group local-server-group;
            relay-server-group relay-server-group;
        }
        equals (ascii ascii-string | hexadecimal hexadecimal-string) {
            drop;
            forward-only;
            local-server-group local-server-group;
            relay-server-group relay-server-group;
        }
        starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
            drop;
```

```
            forward-only;
            local-server-group local-server-group;
            relay-server-group relay-server-group;
        }
    }
    relay-option-82 {
        circuit-id {
            prefix prefix;
            use-interface-description (logical | device);
            use-option-82;
        }
        remote-id {
            prefix prefix;
            use-interface-description (logical | device);
        }
        server-id-override
    }
    remote-id-mismatch disconnect;
    route-suppression;
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay dhcpv6],
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]
```

Description

Specify the name of a group of interfaces that have a common DHCP or DHCPv6 relay agent configuration. A group must contain at least one interface. Use the statement at the `[edit ... dhcpv6]` hierarchy levels to configure DHCPv6 support.

Options

group-name Name of a group of interfaces that have a common DHCP or DHCPv6 relay agent configuration.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 8.3.

Support at the `[edit ... dhcpv6]` hierarchy levels introduced in Junos OS Release 11.4.

`interface-tag` option introduced in Junos OS Release 23.2R1

RELATED DOCUMENTATION

- *Extended DHCP Relay Agent Overview*
- Configuring DHCP Relay Agent
- *Configuring Group-Specific DHCP Relay Options*
- *Grouping Interfaces with Common DHCP Configurations*
- *Specifying Authentication Support*
- *Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces*
- DHCP Liveness Detection Using ARP and Neighbor Discovery Packets

ingress-stats (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
ingress-stats {
    all-fields;
    drop-packets;
    input-bytes;
    input-packets;
    output-bytes;
    output-packets;
    queue-id;
}
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name fields]
```

Description

Specify ingress queue statistics to be collected for the interface.

Options

all-fields	Collect all ingress queue statistics available for the interface context, logical or physical.
drop-packets	Collect the number of received packets dropped on the Ingress queue.
input-bytes	Collect the number of octets received on the queue for the traffic class indicated by the queue identifier.
input-packets	Collect the number of packets received on the queue for the traffic class indicated by the queue identifier.
output-bytes	Collect the number of octets forwarded for the traffic class indicated by the queue identifier. Same value as `input-bytes` unless oversubscription is present at the ingress.
output-packets	Collect the number of packets forwarded for the traffic class indicated by the queue identifier. Same value as `input-packets` unless oversubscription is present at the ingress.
queue-id	Collect the logical identifier for the ingress queue; identifies the traffic class.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring Flat-File Accounting for Layer 2 Wholesale | **162**

Configuring Flat-File Accounting for Extensible Subscriber Services Management | **167**

Flat-File Accounting Overview | **158**

inner-vlan-id (Dynamic VLANs)

IN THIS SECTION

Syntax

```
inner-vlan-id number;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number input-vlan-map],
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number output-vlan-map]
```

Description

For dynamic VLAN interfaces, specify the VLAN ID to rewrite for the inner tag of the final packet.

You cannot include the `inner-vlan-id` statement with the `swap` statement, `swap-push` statement, `push-push` statement, or `push-swap` statement and the `inner-vlan-id` statement at the `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number output-vlan-map]` hierarchy level. If you include any of those statements in the output VLAN map, the VLAN ID in the outgoing frame is rewritten to the `inner-vlan-id` statement you include at the `[edit interfaces interface-name unit logical-unit-number]` hierarchy level.

Options

number—VLAN ID number. When used for input VLAN maps, you can specify the `$junos-inner-vlan-map-id` predefined variable to dynamically obtain the VLAN identifier.

- **Range:** 0 through 4094

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.4.

RELATED DOCUMENTATION

Configuring Inner and Outer TPIDs and VLAN IDs

inner-vlan-id-swap-ranges

IN THIS SECTION

Syntax

```
inner-vlan-id-swap-ranges low-inner-tag-high-inner-tag;
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number]
```

Description

Define core-facing VLAN ID ranges from which an inner VLAN ID tag can be allocated to replace the outer VLAN tag that was appended by the access node on the upstream packets to the BNG in a Layer 2 wholesale network. The tag swap occurs before the subscriber traffic is forwarded to the network service provider (NSP). You can configure up to 32 non-overlapping inner VLAN ID ranges per core-facing physical interface for VLAN-OOB subscribers.

You can add or remove ranges or increase or decrease the size of existing ranges even while Layer 2 wholesale sessions are assigned to the core-facing interface associated with the ranges. You cannot remove a range from which a VLAN ID has already been allocated. You cannot reduce a range if the new range excludes a VLAN ID that has already been allocated.

Options

low-inner-tag Inner (core-facing) VLAN ID tag representing the lower limit of the swap range.

- **Range:** 1 through 4094.

high-inner-tag Inner (core-facing) VLAN ID tag representing the upper limit of the swap range.

- **Range:** 1 through 4094.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 17.2R1.

RELATED DOCUMENTATION

Configuring Multiple Non-Overlapping VLAN Ranges for Core-Facing Physical Interfaces | 155

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

input-vlan-map (Dynamic Interfaces)

IN THIS SECTION

Syntax

```
input-vlan-map {
    inner-tag-protocol-id tpid;
    inner-vlan-id number;
    (push | swap);
    tag-protocol-id tpid;
    vlan-id number;
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number]
```

Description

For dynamic interfaces, define the rewrite profile to be applied to incoming frames on this logical interface.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.4.

RELATED DOCUMENTATION

Stacking and Rewriting VLAN Tags for the Layer 2 Wholesale Solution | 102

instance-role

IN THIS SECTION

Syntax

```
instance-role (access | nni);
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit routing-instances routing-instance-name]
```

Description

Define the role of the routing instance in a Layer 2 Wholesale network.

Options

`access`—Defines the connectivity role of the routing instance in a Layer 2 Wholesale network as an access routing instance. When defined for this role, the same process occurs as in a Layer 3 Wholesale network—when the first packet is received from a given client, authentication for the client initiates with an external entity (for example, RADIUS). If authentication is successful, a logical interface is created with the appropriate outer and inner VLAN tags for that client.

`nni`—Defines the connectivity role of the routing instance in a Layer 2 Wholesale network as a network to network interface (NNI) routing instance. When defined for this role, only outer VLAN tags are learned. In addition, when the NNI routing instance receives a response from the ISP, the packets are forwarded to the appropriate client, provided the packet has the same two tags that were verified during authentication.

NOTE: If you connect an access node or MSAN device to a router participating in the Layer 2 Wholesale network in an NNI role, you must create a new routing instance of type `l2backhaul-vpn` with an instance role of type `access` for that connection.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 11.2.

RELATED DOCUMENTATION

- Configuring Separate Access Routing Instances for Layer 2 Wholesale Service Retailers | 112
- Configuring Separate NNI Routing Instances for Layer 2 Wholesale Service Retailers | 115
- *Subscriber Management Overview*

instance-type

IN THIS SECTION

Syntax

```
instance-type type;
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit routing-instances routing-instance-name]
```

Description

Define the type of routing instance.

CAUTION: We strongly recommend that if you change an `instance-type` referenced under a firewall filter, for example, from `virtual-router` to `forwarding`, make the change during a maintenance window, as follows:

1. Deactivate the routing instance.
2. Change the `instance-type`.
3. Activate the routing instance.

This is not required if you are configuring the `instance-type` for the first time.

Options

type—Can be one of the following:

- `evpn`—Enable an Ethernet VPN (EVPN) on the routing instance.
  - On Junos OS Evolved, `instance-type evpn` is not supported. You can configure an EVPN routing instance using `instance-type mac-vrf` with a routing protocol configuration of `protocols evpn`.

    ```
    set routing-instances $EVPN_INSTANCES$ instance-type mac-vrf protocols evpn
    ```

- `evpn-vpws`—Enable an Ethernet VPN (EVPN) Virtual Private Wire Service (VPWS) on the routing instance.
- `forwarding`—Provide support for filter-based forwarding, where interfaces are not associated with instances. All interfaces belong to the default instance. Other instances are used for populating RPD learned routes. For this instance type, there is no one-to-one mapping between an interface and a routing instance. All interfaces belong to the default instance inet.0.
- `l2backhaul-vpn`—Provide support for Layer 2 wholesale VLAN packets with no existing corresponding logical interface. When using this instance, the router learns both the outer tag and inner tag of the incoming packets, when the `instance-role` statement is defined as `access`, or the outer VLAN tag only, when the `instance-role` statement is defined as `nni`.
- `l2vpn`—Enable a Layer 2 VPN on the routing instance. You must configure the `interface`, `route-distinguisher`, `vrf-import`, and `vrf-export` statements for this type of routing instance.

- `layer2-control` —(MX Series routers only) Provide support for RSTP or MSTP in customer edge interfaces of a VPLS routing instance. This instance type cannot be used if the customer edge interface is multihomed to two provider edge interfaces. If the customer edge interface is multihomed to two provider edge interfaces, use the default BPDU tunneling.

- `mac-vrf`—Enable configuring multiple customer-specific EVPN instances (EVIs) of this type, each of which can support a different EVPN service type. You can have customer-specific virtual routing and forwarding (VRF) tables with MAC addresses on each Juniper Networks device that serves as a virtual tunnel endpoint (VTEP) in the EVPN-VXLAN network. See *mac-vrf* for more on this type of EVPN instance.

- `mpls-forwarding`—(MX Series routers only) Allow filtering and translation of route distinguisher (RD) values in IPv4 and IPv6 VPN address families on both routes received and routes sent for selected BGP sessions. In particular, for Inter-AS VPN Option-B networks, this option can prevent the malicious injection of VPN labels from one peer AS boundary router to another.

- `mpls-internet-multicast`—(EX Series, M Series, MX Series, and T Series routers only) Provide support for ingress replication provider tunnels to carry IP multicast data between routers through an MPLS cloud, using MBGP or next-generation MVPN.

- `no-forwarding`—This is the default routing instance. Do not create a corresponding forwarding instance. Use this routing instance type when a separation of routing table information is required. There is no corresponding forwarding table. All routes are installed into the default forwarding table. IS-IS instances are strictly nonforwarding instance types.

- `virtual-router`—Enable a virtual router routing instance. This instance type is similar to a VPN routing and forwarding instance type, but used for non-VPN-related applications. You must configure the `interface` statement for this type of routing instance. You do not need to configure the `route-distinguisher`, `vrf-import`, and `vrf-export` statements.

- `virtual-switch`—(Not supported on QFX5xxx switches running either Junos OS or Junos OS Evolved) Provide support for Layer 2 bridging. Use this routing instance type to isolate a LAN segment with its Spanning Tree Protocol (STP) instance and to separate its VLAN identifier space. We also support this routing instance type for EVPN instances.

  NOTE: When you want to configure EVPN protocol settings in a `virtual-switch` instance, you must do so at the same time you configure the `virtual-switch` instance. Otherwise the device has problems adding EVPN Type 2 (MAC-IP) route entries in the EVPN routing tables.

  If you need to update an existing `virtual-switch` instance in an active configuration to add EVPN protocol settings (`set … protocols evpn`), you must:

1. Deactivate the `virtual-switch` instance configuration.
2. Add the EVPN protocol statements to the `virtual-switch` instance configuration.
3. Reactivate the updated `virtual-switch` instance configuration with the EVPN protocol updates.

- `vpls`—Enable VPLS on the routing instance. Use this routing instance type for point-to-multipoint LAN implementations between a set of sites in a VPN. You must configure the `interface`, `route-distinguisher`, `vrf-import`, and `vrf-export` statements for this type of routing instance.
  - On Junos OS Evolved, `instance-type vpls` is not supported. You can configure a VPLS routing instance using `instance-type virtual-switch` with a routing protocol configuration of `protocols vpls`.

```
set routing-instances $VPLS_INSTANCE$ instance-type virtual-switch protocols vpls
```

- `vrf`—VPN routing and forwarding (VRF) instance. Provides support for Layer 3 VPNs, where interface routes for each instance go into the corresponding forwarding table only. Required to create a Layer 3 VPN. Create a VRF table (*instance-name*`.inet.0`) that contains the routes originating from and destined for a particular Layer 3 VPN. For this instance type, there is a one-to-one mapping between an interface and a routing instance. Each VRF instance corresponds with a forwarding table. Routes on an interface go into the corresponding forwarding table. You must configure the `interface`, `route-distinguisher`, `vrf-import`, and `vrf-export` statements for this type of routing instance.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

`virtual-switch` and `layer2-control` options introduced in Junos OS Release 8.4.

`mpls-internet-multicast` option introduced in Junos OS Release 11.1 for the EX Series, M Series, MX Series, and T Series.

`evpn` option introduced in Junos OS Release 13.2 for MX 3D Series routers.

`evpn` option introduced in Junos OS Release 17.3 for the QFX Series.

`forwarding` option introduced in Junos OS Release 14.2 for the PTX Series.

`mpls-forwarding` option introduced in Junos OS Release 16.1 for the MX Series.

`evpn-vpws` option introduced in Junos OS Release 17.1 for MX Series routers.

`mac-vrf` option introduced in Junos OS Release 20.4 and Junos OS Evolved Release 21.2R1.

Support for logical systems on MX Series routers added in Junos OS Release 17.4R1.

`evpn-vpws` option introduced in cRPD Release 20.3R1.

RELATED DOCUMENTATION

- *Configuring EVPN Routing Instances*
- *Configuring EVPN Routing Instances on EX9200 Switches*
- Configuring Virtual Router Routing Instances
- Example: Configuring Filter-Based Forwarding on the Source Address
- Example: Configuring Filter-Based Forwarding on Logical Systems
- *MAC-VRF Routing Instance Type Overview*

interface (DHCP Local Server)

IN THIS SECTION

Syntax

```
interface interface-name {
    access-profile profile-name;
    exclude;
    overrides {
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match <option60-and-option82 | incoming-interface>;
        client-negotiation-match  incoming-interface;
        delay-advertise {
            based-on (option-15 | option-16 | option-18 | option-37) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        delay-offer {
            based-on (option-60 | option-77 | option-82) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
```

```
            delay-time seconds;
        }
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        rapid-commit;
    }
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    trace;
    upto upto-interface-name;
}
```

Hierarchy Level

```
[edit system services dhcp-local-server group group-name],
[edit system services dhcp-local-server dhcpv6 group group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server ...],
[edit logical-systems logical-system-name system services dhcp-local-server ...],
[edit routing-instances routing-instance-name system services dhcp-local-server ...]
```

Description

Specify one or more interfaces, or a range of interfaces, that are within a specified group on which the DHCP local server is enabled. You can repeat the `interface interface-name` statement to specify multiple interfaces within a group, but you cannot specify the same interface in more than one group. Also, you cannot use an interface that is being used by the DHCP relay agent.

NOTE: DHCP values are supported in integrated routing and bridging (IRB) configurations. When you configure an IRB interface in a network that is using DHCP, the DHCP information (for example, authentication, address assignment, and so on) is propagated in the associated bridge domain. This enables the DHCP server to configure client IP addresses residing within the bridge domain. IRB currently supports only static DHCP configurations.

Options

`exclude`—Exclude an interface or a range of interfaces from the group. This option and the `overrides` option are mutually exclusive.

interface-name—Name of the interface. You can repeat this option multiple times.

upto-interface-name—Upper end of the range of interfaces; the lower end of the range is the interface-name entry. The interface device name of the *upto-interface-name* must be the same as the device name of the *interface-name*.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

Options `upto` and `exclude` introduced in Junos OS Release 9.1.

RELATED DOCUMENTATION

Understanding Differences Between Legacy DHCP and Extended DHCP

Grouping Interfaces with Common DHCP Configurations

Specifying Authentication Support

interface (DHCP Relay Agent)

IN THIS SECTION

Syntax

```
interface dhcp-interface-name {
    access-profile profile-name;
    exclude;
    overrides {
        allow-no-end-option
        allow-snooped-clients;
        always-write-giaddr;
        always-write-option-82;
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match <option60-and-option82 | incoming-interface>;
        client-negotiation-match incoming-interface;
        disable-relay;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        layer2-unicast-replies;
        no-allow-snooped-clients;
        proxy-mode;
        relay-source
        replace-ip-source-with;
        send-release-on-delete;
        trust-option-82;
    }
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    trace;
    upto upto-interface-name;
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay dhcpv6 group group-name],
[edit forwarding-options dhcp-relay group group-name],
```

```
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]
```

Description

Specify one or more interfaces, or a range of interfaces, that are within a specified group on which the DHCP or DHCPv6 relay agent is enabled. You can repeat the `interface` *`interface-name`* statement to specify multiple interfaces within a group, but you cannot specify the same interface in more than one group. Also, you cannot use an interface that is being used by the DHCP local server. Use the statement at the `[edit ... dhcpv6]` hierarchy levels to configure DHCPv6 support.

EX Series switches do not support DHCPv6.

NOTE: DHCP values are supported in integrated routing and bridging (IRB) configurations. When you configure an IRB interface in a network that is using DHCP, the DHCP information (for example, authentication, address assignment, and so on) is propagated in the associated bridge domain. This enables the DHCP server to configure client IP addresses residing within the bridge domain. IRB currently only supports static DHCP configurations. .

Options

`exclude`—Exclude an interface or a range of interfaces from the group. This option and the `overrides` option are mutually exclusive.

`interface-name`—Name of the interface. You can repeat this option multiple times.

`overrides`—Override the specified default configuration settings for the interface. The `overrides` statement is described separately.

`upto-interface-name`—Upper end of the range of interfaces; the lower end of the range is the interface-name entry. The interface device name of the *`upto-interface-name`* must be the same as the device name of the *`interface-name`*.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 8.3.

Options `upto` and `exclude` introduced in Junos OS Release 9.1.

Support at the `[edit ... dhcpv6]` hierarchy levels introduced in Junos OS Release 11.4.

RELATED DOCUMENTATION

Extended DHCP Relay Agent Overview

Grouping Interfaces with Common DHCP Configurations

Specifying Authentication Support

interface (Dynamic Routing Instances)

IN THIS SECTION

Syntax

```
interface interface-name;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name routing-instances routing-instance-name]
```

Description

Assign the specified interface to the dynamically created routing instance.

Options

interface-name—The interface name variable (*$junos-interface-name*). The interface name variable is dynamically replaced with the interface the accessing client uses when connecting to the router.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.6.

interface (Routing Instances)

IN THIS SECTION

Syntax

```
interface interface-name {
    description text;
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit routing-instances routing-instance-name]
```

Description

Specify the interface over which the VPN traffic travels between the PE device and CE device. You configure the interface on the PE device. If the value `vrf` is specified for the `instance-type` statement included in the routing instance configuration, this statement is required.

Options

interface-name—Name of the interface.

The remaining statement is explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

RELATED DOCUMENTATION

> *Configuring EVPN Routing Instances*
>
> *Configuring EVPN Routing Instances on EX9200 Switches*

interface (VPLS Routing Instances)

interface-mac-limit (VPLS)

IN THIS SECTION

Syntax

```
interface-mac-limit limit {
    packet-action drop;
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols vpls
site site-name interfaces interface-name],
[edit routing-instances routing-instance-name protocols evpn],
[edit routing-instances routing-instance-name protocols evpn interface interface-name],
[edit routing-instances routing-instance-name protocols vpls site site-name interfaces interface-
name]
```

Description

Specify the maximum number of media access control (MAC) addresses that can be learned by the EVPN or VPLS routing instance. You can configure the same limit for all interfaces configured for a routing instance. You can also configure a limit for a specific interface.

Starting with Junos OS Release 12.3R4, if you do not configure the parameter to limit the number of MAC addresses to be learned by a VPLS instance, the default value is not effective. Instead, if you do not include the `interface-mac-limit` option at the `[edit logical-systems` *`logical-system-name`* `routing-instances` *`routing-instance-name`* `protocols vpls site` *`site-name`* `interfaces` *`interface-name`*`]`, hierarchy level, this setting is not present in the configuration with the default value of 1024 addresses. If you upgrade a router running a Junos OS release earlier than Release 12.3R4 to Release 12.3R4 or later, you must configure the `interface-mac-limit` option with a valid value for it to be saved in the configuration.

Options

`limit`—Number of MAC addresses that can be learned from each interface.

- **Range:** 1 through 131,071 MAC addresses

  NOTE: For M120 devices only, the range is 16 through 65,536 MAC addresses.

- **Default:** 1024 addresses

The remaining statement is explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

Support for EVPNs introduced in Junos OS Release 13.2 on MX 3D Series routers.

Support for EVPNs introduced in Junos OS Release 14.2 on EX Series switches.

RELATED DOCUMENTATION

- *Configuring EVPN Routing Instances*
- *Configuring EVPN Routing Instances on EX9200 Switches*
- *Limiting the Number of MAC Addresses Learned from an Interface*
- *interface*
- *mac-table-size*

interfaces (Static and Dynamic Subscribers)

IN THIS SECTION

Syntax

```
interfaces {
    interface-name {
        unit logical-unit-number {
            actual-transit-statistics;
            auto-configure {
                agent-circuit-identifier {
                    dynamic-profile profile-name;
                }
                line-identity {
                    include {
                        accept-no-ids;
                        circuit-id;
                        remote-id;
```

```
                }
                dynamic-profile profile-name;
            }
        }
        family family {
            access-concentrator name;
            address address;
            direct-connect;
            duplicate-protection;
            dynamic-profile profile-name;
            filter {
                adf {
                    counter;
                    input-precedence precedence;
                    not-mandatory;
                    output-precedence precedence;
                    rule rule-value;
                }
                input filter-name {
                    precedence precedence;
                    shared-name  filter-shared-name;
                }
                output filter-name {
                    precedence precedence;
                    shared-name  filter-shared-name;
                }
            }
            max-sessions number;
            max-sessions-vsa-ignore;
            rpf-check {
                mode loose;
            }
            service {
                 input {
                     service-set service-set-name {
                         service-filter filter-name;
                    }
                    post-service-filter filter-name;
                }
                output {
                     service-set service-set-name {
                         service-filter filter-name;
                    }
```

```
                    }
                }
                service-name-table table-name
                short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max maximum-
seconds>;
                unnumbered-address interface-name <preferred-source-address address>;
            }
            filter {
                input filter-name (
                    precedence precedence;
                    shared-name  filter-shared-name;
                }
                output filter-name {
                    precedence precedence;
                    shared-name  filter-shared-name;
                }
            }
            host-prefix-only;
            ppp-options {
                chap;
                pap;
            }
            proxy-arp;
            service {
                pcef  pcef-profile-name {
                    activate rule-name | activate-all;
                }
            }
            targeted-options {
                backup backup;
                group group;
                primary primary;
                weight ($junos-interface-target-weight | weight-value);
            }
            vlan-id;
            vlan-tags outer [tpid].vlan-id [inner [tpid].vlan-id];
        }
        vlan-tagging;
    }
    interface-set interface-set-name {
        interface interface-name {
            unit logical unit number {
                advisory-options {
```

```
                    downstream-rate rate;
                    upstream-rate rate;
                }
            }
        }
        pppoe-underlying-options {
            max-sessions number;
        }
    }
    demux0 {
        unit logical-unit-number {
            demux-options {
                underlying-interface interface-name
            }
            family family {
                access-concentrator name;
                address address;
                direct-connect;
                duplicate-protection;
                dynamic-profile profile-name;
                demux-source {
                    source-prefix;
                }
                filter {
                    input filter-name (
                        precedence precedence;
                        shared-name filter-shared-name;
                    }
                    output filter-name {
                        precedence precedence;
                        shared-name filter-shared-name;
                    }
                }
                mac-validate (loose | strict):
                max-sessions number;
                max-sessions-vsa-ignore;
                rpf-check {
                    fail-filter filter-name;
                    mode loose;
                }
                service-name-table table-name
                short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max maximum-
seconds>;
```

```
                unnumbered-address interface-name <preferred-source-address address>;
            }
            filter {
                input filter-name;
                output filter-name;
            }
            vlan-id number;
            vlan-tags outer [tpid].vlan-id [inner [tpid].vlan-id];
        }
    }
    pp0 {
        unit logical-unit-number {
            keepalives interval seconds;
            no-keepalives;
            pppoe-options {
                underlying-interface interface-name;
                server;
            }
            ppp-options {
                aaa-options aaa-options-name;
                authentication [ authentication-protocols ];
                chap {
                    challenge-length minimum minimum-length maximum maximum-length;
                    local-name name;
                }
                ignore-magic-number-mismatch;
                initiate-ncp (dual-stack-passive | ipv6 | ip)
                ipcp-suggest-dns-option;
                mru size;
                mtu (size | use-lower-layer);
                on-demand-ip-address;
                pap;
                peer-ip-address-optional;
                local-authentication {
                    password password;
                    username-include {
                        circuit-id;
                        delimiter character;
                        domain-name name;
                        mac-address;
                        remote-id;
                    }
                }
```

```
            }
            family inet {
                unnumbered-address interface-name;
                address address;
                service {
                    input {
                        service-set service-set-name {
                            service-filter filter-name;
                        }
                        post-service-filter filter-name;
                    }
                    output {
                        service-set service-set-name {
                            service-filter filter-name;
                        }
                    }
                }
                filter {
                    input filter-name {
                        precedence precedence;
                        shared-name filter-shared-name;
                    }
                    output filter-name {
                        precedence precedence;
                        shared-name filter-shared-name;
                    }
                }
            }
        }
    }
    stacked-interface-set {
        interface-set-name interface-set-name {
            interface-set-name interface-set-name;
        }
    }
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name]
```

Description

Define interfaces for dynamic client profiles.

Options

interface-name—The interface variable (`$junos-interface-ifd-name`). The interface variable is dynamically replaced with the interface the DHCP client accesses when connecting to the router.

> **NOTE**: Though we do not recommend it, you can also enter the specific name of the interface you want to assign to the dynamic profile.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.2.

RELATED DOCUMENTATION

- *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles*
- *Configuring Dynamic PPPoE Subscriber Interfaces*
- *Configuring Dynamic VLANs Based on Agent Circuit Identifier Information*
- *DHCP Subscriber Interface Overview*
- *Subscribers over Static Interfaces Configuration Overview*
- Demultiplexing Interface Overview

interval (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
interval minutes;
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name]
```

Description

Specify the interval in minutes at which the Packet Forwarding Engine associated with the interface is polled to collect the statistics specified in the flat-file accounting profile. These interim accounting results are recorded in the flat file.

NOTE: The value configured with this statement is superseded by the value configured with the *update-interval* statement at the `[edit access profile profile-name service accounting]` hierarchy level. That access profile interval value is in turn superseded by an update interval value configured in the RADIUS attribute, Service-Interim-Acct-Interval (VSA 26–140).

Options

minutes Polling interval.

- **Range:** 1 through 2880 minutes
- **Default:** 15 minutes

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring Flat-File Accounting for Layer 2 Wholesale | **162**

Configuring Flat-File Accounting for Extensible Subscriber Services Management | **167**

Configuring Service Accounting in Local Flat Files | **172**

Flat-File Accounting Overview | **158**

ip-address-first

IN THIS SECTION

Syntax

```
ip-address-first;
```

Hierarchy Level

```
[edit logical-systems logical-system-name system services dhcp-local-server pool-match-order],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server pool-match-order],
[edit routing-instances routing-instance-name system services dhcp-local-server pool-match-order],
[edit system services dhcp-local-server pool-match-order]
```

Description

Configure the extended DHCP local server to use the IP address method to determine which address-assignment pool to use. The local server uses the IP address in the gateway IP address if one is present in the DHCP client PDU. If no gateway IP address is present, the local server uses the IP address of the receiving interface to find the address-assignment pool. The DHCP local server uses this method by default when no method is explicitly specified.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

RELATED DOCUMENTATION

- *Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use*
- *Understanding Differences Between Legacy DHCP and Extended DHCP*
- *Address-Assignment Pools Overview*

keepalives (Dynamic Profiles)

IN THIS SECTION

Syntax

```
keepalives {
    interval seconds;
    }
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces pp0 unit logical-unit-number ]
[edit dynamic-profiles profile-name interfaces pp0 unit “$junos-interface-unit”]
[edit dynamic-profiles profile-name interfaces "$junos-interface-ifd-name" unit “$junos-
interface-unit”]
```

Description

Specify the keepalive interval in a PPP dynamic profile.

Starting in Junos OS Release 15.1R5, you can configure the PPP keepalive interval for subscriber services in the range 1 second through 600 seconds. Subscriber PPP keepalives are handled by the Packet Forwarding Engine. If you configure a value greater than 600 seconds, the number is accepted by the CLI, but the Packet Forwarding Engine limits the interval to 600 seconds.

In earlier Junos OS releases, the range is from 1 second through 60 seconds. The Packet Forwarding Engine limits any higher configured value to an interval of 60 seconds.

PPP keepalives for nonsubscriber services are handled by the Routing Engine with an interval range from 1 second through 32,767 seconds.

Default

Sending of keepalives is enabled by default.

Options

`interval` *`seconds`*—The time in seconds between successive keepalive requests.

- **Range:** 1 through 600 seconds for subscriber services
- **Range:** 1 through 32767 seconds for nonsubscriber services
- **Default:** 30 seconds for LNS-based PPP sessions. 10 seconds for all other PPP sessions.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

Support at the `[edit dynamic-profiles` *`profile-name`* `interfaces pp0 unit “$junos-interface-unit”]` hierarchy level introduced in Junos OS Release 10.1.

Support at the `[edit dynamic-profiles` *`profile-name`* `interfaces "$junos-interface-ifd-name" unit “$junos-interface-unit”]` hierarchy level introduced in Junos OS Release 12.2.

RELATED DOCUMENTATION

> *Dynamic Profiles Overview*
>
> *Configuring Dynamic Authentication for PPP Subscribers*
>
> *Applying PPP Attributes to L2TP LNS Subscribers per Inline Service Interface*

l2-stats (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
l2-stats {
    all-fields;
    input-mcast-bytes;
    input-mcast-packets;
}
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name fields]
```

Description

Specify the statistics to collect for the named flat-file-profile field.

Options

`all-fields`—Collect all Layer 2 statistics for the named flat-file profile.

`input-mcast-bytes`—Collect multicast bytes from the input side for the named flat-file profile.

`input-mcast-packets`—Collect multicast packets from the input side for the named flat-file profile.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

- Configuring Flat-File Accounting for Layer 2 Wholesale | 162
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167
- Flat-File Accounting Overview | 158

mac-validate (Dynamic IP Demux Interface)

IN THIS SECTION

Syntax

```
mac-validate (loose | strict);
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces demux0 unit logical-unit-number family inet]
```

Description

Enable IP and MAC address validation for dynamic IP demux interfaces in a dynamic profile.

Options

`loose`—Forwards incoming packets when both the IP source address and the MAC source address match one of the trusted address tuples. Drops packets when the IP source address matches one of the trusted tuples, but the MAC address does not match the MAC address of the tuple. Continues to forward incoming packets when the source address of the incoming packet does not match any of the trusted IP addresses.

`strict`—Forwards incoming packets when both the IP source address and the MAC source address match one of the trusted address tuples. Drops packets when the MAC address does not match the tuple's MAC source address, or when IP source address of the incoming packet does not match any of the trusted IP addresses.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.3.

RELATED DOCUMENTATION

Configuring MAC Address Validation for Subscriber Interfaces

multicast-replication

IN THIS SECTION

Syntax

```
multicast-replication {
    evpn {
        irb (local-only | local-remote | oism);
        smet-nexthop-limit smet-nexthop-limit;
    }
    ingress;
    local-latency-fairness;
}
```

Hierarchy Level

```
[edit forwarding-options]
```

Description

Configure the mode of multicast replication that helps to optimize multicast latency.

NOTE: The `multicast-replication` statement is supported only on platforms with the `enhanced-ip` mode enabled.

Default

This statement is disabled by default.

Options

NOTE: The `ingress` and the `local-latency-fairness` options do not apply to EVPN configurations.

ingress Complete ingress replication of the multicast data packets where all the egress Packet Forwarding Engines receive packets from the ingress Packet Forwarding Engines directly.

local-latency-fairness Complete parallel replication of the multicast data packets.

evpn irb local-only | local-remote | oism Enable inter-VLAN multicast forwarding in an EVPN-VXLAN network in one of these modes:

- `evpn irb local-only`—Use this mode with a collapsed IP fabric, also known as an *edge-routed bridging overlay*. In this mode, the PFE on the leaf devices in the fabric performs local multicast routing at the fabric edge. The spine devices, also called *lean spines*, primarily act as IP transit devices for the fabric.

- `evpn irb local-remote`—Use this mode with a two-layer IP fabric, also known as a *centrally-routed bridging overlay*. In this mode, the spine devices in the fabric centrally route the multicast traffic between VLANS. The spine devices forward the routed VLAN traffic into the EVPN core toward interested receivers. The spine devices use a PIM designated router (DR) to avoid duplicating packets into the core. The leaf devices forward multicast traffic received on a VLAN to their receivers on that VLAN.

- `evpn irb oism`—Use this mode with a collapsed IP fabric (edge-routed bridging overlay) to also support routing multicast traffic between the fabric and external devices. This mode implements *optimized inter-subnet multicast* (OISM) according to the IETF draft https://tools.ietf.org/html/draft-ietf-bess-evpn-irb-mcast-04. In this mode, the

leaf devices operate in local-remote mode like in a centrally-routed bridging overlay design. At the same time, the device performs local multicast routing.

OISM also supports:

- Selective forwarding on the source VLAN.
- Routing multicast traffic through an external PIM domain.

Default mode: `evpn irb local-remote`

You can enable only one of these modes at a time.

> **NOTE**: Only `local-remote` and `oism` modes support selective multicast (SMET) forwarding.

`smet-nexthop-limit` *`smet-nexthop-limit`*

Configures a limit for the number of SMET next hops for selective multicast forwarding. A PE device uses the SMET next hops list of outgoing interfaces to selectively replicate and forward multicast traffic. When the list of SMET next hops reaches this limit, the PE device stops adding new SMET next hops. At that point, the PE device sends new multicast group traffic to all egress devices.

- **Range:** 10,000 through 40,000
- **Default:** 10,000

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 15.1.

`evpn` stanza introduced in Junos OS Release 17.3R3 for QFX Series switches.

`oism` option in `evpn irb stanza` introduced in Junos OS Release 21.2R1.

RELATED DOCUMENTATION

forwarding-options | 357

IPv4 Inter-VLAN Multicast Forwarding Modes for EVPN-VXLAN Overlay Networks

Optimized Inter-Subnet Multicast in EVPN Networks

neighbor (Define ANCP)

IN THIS SECTION

Syntax

```
neighbor ip-address {
    adjacency-loss-hold-time seconds;
    adjacency-timer;
    auto-configure-trigger interface interface-name;
    ietf-mode;
    maximum-discovery-table-entries entry-number;
    pre-ietf-mode;
}
```

Hierarchy Level

```
[edit protocols ancp]
```

Description

Configure an ANCP neighbor with which the ANCP agent on the router forms an adjacency for reporting and shaping traffic.

Options

ip-address—IP address of the ANCP neighbor.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.4.

RELATED DOCUMENTATION

Configuring the ANCP Agent

Configuring ANCP Neighbors

no-local-switching

IN THIS SECTION

Syntax

```
no-local-switching
```

Hierarchy Level

```
[edit vlans vlan-name]
```

Description

Specify that access ports in this VLAN domain do not forward packets to each other. You use this statement with primary VLANs and isolated secondary VLANs. You can also disable local switching on both customer edge (CE) and VPLS edge (VE) mesh-groups. Access and core-facing interfaces are included in the system-generated CE mesh-group and VE mesh-group, respectively. Traffic originating on access interfaces, including EVPN tunnel traffic, will be flooded only to core-facing interfaces. Traffic originating on core-facing interfaces, including EVPN tunnel traffic, will be flooded only to access interfaces.

NOTE: (MX80, MX104, and the 16x10GE MPC, MPC1, or MPC2 on MX240, MX480, MX960, MX2010, and MX2020 only) If you configure the `no-local-switching` command at the `[edit bridge-domains bridge-domain-name]` hierarchy level, it might not prevent multicast traffic from being forwarded between the CE-facing interfaces of the bridge domain. Broadcast, unknown unicast, and known multicast traffic does not exhibit this behavior.

Required Privilege Level

system—To view this statement in the configuration.

system–control—To add this statement to the configuration.

routing—To view this statement in the configuration.

routing–control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.3.

Support for EVPN-MPLS on PTX Series routers added in Junos OS Evolved Release 23.1R1.

RELATED DOCUMENTATION

- Creating a Private VLAN on a Single QFX Switch
- Creating a Private VLAN Spanning Multiple QFX Series Switches

no-tunnel-services

IN THIS SECTION

Syntax

```
no-tunnel-services;
```

Hierarchy Level

```
[edit logical-systems logical-system-name protocols vpls static-vpls],
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols
vpls],
[edit protocols vpls static-vpls],
[edit routing-instances routing-instance-name protocols vpls]
```

Description

Configure VPLS on a router without a Tunnel Services PIC. Configuring the `no-tunnel-services` statement creates a label-switched interface (LSI) to provide VPLS functionality. An LSI MPLS label is used as the inner label for VPLS. This label maps to a VPLS routing instance. On the PE router, the LSI label is

stripped and then mapped to a logical LSI interface. The Layer 2 Ethernet frame is then forwarded using the LSI interface to the correct VPLS routing instance.

NOTE: In VPLS documentation, the word *Router* in terms such as *PR Router* is used to refer to any device that provides routing functions.

NOTE:
On MX Series routers, label-switched interfaces configured with the `no-tunnel-services` statement are not supported with GRE tunnels when the GRE interface resides on a DPC.

NOTE: Although visible in the CLI, the `no-tunnel-services` statement is not supported on DPC cards at the `[edit logical-systems logical-system-name protocols vpls static-vpls]` and the `[edit logical-systems logical-system-name routing-instances routing-instance-name protocols vpls]` hierarchy levels.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 7.6.

Support for static VPLS added in Junos OS Release 10.2.

RELATED DOCUMENTATION

- *Configuring VPLS Without a Tunnel Services PIC*
- *Configuring Static Pseudowires for VPLS*
- *Configuring EXP-Based Traffic Classification for VPLS*

overall-packet (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
overall-packet {
    all-fields;
    input-bytes;
    input-discards;
    input-errors;
    input-packets;
    inputv6-bytes;
    inputv6-packets;
    output-bytes;
    output-errors;
    output-packets;
    outputv6-bytes;
    outputv6-packets;
    input-v4-bytes;
    input-v4-packets;
    output-v4-bytes;
    output-v4-packets;
    input-bytes-per-sec;
    input-packets-per-sec;
}
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name fields]
```

Description

Specify overall packet statistics to be collected for the interface.

Options

all-fields	Collect all overall packet statistics available for the interface context, logical or physical.
input-bytes	Collect the number of octets received on the interface.
input-discards	(Physical interfaces only) Collect the number of received packets that were discarded on the interface.
input-errors	(Physical interfaces only) Collect the number of frames with errors received on the interface.
input-packets	Collect the number of packets received on the interface.
input-v6-bytes	Collect the number of IPv6 octets received on the interface.
input-v6-packets	Collect the number of IPv6 packets received on the interface.
output-bytes	Collect the number of octets transmitted on the interface.
output-errors	(Physical interfaces only) Collect the number of frames that could not be transmitted on the interface because of errors.
output-packets	Collect the number of packets transmitted on the interface.
output-v6-bytes	Collect the number of IPv6 octets transmitted on the interface.
output-v6-packets	Collect the number of IPv6 packets transmitted on the interface.
input-v4-bytes	Collect the number of IPv4 octets received on the interface.
input-v4-packets	Collect the number of IPv4 packets received on the interface.
output-v4-bytes	Collect the number of IPv4 octets transmitted on the interface.

output-v4-packets	Collect the number of IPv4 packets transmitted on the interface.
input-bytes-per-sec	Collect the total number of bytes received per second.
input-packets-per-sec	Collect the total number of packets received per second.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

- Configuring Flat-File Accounting for Layer 2 Wholesale | **162**
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | **167**
- Flat-File Accounting Overview | **158**

output-vlan-map (Dynamic Interfaces)

IN THIS SECTION

Syntax

```
output-vlan-map {
    inner-tag-protocol-id tpid;
    inner-vlan-id number;
    (pop | swap);
    tag-protocol-id tpid;
    vlan-id number;
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number]
```

Description

For dynamic interfaces, define the rewrite profile to be applied to outgoing frames on this logical interface.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.4.

RELATED DOCUMENTATION

Stacking and Rewriting VLAN Tags for the Layer 2 Wholesale Solution | 102

pap (Dynamic PPP)

IN THIS SECTION

Syntax

```
pap;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces pp0 unit “$junos-interface-unit” ppp-options],
[edit dynamic-profiles profile-name interfaces "$junos-interface-ifd-name" unit “$junos-
interface-unit” ppp-options]
```

Description

Specify PAP authentication in a PPP dynamic profile.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

Support at the [edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit “$junos-interface-unit” ppp-options] hierarchy level introduced in Junos OS Release 12.2.

RELATED DOCUMENTATION

- *Dynamic Profiles Overview*
- *Configuring Dynamic Authentication for PPP Subscribers*
- *Attaching Dynamic Profiles to Static PPP Subscriber Interfaces*
- *Applying PPP Attributes to L2TP LNS Subscribers per Inline Service Interface*

pool (Address-Assignment Pools)

IN THIS SECTION

Syntax

```
pool pool-name {
    active-drain;
    family family {
        dhcp-attributes {
            [ protocol-specific attributes ]
        }
        excluded-address ip-address;
        excluded-range name low minimum-value high maximum-value;
        host hostname {
            hardware-address mac-address;
```

```
            ip-address ip-address;
        }
        network ip-prefixprefix-length>;
        prefix ipv6-prefix;
        range range-name {
            high upper-limit;
            low lower-limit;
            prefix-length prefix-length;
        }
    }
    hold-down;
    link pool-name;
}
```

Hierarchy Level

```
[edit access address-assignment]
[edit routing-instances routing-instances-name access address-assignment]
```

Description

Configure the name of an address-assignment pool.

NOTE: Subordinate statement support depends on the platform. See individual statement topics for more detailed support information.

Options

pool-name	Name assigned to the address-assignment pool.
active-drain	Configure the DHCP local server to stop allocating addresses from this pool. When this is configured, the DHCP local server gracefully shifts clients from this address pool to an alternative pool for which active drain is not configured. When existing clients with an address from this pool submit a DHCPv4 request or DHCPv6 renew, they receive a NAK, forcing them to renegotiate. The server responds with a DHCPv4 offer or DHCPv6 advertise message with an address from a different pool.
family	Configure the protocol family for the address-assignment pool.

The options for this statement are explained separately. Click the linked statement for details.

hold-down Configure an address-assignment pool that is currently in use to be unavailable for further address allocation. When a pool is in the hold-down state, the pool is no longer used to allocate IP addresses for subscribers. Current subscribers who previously obtained an address from the pool are not affected; they can continue to renew their leases. As each of these users disconnects, their address is not reallocated. The pool becomes inactive when all subscribers have disconnected and their addresses are returned to the pool.

link Designate a secondary address-assignment pool that is linked to the pool being configured. When the pool being configured has no addresses available for allocation, the secondary pool can be searched for a free address. You can configure a chain of linked pools, but you cannot directly link more than one pool to or from any other pool. Each linked pool in the chain serves as a backup pool for the pool immediately before it in the chain.

- **Values:** *pool-name*—Name assigned to the secondary address-assignment pool.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

Support at the `[edit routing-instances routing-instances-name access address-assignment]` hierarchy level at tenant system level introduced in Junos OS Release 20.2R1.

RELATED DOCUMENTATION

Address-Assignment Pools for Subscriber Management

DHCP Client Attribute and Address Assignment

pool-match-order

IN THIS SECTION

Syntax

```
pool-match-order {
    external-authority;
    ip-address-first;
    option-82;
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server],
[edit logical-systems logical-system-name system services dhcp-local-server],
[edit routing-instances routing-instance-name system services dhcp-local-server],
[edit system services dhcp-local-server]
```

Description

Configure the order in which the DHCP local server uses information in the DHCP client PDU to determine how to obtain an address for the client.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Default

DHCP local server uses the `ip-address-first` method to determine which address pool to use.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

RELATED DOCUMENTATION

> *Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use*
>
> *Understanding Differences Between Legacy DHCP and Extended DHCP*

pop (Dynamic VLANs)

IN THIS SECTION

Syntax

```
pop;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number output-vlan-map]
```

Description

For dynamic VLAN interfaces, specify the VLAN rewrite operation to remove a VLAN tag from the top of the VLAN tag stack. The outer VLAN tag of the frame is removed.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.4.

RELATED DOCUMENTATION

Removing a VLAN Tag

Stacking and Rewriting VLAN Tags for the Layer 2 Wholesale Solution | 102

pppoe-options (Dynamic PPPoE)

IN THIS SECTION

Syntax

```
pppoe-options {
    underlying-interface interface-name;
    server;
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces pp0 unit “$junos-interface-unit”]
```

Description

Configure the underlying interface and PPPoE server mode for a dynamic PPPoE logical interface in a dynamic profile.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.1.

RELATED DOCUMENTATION

> *Configuring a PPPoE Dynamic Profile*
>
> *Configuring Dynamic PPPoE Subscriber Interfaces*

pppoe-underlying-options (Static and Dynamic Subscribers)

IN THIS SECTION

Syntax

```
pppoe-underlying-options {
    access-concentrator name;
    dynamic-profile profile-name;
    direct-connect
    duplicate-protection;
    max-sessions number;
    max-sessions-vsa-ignore;
    service-name-table table-name;
    short-cycle-protection <lockout-time-min minimum-seconds> <lockout-time-max maximum-seconds>
<filter [aci]>;
}
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]
```

Description

Configure PPPoE-specific interface properties for the underlying interface on which the router creates a static or dynamic PPPoE logical interface. The underlying interface must be configured with PPPoE (ppp-over-ether) encapsulation.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.0.

RELATED DOCUMENTATION

Configuring PPPoE

Configuring an Underlying Interface for Dynamic PPPoE Subscriber Interfaces

Assigning a Service Name Table to a PPPoE Underlying Interface

ppp-options (Dynamic PPP)

IN THIS SECTION

Syntax

```
ppp-options {
    aaa-options aaa-options-name;
    authentication [ authentication-protocols ];
    chap {
        challenge-length minimum minimum-length maximum maximum-length;
        local-name name;
    }
    ignore-magic-number-mismatch;
    initiate-ncp (dual-stack-passive | ipv6 | ip)
    ipcp-suggest-dns-option;
    lcp-connection-update;
    mru size;
    mtu (size | use-lower-layer);
    on-demand-ip-address;
    pap;
    peer-ip-address-optional;
    local-authentication {
        password password;
        username-include {
            circuit-id;
            delimiter character;
            domain-name name;
            mac-address;
            remote-id;
        }
    }
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces "$junos-interface-ifd-name" unit “$junos-
interface-unit”].
[edit dynamic-profiles profile-name interfaces pp0 unit “$junos-interface-unit”]
```

Description

Configure PPP-specific interface properties in a dynamic profile.

NOTE: PPP options can also be configured in a group profile with the `ppp-options (L2TP)` statement. The following behavior determines the interaction between the PPP options configured in a group profile and the PPP options configured in a dynamic profile:

- When PPP options are configured only in the group profile, the group profile options are applied to the subscriber.
- When PPP options are configured in both a group profile and a dynamic profile, the dynamic profile configuration takes complete precedence over the group profile when the dynamic profile includes one or more of the PPP options that can be configured in the group profile. Complete precedence means that there is no merging of options between the profiles. The group profile is applied to the subscriber only when the dynamic profile does not include any PPP option available in the group profile.

Options

lcp-connection-update

Enable PPP to act on a Connection-Status-Message VSA (26–218) received by authd in either a RADIUS Access-Accept message or a CoA message. PPP conveys the contents of the VSA in an LCP Connection-Update-Request message to the remote peer, such as a home gateway. This action requires the following to be true:

- At least the first address family has been successfully negotiated and the session is active.
- The router LCP is in the Opened state.

Otherwise PPP takes no action on the VSA. If you do not enable the `lcp-connection-update` option, PPP processes the notification from authd, but takes no action.

- **Default:** Disabled

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

Support at the `[edit dynamic-profiles profile-name interfaces "$junos-interface-ifd-name" unit “$junos-interface-unit”]` hierarchy level introduced in Junos OS Release 12.2.

`lcp-connection-update` option added in Junos OS Release 20.2R1.

RELATED DOCUMENTATION

- *Dynamic Profiles Overview*
- *Configuring a PPPoE Dynamic Profile*
- *Configuring Dynamic Authentication for PPP Subscribers*
- *Attaching Dynamic Profiles to Static PPP Subscriber Interfaces*
- *Applying PPP Attributes to L2TP LNS Subscribers per Inline Service Interface*
- *How to Configure RADIUS-Sourced Connection Status Updates to CPE Devices*

prefix (Address-Assignment Pools)

IN THIS SECTION

Syntax

```
prefix ipv6-prefix;
```

Hierarchy Level

```
[edit access address-assignment pool pool-name family inet6]
```

Description

Specify the IPv6 prefix for the IPv6 address-assignment pool. This statement is mandatory for IPv6 address-assignment pools.

Options

ipv6-prefix—The IPv6 prefix.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.0.

RELATED DOCUMENTATION

Address-Assignment Pools Overview

Address-Assignment Pool Configuration Overview

profile (Access)

IN THIS SECTION

Syntax

```
profile profile-name {
    accounting {
        address-change-immediate-update
        accounting-stop-on-access-deny;
        accounting-stop-on-failure;
        ancp-speed-change-immediate-update;
        coa-immediate-update;
        coa-no-override service-class-attribute;
        duplication;
        duplication-filter;
        duplication-vrf {
            access-profile-name profile-name;
            vrf-name vrf-name;
        }
        immediate-update;
        order [ accounting-method ];
        send-acct-status-on-config-change;
        statistics (time | volume-time);
        update-interval minutes;
        wait-for-acct-on-ack;
    }
    accounting-order (radius | [accounting-order-data-list]);
    authentication-order [ authentication-methods ];
    client client-name {
        chap-secret chap-secret;
        group-profile profile-name;
        ike {
            allowed-proxy-pair {
                remote remote-proxy-address local local-proxy-address;
            }
            pre-shared-key (ascii-text character-string | hexadecimal hexadecimal-digits);
```

```
            ike-policy policy-name;
            interface-id string-value;
        }
        l2tp {
            aaa-access-profile profile-name;
            interface-id interface-id;
            lcp-renegotiation;
            local-chap;
            maximum-sessions number;
            maximum-sessions-per-tunnel number;
            multilink {
                drop-timeout milliseconds;
                fragment-threshold bytes;
            }
            override-result-code session-out-of-resource;
            ppp-authentication (chap | pap);
            ppp-profile profile-name;
            service-profile profile-name(parameter)&profile-name;
            sessions-limit-group limit-group-name;
            shared-secret shared-secret;
        }
        pap-password pap-password;
        ppp {
            cell-overhead;
            encapsulation-overhead bytes;
            framed-ip-address ip-address;
            framed-pool framed-pool;
            idle-timeout seconds;
            interface-id interface-id;
            keepalive seconds;
            primary-dns primary-dns;
            primary-wins primary-wins;
            secondary-dns secondary-dns;
            secondary-wins secondary-wins;
        }
        user-group-profile profile-name;
    }
    domain-name-server;
    domain-name-server-inet;
    domain-name-server-inet6;
    local {
        flat-file-profile profile-name;
    }
```

```
    preauthentication-order preauthentication-method;
    provisioning-order  (gx-plus | jsrc | pcrf);
    radius {
        accounting-server [ ip-address ];
        attributes {
            exclude {
                attribute-name packet-type;
                standard-attribute number {
                    packet-type [ access-request | accounting-off | accounting-on | accounting-
start | accounting-stop ];
                }
                vendor-id id-number {
                    vendor-attribute vsa-number {
                        packet-type [ access-request | accounting-off | accounting-on |
accounting-start | accounting-stop ];
                    }
                }
            }
            ignore {
                dynamic-iflset-name;
                framed-ip-netmask;
                idle-timeout;
                input-filter;
                logical-system:routing-instance;
                output-filter;
                session-timeout;
                standard-attribute number;
                vendor-id id-number {
                    vendor-attribute vsa-number;
                }
            }
        }
        authentication-server [ ip-address ];
        options {
            accounting-session-id-format (decimal | description);
            calling-station-id-delimiter delimiter-character;
            calling-station-id-format {
                agent-circuit-id;
                agent-remote-id;
                interface-description;
                interface-text-description;
                mac-address;
                nas-identifier;
```

```
        stacked-vlan;
        vlan;
    }
    chap-challenge-in-request-authenticator;
    client-accounting-algorithm (direct | round-robin);
    client-authentication-algorithm  (direct | round-robin);
    coa-dynamic-variable-validation;
    ethernet-port-type-virtual;
    interface-description-format {
        exclude-adapter;
        exclude-channel;
        exclude-sub-interface;
    }
    juniper-access-line-attributes;
    nas-identifier identifier-value;
    nas-port-extended-format {
        adapter-width width;
        ae-width width;
        port-width width;
        pw-width width;
        slot-width width;
        stacked-vlan-width width;
        vlan-width width;
        atm {
            adapter-width width;
            port-width width:
            slot-width width;
            vci-width width:
            vpi-width width;
        }
    }
    nas-port-id-delimiter delimiter-character;
    nas-port-id-format {
        agent-circuit-id;
        agent-remote-id;
        interface-description;
        interface-text-description;
        nas-identifier;
        order {
            agent-circuit-id;
            agent-remote-id;
            interface-description;
            interface-text-description;
```

```
                    nas-identifier;
                    postpend-vlan-tags;
                }
                postpend-vlan-tags;
            }
            nas-port-type {
                ethernet {
                    port-type;
                }
            }
            override {
                calling-station-id remote-circuit-id;
                nas-ip-address tunnel-client-gateway-address;
                nas-port tunnel-client-nas-port;
                nas-port-type tunnel-client-nas-port-type;
            }
            remote-circuit-id-delimiter;
            remote-circuit-id-fallback {
            remote-circuit-id-format;
                agent-circuit-id;
                agent-remote-id;
            }
            revert-interval interval;
            service-activation {
                dynamic-profile (optional-at-login | required-at-login);
                extensible-service (optional-at-login | required-at-login);
            }
            vlan-nas-port-stacked-format;
        }
        preauthentication-server ip-address;
    }
    radius-server server-address {
        accounting-port port-number;
        accounting-retry number;
        accounting-timeout seconds;
        dynamic-request-port
        port port-number;
        preauthentication-port port-number;
        preauthentication-secret password;
        retry attempts;
        routing-instance routing-instance-name;
        secret password;
        max-outstanding-requests value;
```

```
         source-address source-address;
        timeout seconds;
    }
    service {
        accounting {
            statistics (time | volume-time);
            update-interval minutes;
        }
        accounting-order (activation-protocol | local | radius);
    }
    session-limit-per-username number;
    session-options {
        client-idle-timeout minutes;
        client-idle-timeout-ingress-only;
        client-session-timeoutminutes;
        pcc-context {
            input-service-filter-name filter-name;
            input-service-set-name service-set-name;
            ipv6-input-service-filter-name filter-name;
            ipv6-input-service-set-name service-set-name;
            ipv6-output-service-filter-name filter-name;
            ipv6-output-service-set-name service-set-name;
            output-service-filter-name filter-name;
            output-service-set-name service-set-name;
            profile-name pcef-profile-name;
        }
        strip-user-name {
            delimiter [ delimiter ];
            parse-direction (left-to-right | right-to-left);
        }
    }
    subscriber username {
        delegated-pool delegated-pool-name;
        framed-ip-address ipv4-address;
        framed-ipv6-pool ipv6-pool-name;
        framed-pool ipv4-pool-name;
        password password;
        target-logical-system logical-system-name <target-routing-instance (default | routing-
instance-name>;
        target-routing-instance (default | routing-instance-name);
    }
}
```

Hierarchy Level

```
[edit access]
```

Description

Configure a subscriber access profile that includes subscriber access, L2TP, or PPP properties.

Options

profile-name—Name of the profile.

For CHAP, the name serves as the mapping between peer identifiers and CHAP secret keys. This entity is queried for the secret key whenever a CHAP challenge or response is received.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

RELATED DOCUMENTATION

- *Point-to-Point Protocol (PPP)*
- *Layer 2 Tunneling Protocol (L2TP)*
- *L2TP LNS Inline Service Interfaces*
- *Configuring the PPP Challenge Handshake Authentication Protocol*
- *Configuring the PPP Password Authentication Protocol*
- *JSRC for Subscriber Provisioning and Accounting*
- Configuring Service Accounting in Local Flat Files | **172**
- *AAA Service Framework Overview*

Enabling Direct PCC Rule Activation by a PCRF for Subscriber Management

protocols

IN THIS SECTION

Syntax

```
protocols {
    bgp {
        ... bgp-configuration ...
    }
    isis {
        ... isis-configuration ...
    }
    ldp {
        ... ldp-configuration ...
    }
    mpls {
        ... mpls -configuration ...
    }
    msdp {
        ... msdp-configuration ...
    }
    mstp {
        ... mstp-configuration ...
    }
    ospf {
```

```
        ... ospf-configuration ...
    }
    ospf3 {
        ... ospf3-configuration ...
    }
    pim {
        ... pim-configuration ...
    }
    rip {
        ... rip-configuration ...
    }
    ripng {
        ... ripng-configuration ...
    }
    rstp {
        rstp-configuration;
    }
    rsvp{
        ... rsvp-configuration ...
    }
    vstp {
        vstp configuration;
    }
    vpls {
        vpls configuration;
    }
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit routing-instances routing-instance-name]
```

Description

Specify the protocol for a routing instance. You can configure multiple instances of many protocol types. Not all protocols are supported on the switches. See the switch CLI.

Options

bgp Specify BGP as the protocol for a routing instance.

isis Specify IS-IS as the protocol for a routing instance.

ldp Specify LDP as the protocol for a routing instance or for a virtual router instance.

l2vpn Specify Layer 2 VPN as the protocol for a routing instance.

mpls Specify MPLS as the protocol for a routing instance.

msdp Specify the Multicast Source Discovery Protocol (MSDP) for a routing instance.

mstp Specify the Multiple Spanning Tree Protocol (MSTP) for a virtual switch routing instance.

ospf Specify OSPF as the protocol for a routing instance.

ospf3 Specify OSPF version 3 (OSPFv3) as the protocol for a routing instance.

> **NOTE**: OSPFv3 supports the `no-forwarding`, `virtual-router`, and `vrf` routing instance types only.

pim Specify the Protocol Independent Multicast (PIM) protocol for a routing instance.

rip Specify RIP as the protocol for a routing instance.

ripng Specify RIP next generation (RIPng) as the protocol for a routing instance.

rstp Specify the Rapid Spanning Tree Protocol (RSTP) for a virtual switch routing instance.

rsvp Specify the RSVP for a routing instance.

vstp Specify the VLAN Spanning Tree Protocol (VSTP) for a virtual switch routing instance.

vpls Specify VPLS as the protocol for a routing instance.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

Support for RIPng introduced in Junos OS Release 9.0.

`mpls` and `rsvp` options added in Junos OS Release 15.1.

RELATED DOCUMENTATION

Example: Configuring Multiple Routing Instances of OSPF

proxy-arp

IN THIS SECTION

Syntax

```
proxy-arp (restricted | unrestricted);
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]
```

Description

For Ethernet interfaces only, configure the router or switch to respond to any ARP request, as long as the router or switch has an active route to the ARP request's target address.

NOTE: You must configure the IP address and the `inet` family for the interface when you enable proxy ARP.

Default

Proxy ARP is not enabled. The router or switch responds to an ARP request only if the destination IP address is its own.

Options

- `none`—The router or switch responds to any ARP request for a local or remote address if the router or switch has a route to the target IP address.
- `restricted`—(Optional) The router or switch responds to ARP requests in which the physical networks of the source and target are different and does not respond if the source and target IP addresses are in the same subnet. The router or switch must also have a route to the target IP address.
- `unrestricted`—(Optional) The router or switch responds to any ARP request for a local or remote address if the router or switch has a route to the target IP address.
- **Default:** `unrestricted`

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

`restricted` added in Junos OS Release 10.0 for EX Series switches.

RELATED DOCUMENTATION

- Configuring Restricted and Unrestricted Proxy ARP
- Configuring Proxy ARP on Switches
- Example: Configuring Proxy ARP on an EX Series Switch
- Configuring Gratuitous ARP

proxy-arp (Dynamic Profiles)

IN THIS SECTION

Syntax

```
proxy-arp;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number]
```

Description

For Ethernet interfaces only, configure the router to respond to any ARP request, as long as the router has an active route to the target address of the ARP request.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

RELATED DOCUMENTATION

- Configuring Restricted and Unrestricted Proxy ARP
- Configuring Gratuitous ARP

push (Dynamic VLANs)

IN THIS SECTION

Syntax

```
push;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number input-vlan-map]
```

Description

For dynamic VLAN interfaces, specify the VLAN rewrite operation to add a new VLAN tag to the top of the VLAN stack. An outer VLAN tag is pushed in front of the existing VLAN tag. If you include the `push` statement in the configuration, you must also include the `pop` statement at the `[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number output-vlan-map]` hierarchy level.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.4.

RELATED DOCUMENTATION

Stacking and Rewriting VLAN Tags for the Layer 2 Wholesale Solution | 102

push-backup-to-master (Accounting Options)

IN THIS SECTION

Syntax

```
push-backup-to-master;
```

Hierarchy Level

[edit accounting-options file *filename*]

Description

Configure the router to save the accounting files from the new backup Routing Engine to the new primary Routing Engine when a change in primary role occurs. The files are saved to the **/var/log/pfedBackup** directory on the router. The primary Routing Engine includes these accounting files with its own current accounting files when it transfers the files from the backup directory to the archive site at the next transfer interval. Use this statement when the new backup Routing Engine is not able to connect to the archive site; for example, when site is not connected by means of an out-of-band interface or the path to the site is routed through a line card.

NOTE: The backup Routing Engine's files on the primary Routing Engine are sent at each interval even though the files remain the same. If this is more activity than you want, consider using the `backup-on-failure master-and-slave` statement instead.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring Accounting-Data Log Files

Configuring Flat-File Accounting for Layer 2 Wholesale | 162

Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167

Flat-File Accounting Overview | 158

radius (Access Profile)

IN THIS SECTION

Syntax

```
radius {
    accounting-server [ ip-address ];
    attributes {
        exclude
            attribute-name packet-type;
            standard-attribute number {
                packet-type [ access-request | accounting-off | accounting-on | accounting-start
| accounting-stop ];
            }
            vendor-id id-number {
                vendor-attribute vsa-number {
                    packet-type [ access-request | accounting-off | accounting-on | accounting-
start | accounting-stop ];
                }
            }
```

```
        }
        ignore {
            dynamic-iflset-name;
            framed-ip-netmask;
            idle-timeout;
            input-filter;
            logical-system-routing-instance;
            output-filter;
            session-timeout;
            standard-attribute number;
            vendor-id id-number {
                vendor-attribute vsa-number;
            }
        }
    }
    authentication-server [ ip-address ];
    options {
        accounting-session-id-format (decimal | description);
        calling-station-id-delimiter delimiter-character;
        calling-station-id-format {
            agent-circuit-id;
            agent-remote-id;
            interface-description;
            nas-identifier;
        }
        chap-challenge-in-request-authenticator;
        client-accounting-algorithm (direct | round-robin);
        client-authentication-algorithm  (direct | round-robin);
        coa-dynamic-variable-validation;
        ethernet-port-type-virtual;
        interface-description-format {
            exclude-adapter;
            exclude-channel;
            exclude-sub-interface;
        }
        ip-address-change-notify message;
        juniper-access-line-attributes;
        nas-identifier identifier-value;
        nas-port-extended-format {
            adapter-width width;
            ae-width width;
            port-width width;
            slot-width width;
```

```
            stacked-vlan-width width;
            vlan-width width;
            atm {
                adapter-width width;
                port-width width:
                slot-width width;
                vci-width width:
                vpi-width width;
            }
        }
        nas-port-id-delimiter delimiter-character;
        nas-port-id-format {
            agent-circuit-id;
            agent-remote-id;
            interface-description;
            interface-text-description;
            nas-identifier;
            order {
                agent-circuit-id;
                agent-remote-id;
                interface-description;
                interface-text-description;
                nas-identifier;
                postpend-vlan-tags;
            }
            postpend-vlan-tags;
        }
        nas-port-type {
            ethernet {
                port-type;
            }
        }
        override {
            calling-station-id remote-circuit-id;
            nas-ip-address tunnel-client-gateway-address;
            nas-port tunnel-client-nas-port;
            nas-port-type tunnel-client-nas-port-type;
        }
        remote-circuit-id-delimiter;
        remote-circuit-id-fallback;
        remote-circuit-id-format {
            agent-circuit-id;
            agent-remote-id;
```

```
        }
        revert-interval interval;
        service-activation {
            dynamic-profile (optional-at-login | required-at-login);
            extensible-service (optional-at-login | required-at-login);
        }
        vlan-nas-port-stacked-format;
    }
    preauthentication-server ip-address;
}
```

Hierarchy Level

```
[edit access profile profile-name]
```

Description

Configure the RADIUS parameters that the router uses for AAA authentication and accounting for subscribers.

Options

accounting-server (MX Series only) Specify a list of the RADIUS accounting servers used for accounting for DHCP, L2TP, and PPP clients.

- **Values:** *ip-address*—IP version 4 (IPv4) address.

authentication-server (SRX Series only) Specify a list of the RADIUS authentication servers used to authenticate DHCP, L2TP, and PPP clients. The servers in the list are also used as RADIUS dynamic-request servers, from which the router accepts and processes RADIUS disconnect requests, CoA requests, and dynamic service activations and deactivations.

- **Values:** *ip-address*—IPv4 address.

preauthentication-server (MX Series only) Starting in Junos OS Release 13.3, specify the RADIUS preauthentication server, which is used for the LLID service.

> **NOTE**: You cannot configure this statement if the Calling-Station-ID attribute is excluded from RADIUS Access-Request messages by the `exclude` statement.

- **Values:** *ip-address*—IPv4 address.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.1.

RELATED DOCUMENTATION

RADIUS Authentication and Accounting Basic Configuration

RADIUS Logical Line Identification

radius-server

IN THIS SECTION

Syntax

```
radius-server server-address {
    accounting-port port-number;
    accounting-retry number;
    accounting-timeout seconds;
    dynamic-request-port port-number;
    max-outstanding-requests value;
    port port-number;
    preauthentication-port port-number;
    preauthentication-secret password;
    retry attempts;
    routing-instance routing-instance-name;
    secret password;
    source-address source-address;
    timeout seconds;
}
```

Hierarchy Level

```
[edit access],
[edit access profile profile-name]
```

Description

Configure RADIUS for subscriber access management, L2TP, or PPP.

To configure multiple RADIUS servers, include multiple `radius-server` statements. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.

Options

server-address IPv4 or IPv6 address of the RADIUS server.

accounting-port Configure the port number on which to contact the RADIUS accounting server.

> **NOTE**: Specifying the accounting port is optional, and port 1813 is the default. However, we recommend that you configure it in order to avoid confusion, as some RADIUS servers might refer to an older default.

- **Values:** *port-number*—Port number on which to contact the RADIUS accounting server. Most RADIUS servers use port 1813, as specified in RFC 2866.
- **Default:** 1813

accounting-retry Configure the number of times the device retransmits RADIUS accounting messages when no response is received from the server. When you do not configure this statement, the number of retry attempts is determined by the `retry` statement.

> **NOTE**: To successfully set a retry limit for the accounting servers different from the authentication servers, you must configure both the `accounting-retry` and `accounting-timeout` statements . If you configure only one of these statements, then the value you configure is ignored in favor of the values configured with the `retry` and `timeout` statements.

> **NOTE**: The maximum retry duration (the number of retries times the length of the timeout) cannot exceed 2700 seconds. An error message is displayed if you configure a longer duration.

- **Values:** *number*—Number of retry attempts.
- **Range:** 0 through 100
- **Default:** 0 (disabled)

accounting-timeout

Configure how long the local device waits to receive a response from a RADIUS accounting server before retransmitting the message. When you do not configure this statement, the length of the timeout is determined by the `timeout` statement.

> **NOTE**: To successfully set a timeout value for the accounting servers different from the authentication servers, you must configure both the `accounting-retry` and `accounting-timeout` statements . If you configure only one of these statements, then the value you configure is ignored in favor of the values configured with the `retry` and `timeout` statements.

> **NOTE**: The maximum retry duration (the number of retries times the length of the timeout) cannot exceed 2700 seconds. An error message is displayed if you configure a longer duration.

- **Values:** *seconds*—Duration of timeout period.
- **Range:** 0 through 1000 seconds
- **Default:** 0 (disabled)

dynamic-request-port

Specify the port that the router monitors for dynamic (CoA) requests from the specified RADIUS servers. You can configure a port globally or for a specific access profile.

You must either use the default port for all RADIUS servers or configure the same nondefault port for all RADIUS servers. This rule applies at both the global access and access profile levels.

> **NOTE**: Any other configuration results in a commit check failure. Multiple port numbers—that is, different port numbers for different servers—are not supported.

- **Values:** *port-number*—Number of the monitored port.
- **Default:** 3799 (as specified in RFC 5176)

max-outstanding-requests

Configure the maximum number of outstanding requests for this RADIUS server. An increase in this value is immediate while a decrease is more gradual if the current number of outstanding requests exceeds the new value.

- **Values:** *requests*—Maximum number of outstanding requests for this RADIUS server.
- **Range:** 0 through 2000 outstanding requests per server
- **Default:** 1000 outstanding requests per server

port

Configure the port number on which to contact the RADIUS server.

- **Values:** *port-number*—Port number on which to contact the RADIUS server.
- **Default:** 1812 (as specified in RFC 2865)

preauthentication-port

Configure the port number on which to contact the RADIUS server for logical line identification (LLID) preauthentication requests. If you do not configure a separate UDP port for preauthentication purposes, the same UDP port that you configure for authentication messages by including the `port` *`port-number`* statement is used.

- **Values:** *port-number*—Port number used for preauthentication requests to contact the RADIUS server.

preauthentication-secret

Configure the password to use with the RADIUS server for LLID preauthentication requests. If you do not configure a separate UDP password for preauthentication purposes, the same password that you configure for authentication messages by including the `secret` *`password`* statement is used. The secret password used by the local router must match that used by the server.

- **Values:** *password*—Password to use. To include spaces enclose the character string in quotation marks.

retry

Specify the number of times that the device is allowed to attempt to contact a RADIUS authentication or accounting server. You can override the retry limit for accounting servers with the `accounting-retry` statement.

> **NOTE**: To successfully set a retry limit for the accounting servers different from the authentication servers, you must configure both the `accounting-retry` and `accounting-timeout` statements . If you configure only one of these statements, then the value you configure is ignored in favor of the values configured with the `retry` and `timeout` statements.

NOTE: The maximum retry duration (the number of retries times the length of the timeout) cannot exceed 2700 seconds. An error message is displayed if you configure a longer duration.

- **Values:** *attempts*—Number of times that the router is allowed to attempt to contact a RADIUS server.
- **Range:** 1 through 100
- **Default:** 3

routing-instance

Configure the routing instance used to send RADIUS packets to the RADIUS server.

- **Values:** *routing-instance-name*—Routing instance name.

source-address

Configure a source address for each configured RADIUS server. Each RADIUS request sent to a RADIUS server uses the specified source address. Support for IPv6 *source-address* was introduced in Junos OS Release 16.1.

- **Values:** *source-address*—Valid IPv4 or IPv6 address configured on one of the router or switch interfaces. On M Series routers only, the source address can be an IPv6 address and the UDP source port is 514.

timeout

Configure the amount of time that the local device waits to receive a response from RADIUS authentication and accounting servers. You can override the timeout value for accounting servers with the `accounting-timeout` statement.

NOTE: To successfully set a timeout value for the accounting servers different from the authentication servers, you must configure both the `accounting-retry` and `accounting-timeout` statements . If you configure only one of these statements, then the value you configure is ignored in favor of the values configured with the `retry` and `timeout` statements.

NOTE: The maximum retry duration (the number of retries times the length of the timeout) cannot exceed 2700 seconds. An error message is displayed if you configure a longer duration.

- **Values:** *seconds*—Amount of time to wait.
- **Range:** 1 through 1000 seconds
- **Default:** 3 seconds

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

`max-outstanding-requests` introduced in Junos OS Release 11.4.

`accounting-retry` and `accounting-timeout` introduced in Junos OS Release 14.1.

`dynamic-request-port` option added in Junos OS Release 14.2R1 for MX Series routers.

`preauthentication-port` and `preauthentication-secret` options added in Junos OS Release 15.1 for MX Series routers.

`accounting-port` introduced in Junos OS Release 13.2X50-D10 for EX Series switches with support for Enhanced Layer 2 software (ELS). It was introduced in Junos OS without ELS in the following releases: Junos OS Releases 12.3R10, 14.1X53-D25, and 15.1R4 for EX Series switches.

Support for IPv6 *`server-address`* introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

- *RADIUS Authentication and Accounting Basic Configuration*
- *Configuring the PPP Password Authentication Protocol*
- *Configuring RADIUS Authentication for L2TP*
- *RADIUS Authentication*
- Configuring RADIUS-Initiated Dynamic Request Support
- *RADIUS Logical Line Identification*
- *show network-access aaa statistics*

clear network-access aaa statistics

range (Address-Assignment Pools)

IN THIS SECTION

Syntax

```
range range-name {
    high upper-limit;
    low lower-limit;
    prefix-length prefix-length;
}
```

Hierarchy Level

```
[edit access address-assignment pool pool-name family (inet | inet6)]
```

Description

Configure a named range of IPv4 addresses or IPv6 prefixes, used within an address-assignment pool.

Options

`high` *upper-limit*—Upper limit of an address range or IPv6 prefix range.

`low` *`lower-limit`*—Lower limit of an address range or IPv6 prefix range.

`prefix-length` *`prefix-length`*—Assigned length of the IPv6 prefix.

`range-name`—Name assigned to the range of IPv4 addresses or IPv6 prefixes.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

IPv6 support introduced in Junos OS Release 10.0.

RELATED DOCUMENTATION

Address-Assignment Pools for Subscriber Management

ranges (Dynamic VLAN)

IN THIS SECTION

Syntax

```
ranges (any | low-tag)-(any | high-tag);
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure vlan-ranges dynamic-profile profile-name]
```

Description

Configure VLAN ranges for dynamic, auto-sensed VLANs.

Options

any—The entire VLAN range.

low-tag—The lower limit of the VLAN range.

high-tag—The upper limit of the VLAN range.

- **Range:** 1 through 4094

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

RELATED DOCUMENTATION

Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs

remote-id (VLAN Authentication Username)

IN THIS SECTION

Syntax

```
remote-id;
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure vlan-ranges authentication username-include]
```

Description

Include the agent remote identifier (ARI) in the username sent to RADIUS for authentication of the dynamic VLAN. The ARI is conveyed by the Access-Loop-Remote-ID TLV in an out-of-band ANCP Port Up message.

NOTE: This statement is not supported for stacked VLANs.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Configuring a Username for Authentication of Out-of-Band Triggered Dynamic VLANs | 149

Configuring VLAN Interface Username Information for AAA Authentication

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

route-distinguisher

IN THIS SECTION

Syntax

```
route-distinguisher (as-number:id | ip-address:id);
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols
l2vpn mesh-group mesh-group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols vpls
mesh-group mesh-group-name],
```

```
[edit protocols evpn interconnect]
[edit routing-instances routing-instance-name],
[edit routing-instances routing-instance-name protocols evpn interconnect]
[edit routing-instances routing-instance-name protocols l2vpn mesh-group mesh-group-name],
[edit routing-instances routing-instance-name protocols vpls mesh-group mesh-group-name]
```

Description

Specify an identifier attached to a route that distinguishes to which VPN or virtual private LAN service (VPLS) the route belongs. Each routing instance must have a unique route distinguisher (RD) associated with it. The RD places bounds around a VPN so the device can use the same IP address prefixes in different VPNs without having the addresses overlap. You must configure the route-distinguisher statement for instances with instance type `vrf`.

Use the following guidelines when you assign RDs:

- For Layer 2 (L2) VPNs and VPLS, if you configure the `l2vpn-use-bgp-rules` statement, you must configure a unique RD for each PE router participating in the routing instance.

  If you configure mesh groups, the RD in each mesh group must also be unique.

- For Ethernet VPNs (EVPNs), you must configure a unique RD for each provider edge (PE) device participating in the routing instance to ensure that the prefixes generated by different PEs are unique.

- For other VPNs besides L2 VPNs, VPLS, and EVPNs, we recommend that you use a unique RD for each PE device participating in a particular routing instance. You can alternatively use the same RD on all PE devices for the same VPN routing instance, but if you use a unique RD, you can determine the customer edge (CE) router from which a route originated within the VPN.

- On EVPN data center interconnect (DCI) gateway devices, if you configure an interconnect RD at the `[edit routing-instances name protocols evpn interconnect]` hierarchy, the interconnect RD must be different from the local RD in the routing instance.

  NOTE: When you configure DCI with seamless stitching for EVPN Type 2 routes, the device throws a commit error if you try to configure the same value for the interconnect RD and the local RD.

  To enforce this condition for DCI seamless stitching with EVPN Type 5 routes as well, you also see a commit error with Junos OS and Junos OS Evolved Releases starting in 22.4R2 and 23.1R1.

CAUTION: We strongly recommend that if you change an RD that you configured and committed previously, or change the routing instance type from `virtual-router` to `vrf`, make either of those changes during a maintenance window, as follows:

1. Deactivate the routing instance.
2. Change the RD.
3. Activate the routing instance.

Options

as-number:*number*—*as-number* is an assigned AS number, and *number* is any 2-byte or 4-byte value. The AS number can be from 1 through 4,294,967,295. If the AS number is a 2-byte value, the administrative number is a 4-byte value. If the AS number is 4-byte value, the administrative number is a 2-byte value. An RD consisting of a 4-byte AS number and a 2-byte administrative number is defined as a type 2 RD in RFC 4364 *BGP/MPLS IP VPNs*.

NOTE: In Junos OS Release 9.1 and later, the numeric range for AS numbers is extended to provide BGP support for 4-byte AS numbers, as defined in RFC 4893, *BGP Support for Four-octet AS Number Space*. All releases of Junos OS support 2-byte AS numbers. To configure an RD that includes a 4-byte AS number, append the letter "L" to the end of the AS number. For example, an RD with the 4-byte AS number 7,765,000 and an administrative number of 1,000 is represented as `77765000L:1000`.

In Junos OS Release 9.2 and later, you can also configure a 4-byte AS number using the AS dot notation format of two integer values joined by a period: <*16-bit high-order value in decimal*>.<*16-bit low-order value in decimal*>. For example, the 4-byte AS number of 65,546 in the plain-number format is represented as 1.10 in AS dot notation format.

number:*id*—Number and identifer expressed in one of these formats: *16-bit number*.*32-bit identifier* or *32-bit number*.*16-bit identifier*.

ip-address:*id*—IP address (*ip-address* is a 4-byte value) within your assigned prefix range and a 2-byte value for the *id*. The IP address can be any globally unique unicast address.

- **Range:** 0 through 4,294,967,295 (2^{32} – 1). If the router you are configuring is a BGP peer of a router that does not support 4-byte AS numbers, you need to configure a local AS number. For more information, see *Using 4-Byte Autonomous System Numbers in BGP Networks Technology Overview*.

NOTE: For Ethernet VPNs (EVPNs), an RD that includes zero as the *id* value is reserved for the default EVPN routing instance by default. Because you can't assign the same RD for two routing instances, the device throws a commit error if you use an RD of the form *ip-address*:*id* with *id* value zero for another routing instance.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

Support at `[edit routing-instances routing-instance-name protocols vpls mesh-group mesh-group-name]` hierarchy level introduced in Junos OS Release 11.2.

Support at `[edit routing-instances routing-instance-name protocols l2vpn mesh-group mesh-group-name]` hierarchy level introduced in Junos OS Release 13.2.

Support at the following hierarchy levels introduced in Junos OS Release 20.3R1 on QFX Series switches: `[edit protocols evpn interconnect]` and `[edit routing-instances routing-instance-name protocols evpn interconnect]`.

RELATED DOCUMENTATION

- *Example: Configuring BGP Route Target Filtering for VPNs*
- *Example: Configuring FEC 129 BGP Autodiscovery for VPWS*
- *Configuring EVPN Routing Instances*
- *Configuring Routing Instances on PE Routers in VPNs*
- Configuring an MPLS-Based Layer 2 VPN (CLI Procedure)
- Configuring an MPLS-Based Layer 3 VPN (CLI Procedure)
- *path-selection*

routing-instances (Dynamic Profiles)

IN THIS SECTION

Syntax

```
routing-instances routing-instance-name {
    interface interface-name;
    multicast-snooping-options {
    }
    routing-options {
        access {
            route prefix {
                metric route-cost;
                next-hop next-hop;
                preference route-distance;
                tag route-tag;
                tag2 route-tag2;
            }
        }
        access-internal {
            route subscriber-ip-address {
                qualified-next-hop underlying-interface {
                    mac-address address;
                }
            }
        }
        multicast {
            interface interface-name {
                no-qos-adjust;
```

```
            }
        }
        rib routing-table-name {
            access {
                route prefix {
                    metric route-cost;
                    next-hop next-hop;
                    preference route-distance;
                    tag route-tag;
                    tag2 route-tag2;
                }
            }
            access-internal {
                route subscriber-ip-address {
                    qualified-next-hop underlying-interface {
                        mac-address address;
                    }
                }
            }
        }
    }
}
```

Hierarchy Level

```
[edit dynamic-profiles]
[edit logical-systems logical-system-name ]
```

Description

Dynamically configure an additional routing entity for a router in a dynamic client profile or a dynamic service profile.

Options

routing-instance-name—The routing instance variable (*$junos-routing-instance*). The routing instance variable is dynamically replaced with the routing instance the accessing client uses when connecting to the router.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.6.

Support at the `logical-systems` hierarchy level was introduced in Junos OS Release 14.2.

RELATED DOCUMENTATION

Configuring a Dynamic Profile for use by a Retailer in the DHCPv4 Solution | 23

schema-version (Flat-File Accounting Options)

IN THIS SECTION

Syntax

```
schema-version schema-name;
```

Hierarchy Level

```
[edit accounting-options flat-file-profile profile-name]
```

Description

Specify the name of the XML schema that defines the contents and format of the accounting file, and appears in the accounting record header.

Options

schema-name	Name of the schema.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

- Configuring Flat-File Accounting for Layer 2 Wholesale | 162
- Configuring Flat-File Accounting for Extensible Subscriber Services Management | 167
- Flat-File Accounting Overview | 158

secret (RADIUS)

IN THIS SECTION

Syntax

```
secret password;
```

Hierarchy Level

```
[edit access profile profile-name radius-server server-address],
[edit access radius-disconnect client-address],
[edit access radius-server server-address]
```

Description

Configure the password to use with the RADIUS server. The secret password used by the local router or switch must match that used by the server.

Options

password—Password to use; it can include spaces if the character string is enclosed in quotation marks.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

RELATED DOCUMENTATION

- *RADIUS Servers and Parameters for Subscriber Access*
- *Example: Configuring CHAP Authentication with RADIUS*
- *Configuring RADIUS Authentication for L2TP*

server (Dynamic PPPoE)

IN THIS SECTION

Syntax

```
server;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces pp0 unit "$junos-interface-unit" pppoe-options]
```

Description

In a dynamic profile, configure the router to act as a PPPoE server, also known as a remote access concentrator, when a PPPoE logical interface is dynamically created.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.1.

RELATED DOCUMENTATION

Configuring a PPPoE Dynamic Profile

Subscriber Interfaces and PPPoE Overview

server-group

IN THIS SECTION

Syntax

```
server-group {
    server-group-name {
        server-ip-address;
    }
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay dhcpv6],
[edit logical-systems logical-system-name forwarding-options dhcp-relay],
[edit logical-systems logical-system-name forwarding-options dhcp-relay dhcpv6],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay],
[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-
options dhcp-relay dhcpv6],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay dhcpv6]
```

Description

Specify the name of a group of DHCP server addresses for use by the extended DHCP relay agent. Apply the group with the `active-server-group` statement globally for all interfaces or for a named group of interfaces configured with the `group` statement. This mechanism enables you to apply different DHCP relay configurations for different groups of servers, with a common configuration for the servers within a server group.

Options

server-group-name	Name of the group of DHCP or DHCPv6 server addresses.
server-ip-address	IP address of the DHCP server belonging to this named server group. Use IPv6 addresses when configuring DHCPv6 support. Starting in Junos OS Release 18.4R1, you can configure up to 32 server IP addresses per group for DHCPv4 servers. In earlier releases, you can configure only up to 5 server IP addresses for DHCPv4 servers. For DHCPv6 servers, you can configure only up to 32 addresses in all releases. The configuration fails commit check if you configure more than the maximum number of server addresses.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 8.3.

Support at the `[edit ... dhcpv6]` hierarchy levels introduced in Junos OS Release 11.4.

RELATED DOCUMENTATION

> *Extended DHCP Relay Agent Overview*
>
> *Configuring Active Server Groups to Apply a Common DHCP Relay Agent Configuration to Named Server Groups*

site (VPLS Multihoming for FEC 128)

IN THIS SECTION

Syntax

```
site site-name {
    mac-pinning;
    active-interface (any | primary interface-name);
    best-site;
    interface interface-name {
        interface-mac-limit limit;
    }
    mesh-group mesh-group-name;
    multi-homing;
```

```
    site-identifier identifier;
    site-preference preference-value;
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols
vpls],
[edit routing-instances routing-instance-name protocols vpls]
```

Description

Specify the site name and site identifier for a site. Allows you to configure a remote site ID for remote sites.

Options

site-name—Name of the site.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

site-identifier (VPLS)

IN THIS SECTION

Syntax

```
site-identifier identifier;
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols vpls
site site-name],
[edit routing-instances routing-instance-name protocols vpls site site-name]
```

Description

Specify the numerical identifier for the local VPLS site.

Options

identifier—Specify the numerical identifier for the local VPLS site. The identifier must be an unsigned 16-bit number greater than zero.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

RELATED DOCUMENTATION

Configuring the VPLS Site Name and Site Identifier

site-range

IN THIS SECTION

Syntax

```
site-range number;
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols
vpls],
[edit routing-instances routing-instance-name protocols vpls]
```

Description

Specify an upper limit on the maximum site identifier that can be accepted to allow a pseudowire to be brought up. Pseudowires cannot be established to sites with site identifiers greater than the configured site range. If you issue the `show vpls connections` command, such sites are displayed as OR (out of range).

Options

number Maximum number of site identifiers. We recommend using the default value.

- **Range:** 1 through 65,534
- **Default:** 65,534

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

RELATED DOCUMENTATION

Configuring the Site Range

stacked-vlan-ranges

IN THIS SECTION

Syntax

```
stacked-vlan-ranges {
    access-profile profile-name;
    authentication {
        packet-types  [packet-types];
        password password-string;
        username-include {
            circuit-type;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-name;
            mac-address;
            option-18
            option-37
            option-82;
            radius-realm radius-realm-string;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    dynamic-profile profile-name {
        accept (any | dhcp-v4 | inet);
        access-profile vlan-dynamic-profile-name;
        ranges (any | low-tag-high-tag),(any | low-tag-high-tag);
    }
    override;
}
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure]
```

Description

Configure multiple VLANs. Each VLAN is assigned a VLAN ID number from the range.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing–control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

RELATED DOCUMENTATION

Configuring an Interface to Use the Dynamic Profile Configured to Create Stacked VLANs

Configuring Interfaces to Support Both Single and Stacked VLANs

stacked-vlan-tagging

IN THIS SECTION

Syntax

```
stacked-vlan-tagging;
```

Hierarchy Level

```
[edit interfaces interface-name]
```

Description

For Gigabit Ethernet IQ interfaces, Gigabit Ethernet, 10-Gigabit Ethernet LAN/WAN PIC, and 100-Gigabit Ethernet Type 5 PIC with CFP, enable stacked VLAN tagging for all logical interfaces on the physical interface.

For pseudowire subscriber interfaces, enable stacked VLAN tagging for logical interfaces on the pseudowire service.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

Statement introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers.

RELATED DOCUMENTATION

Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview

traceoptions (DHCP)

IN THIS SECTION

Syntax

```
traceoptions {
    file filename <files number> <match regular-expression > <size maximum-file-size> <world-
readable | no-world-readable>;
    flag flag;
    level  (all | error | info | notice | verbose | warning);
    no-remote-trace;
}
```

Hierarchy Level

```
[edit system processes dhcp-service]
[edit security dynamic-address]
```

Description

Define global tracing operations for extended DHCP local server and extended DHCP relay agent processes.

This statement replaces the deprecated `traceoptions` statements at the `[edit forwarding-options dhcp-relay]` and `[edit system services dhcp-local-server]` hierarchy levels.

NOTE: Traceoptions does not differentiate between a logical system and tenant system, and can be configured under the root logical system.

Options

`file` *`filename`*—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory `/var/log`.

`files` *`number`*—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the `size` option.

- **Range:** 2 through 1000
- **Default:** 3 files

`flag` *`flag`*—Tracing operation to perform. To specify more than one tracing operation, include multiple `flag` statements:

- `all`—Trace all events.
- `auth`—Trace authentication events.
- `database`—Trace database events.
- `fwd`—Trace firewall process events.
- `general`—Trace miscellaneous events.
- `ha`—Trace high availability-related events.
- `era`—Enables logging.
- `interface`—Trace interface operations.
- `io`—Trace I/O operations.
- `liveness-detection`—Trace liveness detection operations.
- `packet`—Trace packet and option decoding operations.
- `performance`—Trace performance measurement operations.
- `profile`—Trace profile operations.
- `rpd`—Trace routing protocol process events.

- `rtsock`—Trace routing socket operations.
- `security-persistence`—Trace security persistence events.
- `session-db`—Trace session database events.
- `state`—Trace changes in state.
- `statistics`—Trace baseline statistics.
- `ui`—Trace user interface operations.

`level`—Level of tracing to perform; also known as severity level. The option you configure enables tracing of events at that level and all higher (more restrictive) levels. You can specify any of the following levels:

- `all`—Match messages of all levels.
- `error`—Match error messages.
- `info`—Match informational messages.
- `notice`—Match notice messages about conditions requiring special handling.
- `verbose`—Match verbose messages. This is the lowest (least restrictive) severity level; when you configure `verbose`, messages at all higher levels are traced. Therefore, the result is the same as when you configure `all`.
- `warning`—Match warning messages.
- **Default:** `error`

`match` *`regular-expression`*—(Optional) Refine the output to include lines that contain the regular expression.

`no-remote-trace`—Disable remote tracing.

`no-world-readable`—(Optional) Disable unrestricted file access, allowing only the user `root` and users who have the Junos OS `maintenance` permission to access the trace files.

`size` *`maximum-file-size`*—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (*`maximum-file-size`*`k`), megabytes (*`maximum-file-size`*`m`), or gigabytes (*`maximum-file-size`*`g`). If you specify a maximum file size, you also must specify a maximum number of trace files with the `files` option.

- **Range:** 10,240 through 1,073,741,824
- **Default:** 128 KB

`world-readable`—(Optional) Enable unrestricted file access.

Required Privilege Level

trace—To view this statement in the configuration.

trace-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 11.4.

RELATED DOCUMENTATION

DHCP Monitoring and Management

underlying-interface (demux0)

IN THIS SECTION

Syntax

```
underlying-interface underlying-interface-name;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces demux0 interface-name unit unit logical-unit-number
demux-options]
```

Description

Configure the underlying interface on which the demultiplexing (demux) interface is running.

CAUTION: Before you make any changes to the underlying interface for a demux0 interface, you must ensure that no subscribers are currently present on that underlying interface. If any subscribers are present, you must remove them before you make changes.

Options

underlying-interface-name—Either the specific name of the interface on which the DHCP discover packet arrives or one of the following interface variables:

- `$junos-underlying-interface` when configuring dynamic IP demux interfaces.
- `$junos-interface-ifd-name` when configuring dynamic VLAN demux interfaces.

The variable is used to specify the underlying interface when a new demux interface is dynamically created. The variable is dynamically replaced with the underlying interface that DHCP supplies when the subscriber logs in.

NOTE: Logical demux interfaces are currently supported on Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet interfaces.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.3.

Support for aggregated Ethernet introduced in Junos OS Release 9.4.

RELATED DOCUMENTATION

Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles

Configuring Dynamic Subscriber Interfaces Using VLAN Demux Interfaces in Dynamic Profiles

Dynamic PPPoE Subscriber Interfaces over Static Underlying Interfaces Overview

Junos OS Network Interfaces Library for Routing Devices

underlying-interface (Dynamic PPPoE)

IN THIS SECTION

Syntax

```
underlying-interface interface-name;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces pp0 unit "$junos-interface-unit" pppoe-options]
```

Description

In a dynamic profile, configure the underlying interface on which the router creates the dynamic PPPoE logical interface.

Options

interface-name—Variable used to specify the name of the underlying interface on which the PPPoE logical interface is dynamically created. In the `underlying-interface` *interface-name* statement for dynamic PPPoE logical interfaces, you must use the predefined variable `$junos-underlying-interface` in place of *interface-name*. When the router creates the dynamic PPPoE interface, the `$junos-underlying-interface` predefined variable is dynamically replaced with the name of the underlying interface supplied by the network when the subscriber logs in.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.1.

RELATED DOCUMENTATION

Configuring a PPPoE Dynamic Profile

Dynamic PPPoE Subscriber Interfaces over Static Underlying Interfaces Overview

unit

IN THIS SECTION

Syntax

```
unit logical-unit-number {
    accept-source-mac {
        mac-address mac-address {
            policer {
                input cos-policer-name;
                output cos-policer-name;
            }
        }
    }
    accounting-profile name;
    advisory-options {
        downstream-rate rate;
        upstream-rate rate;
    }
    allow-any-vci;
    atm-scheduler-map (map-name | default);
    auto-configure {
        agent-circuit-identifier {
            dynamic-profile profile-name;
        }
        line-identity {
            include {
                accept-no-ids;
                circuit-id;
                remote-id;

            }
            dynamic-profile profile-name;
        }
    }
    backup-options {
        interface interface-name;
```

```
    }
    bandwidth rate;
    cell-bundle-size cells;
    clear-dont-fragment-bit;
    compression {
        rtp {
            maximum-contexts number <force>;
            f-max-period number;
            queues [queue-numbers];
            port {
                minimum port-number;
                maximum port-number;
            }
        }
    }
    compression-device interface-name;
    copy-tos-to-outer-ip-header;
    demux {
        inet {
            address-source address;
            auto-configure {
                address-ranges {
                    authentication {
                        password password-string;
                        username-include {
                            auth-server-realm realm-string;
                            delimiter delimiter-character;
                            domain-name domain-name;
                            interface-name;
                            source-address;
                            user-prefix user-prefix-string;
                        }
                    }
                    dynamic-profile profile-name {
                        network ip-address {
                            range name {
                                low lower-limit;
                                high upper-limit;
                            }
                        }
                    }
                }
```

```
            }
        }
        inet6 {
            address-source address;
            auto-configure {
                address-ranges {
                    authentication {
                        password password-string;
                        username-include {
                            auth-server-realm realm-string;
                            delimiter delimiter-character;
                            domain-name domain-name;
                            interface-name;
                            source-address;
                            user-prefix user-prefix-string;
                        }
                    }
                    dynamic-profile profile-name {
                        network ip-address {
                            range name {
                                low lower-limit;
                                high upper-limit;
                            }
                        }
                    }
                }

            }
        }
    }
    demux-destination family;
    demux-source family;
    demux-options {
        underlying-interface interface-name;
    }
    description text;
    etree-ac-role (leaf | root);
    interface {
        l2tp-interface-id name;
        (dedicated | shared);
    }
    dialer-options {
        activation-delay seconds;
```

```
        callback;
        callback-wait-period time;
        deactivation-delay seconds;
        dial-string [dial-string-numbers];
        idle-timeout seconds;
        incoming-map {
            caller caller-id | accept-all;
            initial-route-check seconds;
            load-interval seconds;
            load-threshold percent;
            pool pool-name;
            redial-delay time;
            watch-list {
                [routes];
            }
        }
    }
    disable;
    disable-mlppp-inner-ppp-pfc;
    dlci dlci-identifier;
    drop-timeout milliseconds;
    dynamic-call-admission-control {
        activation-priority priority;
        bearer-bandwidth-limit kilobits-per-second;
    }
    encapsulation type;
    epd-threshold cells plp1 cells;
    family family-name {
        ... the family subhierarchy appears after the main [edit interfaces interface-name unit
logical-unit-number] hierarchy ...
    }
    fragment-threshold bytes;
    host-prefix-only;
    inner-vlan-id-range start start-id end end-id;
    input-vlan-map {
        (pop | pop-pop | pop-swap | push | push-push | swap |
        swap-push | swap-swap);
        inner-tag-protocol-id tpid;
        inner-vlan-id number;
        tag-protocol-id tpid;
        vlan-id number;
    }
    interleave-fragments;
```

```
    inverse-arp;
    layer2-policer {
        input-policer policer-name;
        input-three-color policer-name;
        output-policer policer-name;
        output-three-color policer-name;
    }
    link-layer-overhead percent;
    minimum-links number;
    mrru bytes;
    multicast-dlci dlci-identifier;
    multicast-vci vpi-identifier.vci-identifier;
    multilink-max-classes number;
    multipoint;
    oam-liveness {
        up-count cells;
        down-count cells;
    }
    oam-period (disable | seconds);
    output-vlan-map {
        (pop | pop-pop | pop-swap | push | push-push | swap |
        swap-push | swap-swap);
        inner-tag-protocol-id tpid;
        inner-vlan-id number;
        tag-protocol-id tpid;
    }
    passive-monitor-mode;
    peer-unit unit-number;
    plp-to-clp;
    point-to-point;
    ppp-options {
        mru size;
        mtu (size | use-lower-layer);
        chap {
            access-profile name;
            default-chap-secret name;
            local-name name;
            passive;
        }
        compression {
            acfc;
            pfc;
        }
```

```
        dynamic-profile profile-name;
        ipcp-suggest-dns-option;
        lcp-restart-timer milliseconds;
        loopback-clear-timer seconds;
        ncp-restart-timer milliseconds;
        pap {
            access-profile name;
            default-pap-password password;
            local-name name;
            local-password password;
            passive;
        }
    }
    pppoe-options {
        access-concentrator name;
        auto-reconnect seconds;
        (client | server);
        service-name name;
        underlying-interface interface-name;
    }
    pppoe-underlying-options {
        access-concentrator name;
        direct-connect;
        dynamic-profile profile-name;
        max-sessions number;
    }
    proxy-arp;
    service-domain (inside | outside);
    shaping {
        (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
burst length);
        queue-length number;
    }
    short-sequence;
    targeted-distribution;
    transmit-weight number;
    (traps | no-traps);
    trunk-bandwidth rate;
    trunk-id number;
    tunnel {
        backup-destination address;
        destination address;
        key number;
```

```
        routing-instance {
            destination routing-instance-name;
        }
        source source-address;
        ttl number;
    }
    vci vpi-identifier.vci-identifier;
    vci-range start start-vci end end-vci;
    vpi vpi-identifier;
    vlan-id number;
    vlan-id-range number-number;
    vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
    family family {
        accounting {
            destination-class-usage;
            source-class-usage {
                (input | output | input output);
            }
        }
        access-concentrator name;
        address address {
            ... the address subhierarchy appears after the main [edit interfaces interface-name
unit logical-unit-number family family-name] hierarchy ...
        }
        bundle interface-name;
        core-facing;
        demux-destination {
            destination-prefix;
        }
        demux-source {
            source-prefix;
        }
        direct-connect;
        duplicate-protection;
        dynamic-profile profile-name;
        filter {
            group filter-group-number;
            input filter-name;
            input-list [filter-names];
            output filter-name;
            output-list [filter-names];
        }
        interface-mode (access | trunk);
```

```
        ipsec-sa sa-name;
        keep-address-and-control;
        mac-validate (loose | strict);
        max-sessions number;
        mtu bytes;
        multicast-only;
        no-redirects;
        policer {
            arp policer-template-name;
            input policer-template-name;
            output policer-template-name;
        }
        primary;
        protocols [inet iso mpls];
        proxy inet-address address;
        receive-options-packets;
        receive-ttl-exceeded;
        remote (inet-address address | mac-address address);
        rpf-check {
            fail-filter filter-name
            mode loose;
        }
        sampling {
            input;
            output;
        }
        service {
            input {
                post-service-filter filter-name;
                service-set service-set-name <service-filter filter-name>;
            }
            output {
                service-set service-set-name <service-filter filter-name>;
            }
        }
        service-name-table table-name
        targeted-options {
            backup backup;
            group group;
            primary primary;
            weight ($junos-interface-target-weight | weight-value);
        }
        (translate-discard-eligible | no-translate-discard-eligible);
```

```
        (translate-fecn-and-becn | no-translate-fecn-and-becn);
        translate-plp-control-word-de;
        unnumbered-address interface-name destination address destination-profile profile-name;
        vlan-id number;
        vlan-id-list [number number-number];
        address address {
            arp ip-address (mac | multicast-mac) mac-address <publish>;
            broadcast address;
            destination address;
            destination-profile name;
            eui-64;
            primary-only;
            multipoint-destination address {
                dlci dlci-identifier;
                epd-threshold cells <plp1 cells>;
                inverse-arp;
                oam-liveness {
                    up-count cells;
                    down-count cells;
                }
                oam-period (disable | seconds);
                shaping {
                    (cbr rate | rtvbr burst length peak rate sustained rate | vbr burst length
peak rate sustained rate);
                    queue-length number;
                }
                vci vpi-identifier.vci-identifier;
            }
            preferred;
            primary;
            (vrrp-group | vrrp-inet6-group) group-number {
                (accept-data | no-accept-data);
                advertise-interval seconds;
                authentication-type authentication;
                authentication-key key;
                fast-interval milliseconds;
                (preempt | no-preempt) {
                    hold-time seconds;
                }
                priority number;
                track {
                    interface interface-name {
                        bandwidth-threshold bits-per-second priority-cost number;
```

```
                    }
                    priority-hold-time seconds;
                    route ip-address/prefix-length routing-instance instance-name priority-
cost cost;
                }
                virtual-address [addresses];
                virtual-link-local-address ipv6-address;
                vrrp-inherit-from {
                    active-interface interface-name;
                    active-group group-number;
                }
            }
        }
    }
}
```

Hierarchy Level

```
[edit interfaces interface-name],
[edit logical-systems logical-system-name interfaces interface-name],
[edit interfaces interface-set interface-set-name interface interface-name]
```

Description

Configure a logical interface on the physical device. You must configure a logical interface to be able to use the physical device.

Options

logical-unit-number—Number of the logical unit.

- **Range:** 0 through 1,073,741,823 for demux, PPPoE, and pseudowire static interfaces. 0 through 16,385 for all other static interface types.

`etree-ac-role (leaf | root)`—To configure an interface as either leaf or root.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

Range increased for static pseudowire interfaces to 1,073,741,823 in Junos OS Release 18.3R1.

RELATED DOCUMENTATION

- Configuring Logical Interface Properties
- Junos OS Services Interfaces Library for Routing Devices

unit (Dynamic Demux Interface)

IN THIS SECTION

Syntax

```
unit logical-unit-number {
    demux-options {
        underlying-interface interface-name
    }
```

```
    family family {
        access-concentrator name;
        address address;
        demux-source {
            source-address;
        }
        direct-connect;
        duplicate-protection;
        dynamic-profile profile-name;
        filter {
            input filter-name;
            output filter-name;
        }
        mac-validate (loose | strict):
        max-sessions number;
        max-sessions-vsa-ignore;
        rpf-check {
            fail-filter filter-name;
            mode loose;
        }
        service-name-table table-name;
        short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max maximum-seconds>;
        unnumbered-address interface-name <preferred-source-address address>;
    }
    filter {
        input filter-name;
        output filter-name;
    }
}
vlan-id number;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces demux0]
```

Description

Configure a dynamic logical interface on the physical device. You must configure a logical interface to be able to use the physical device.

Options

logical-unit-number—Either the specific unit number of the interface or the unit number variable (`$junos-interface-unit`). The variable is used to specify the unit of the interface when a new demux interface is dynamically created. The static unit number variable is dynamically replaced with the unit number that DHCP supplies when the subscriber logs in.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.3.

RELATED DOCUMENTATION

> *Configuring Dynamic Subscriber Interfaces Using IP Demux Interfaces in Dynamic Profiles*

unit (Dynamic Profiles Standard Interface)

IN THIS SECTION

Syntax

```
unit logical-unit-number {
    actual-transit-statistics;
    auto-configure {
        agent-circuit-identifier {
            dynamic-profile profile-name;
        }
        line-identity {
            include {
                accept-no-ids;
                circuit-id;
                remote-id;

            }
            dynamic-profile profile-name;
        }
    }
    dial-options {
        ipsec-interface-id name;
        l2tp-interface-id name;
        (shared | dedicated);
    }
    encapsulation  (atm-ccc-cell-relay | atm-ccc-vc-mux | atm-cisco-nlpid | atm-tcc-vc-mux | atm-
mlppp-llc | atm-nlpid | atm-ppp-llc | atm-ppp-vc-mux | atm-snap | atm-tcc-snap | atm-vc-mux |
ether-over-atm-llc | ether-vpls-over-atm-llc | ether-vpls-over-fr | ether-vpls-over-ppp |
ethernet | frame-relay-ccc | frame-relay-ppp | frame-relay-tcc | frame-relay-ether-type | frame-
relay-ether-type-tcc | multilink-frame-relay-end-to-end | multilink-ppp | ppp-over-ether | ppp-
over-ether-over-atm-llc | vlan-bridge | vlan-ccc | vlan-vci-ccc | vlan-tcc | vlan-vpls);
    family family {
        address address;
        demux-destination,
        filter {
            adf {
                counter;
                input-precedence precedence;
                not-mandatory;
                output-precedence precedence;
                rule rule-value;
            }
            input filter-name {
                precedence precedence;
```

```
            shared-name filter-shared-name;
        }
        output filter-name {
            precedence precedence;
            shared-name filter-shared-name;
        }
    }
    max-sessions number;
    max-sessions-vsa-ignore;
    rpf-check {
        fail-filter filter-name;
        mode loose;
    }
    service {
         input {
             service-set service-set-name {
                 service-filter filter-name;
             }
             post-service-filter filter-name;
        }
        input-vlan-map {
            inner-tag-protocol-id tpid;
            inner-vlan-id number;
            (push | swap);
            tag-protocol-id tpid;
            vlan-id number;
        }
        output {
             service-set service-set-name {
                 service-filter filter-name;
             }
        }
        output-vlan-map {
            inner-tag-protocol-id tpid;
            inner-vlan-id number;
            (pop | swap);
            tag-protocol-id tpid;
            vlan-id number;
        }
    }
    service-name-table table-name
    short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max maximum-seconds>;
    unnumbered-address interface-name <preferred-source-address address>;
```

```
    }
    filter {
        input filter-name {
            shared-name  filter-shared-name;
        }
        output filter-name {
            shared-name  filter-shared-name;
        }
    }
    host-prefix-only;
    keepalives {
        interval seconds;
        }
    ppp-options {
        aaa-options aaa-options-name;
        authentication [ authentication-protocols ];
        chap {
            challenge-length minimum minimum-length maximum maximum-length;
            local-name name;
        }
        ignore-magic-number-mismatch;
        initiate-ncp (dual-stack-passive | ipv6 | ip)
        ipcp-suggest-dns-option;
        mru size;
        mtu (size | use-lower-layer);
        on-demand-ip-address;
        pap;
        peer-ip-address-optional;
        local-authentication {
            password password;
            username-include {
                circuit-id;
                delimiter character;
                domain-name name;
                mac-address;
                remote-id;
            }
        }
    }
    service {
        pcef  pcef-profile-name {
            activate rule-name | activate-all;
        }
```

```
    }
    targeted-options {
        backup backup;
        group group;
        primary primary;
        weight ($junos-interface-target-weight | weight-value);
    }
    vlan-id number;
    vlan-tags outer  [tpid].vlan-id [inner [tpid].vlan-id];
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name]
```

Description

Configure a logical interface on the physical device. You must configure a logical interface to be able to use the physical device.

Options

logical-unit-number—The specific unit number of the interface you want to assign to the dynamic profile, or one of the following predefined variables:

- `$junos-underlying-interface-unit`—For static VLANs, the unit number variable. The static unit number variable is dynamically replaced with the client unit number when the client session begins. The client unit number is specified by the DHCP when it accesses the subscriber network.
- `$junos-interface-unit`—The unit number variable on a dynamic underlying VLAN interface for which you want to enable the creation of dynamic VLAN subscriber interfaces based on the ACI.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.2.

RELATED DOCUMENTATION

Configuring Dynamic Underlying VLAN Interfaces to Use Agent Circuit Identifier Information

Configuring Static Underlying VLAN Interfaces to Use Agent Circuit Identifier Information

Agent Circuit Identifier-Based Dynamic VLANs Overview

unnumbered-address (Dynamic PPPoE)

IN THIS SECTION

Syntax

```
unnumbered-address interface-name;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces pp0 unit "$junos-interface-unit" family inet]
```

Description

For dynamic PPPoE interfaces, enable the local address to be derived from the specified interface. Configuring unnumbered Ethernet interfaces enables IP processing on the interface without assigning an explicit IP address to the interface.

Options

interface-name—Interface from which the local address is derived. The interface name must include a logical unit number and must have a configured address.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.1.

RELATED DOCUMENTATION

Configuring a PPPoE Dynamic Profile

Dynamic PPPoE Subscriber Interfaces over Static Underlying Interfaces Overview

unnumbered-address (Dynamic Profiles)

IN THIS SECTION

Syntax

```
unnumbered-address interface-name <preferred-source-address address>;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number family
family],
[edit dynamic-profiles profile-name interfaces demux0 unit logical-unit-number family family]
```

Description

For Ethernet interfaces, enable the local address to be derived from the specified interface. Configuring unnumbered Ethernet interfaces enables IP processing on the interface without assigning an explicit IP address to the interface. To configure unnumbered address dynamically, include the `$junos-loopback-interface-address` predefined variable.

You can configure unnumbered address support on Ethernet interfaces for IPv4 and IPv6 address families.

Options

interface-name Name of the interface from which the local address is derived. The specified interface must have a logical unit number, a configured IP address, and must not be an unnumbered interface. This value can be a specific interface name or the `$junos-loopback-interface` predefined variable.

When defining the `unnumbered-address` statement using a static interface, keep the following in mind:

- If you choose to include the `routing-instance` statement at the `[edit dynamic-profiles]` hierarchy level, that statement must be configured with a dynamic value by using the `$junos-routing-instance` predefined variable. In addition, whatever static unnumbered

interface you specify must belong to that routing instance; otherwise, the profile instantiation fails.

- If you choose to not include the `routing-instance` statement at the `[edit dynamic-profiles]` hierarchy level, the unnumbered-address statement uses the default routing instance. The use of the default routing instance requires that the unnumbered interface be configured statically and that it reside in the default routing instance.

> **NOTE**: When you specify a static logical interface for the unnumbered interface in a dynamic profile that includes the `$junos-routing-instance` predefined variable, you must not configure a preferred source address, whether with the `$junos-preferred-source-address` predefined variable, the `$junos-preferred-source-ipv6-address` predefined variable, or the `preferred-source-address` statement. Configuring the preferred source address in this circumstance causes a commit failure.

When defining the `unnumbered-address` statement using the `$junos-loopback-interface` predefined variable, keep the following in mind:

- To use the `$junos-loopback-interface` predefined variable, the dynamic profile must also contain the `routing-instance` statement configured with the `$junos-routing-instance` predefined variable at the [edit dynamic-profiles] hierarchy level.
- The applied loopback interface is based on the dynamically obtained routing instance of the subscriber.

address (Optional) Secondary IP address of the donor interface. Configuring the preferred source address enables you to use an IP address other than the primary IP address on some of the unnumbered Ethernet interfaces in your network. This value can be a static IP address, the `$junos-preferred-source-address` predefined variable for the inet family, or the `$junos-preferred-source-ipv6-address` predefined variable for the inet6 family.

When defining the `preferred-source-address` value using a static IP address, keep the following in mind:

- The unnumbered interface must be statically configured.
- The IP address specified as the `preferred-source-address` must be configured in the specified unnumbered interface.

When defining the `preferred-source-address` value using the `$junos-preferred-source-address` or the `$junos-preferred-source-ipv6-address` predefined variables, keep the following in mind:

- You must configure the `unnumbered-address` statement using the `$junos-loopback-interface` predefined variable.
- You must configure the `routing-instance` statement using the `$junos-routing-instance` predefined variable at the `[edit dynamic-profiles]` hierarchy level.
- The preferred source address chosen is based on the dynamically applied loopback address which is in turn derived from the dynamically obtained routing instance of the subscriber. The configured loopback address with the closest network match to the user IP address is selected as the preferred source address.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.2.

Support for the `$junos-preferred-source-address` and `$junos-preferred-source-ipv6-address` predefined variables introduced in Junos OS Release 9.6.

Support for the `$junos-loopback-interface` predefined variable introduced in Junos OS Release 9.6.

RELATED DOCUMENTATION

Dynamic Profiles Overview

unnumbered-address (Ethernet)

IN THIS SECTION

Syntax

```
unnumbered-address interface-name <preferred-source-address address>;
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number family family],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family
family]
```

Description

For Ethernet interfaces, enable the local address to be derived from the specified interface. Configuring an unnumbered Ethernet interface enables IP processing on the interface without assigning an explicit IP address to the interface.

Options

interface-name—Name of the interface from which the local address is derived. The specified interface must have a logical unit number and a configured IP address, and must not be an unnumbered interface.

The `preferred-source-address` statement is explained separately.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 8.2.

`preferred-source-address` option introduced in Junos OS Release 9.0.

RELATED DOCUMENTATION

- Configuring an Unnumbered Interfaceaddress
- address
- Overview for Junos OS

username-include (Interfaces)

IN THIS SECTION

Syntax

```
username-include {
    circuit-id;
    circuit-type;
    delimiter delimiter-character;
    domain-name domain-name-string;
    interface-name;
    mac-address;
    option-18;
    option-37;
```

```
    option-82 <circuit-id> <remote-id>;
    radius-realm radius-realm-string;
    remote-id;
    user-prefix user-prefix-string;
    vlan-tags;
}
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure vlan-ranges authentication],
[edit interfaces interface-name auto-configure stacked-vlan-ranges authentication]
```

Description

Configure the username that the router passes to the external AAA server. You must include at least one of the optional statements for the username to be valid. If you do not configure a username, the router accesses the local authentication service only and does not use external authentication services, such as RADIUS.

The username takes the format *user-prefix mac-address circuit-type circuit-id remote-id option-82 interface-name domain-name radius-realm*. By default, each component is separated by a period (.), but you can specify a different delimiter with the `delimiter` statement.

Options

vlan-tags Include the subscriber session VLAN tags in the username for interactions with an external authority. Both single-tagged and double-tagged VLANs are supported: The tags are added in the format *outer-vlan-tag-inner-vlan-tag*. The outer tag is always included; the inner tag is included for double-tagged VLANs.

You can use this option instead of the `interface-name` option when the outer VLAN tag is unique across the system and you do not need the underlying physical interface name to be part of the format.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.0.

`vlan-tags` option added in Junos OS Release 18.3R1 on MX Series routers.

RELATED DOCUMENTATION

Configuring VLAN Interface Username Information for AAA Authentication

Using DHCP Option 82 Suboptions in Authentication Usernames for Autosense VLANs

Using DHCP Option 18 and Option 37 in Authentication Usernames for DHCPv6 Autosense VLANs

Configuring a Username for Authentication of Out-of-Band Triggered Dynamic VLANs | 149

user-prefix (DHCP Local Server)

IN THIS SECTION

Syntax

```
user-prefix user-prefix-string;
```

Hierarchy Level

[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server authentication username-include],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 authentication],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* authentication username-include],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server group *group-name* authentication username-include],
[edit logical-systems *logical-system-name* system services dhcp-local-server authentication username-include],
[edit logical-systems *logical-system-name* system services dhcp-local-server dhcpv6 authentication username-include],
[edit logical-systems *logical-system-name* system services dhcp-local-server dhcpv6 group *group-name* authentication username-include],
[edit logical-systems *logical-system-name* system services dhcp-local-server group *group-name* authentication username-include],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server authentication username-include],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 authentication username-include],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* authentication username-include],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server group *group-name* authentication username-include],
[edit routing-instances *routing-instance-name* system services dhcp-local-server authentication username-include],
[edit routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 authentication username-include],
[edit routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* authentication username-include],
[edit routing-instances *routing-instance-name* system services dhcp-local-server group *group-name* authentication username-include],
[edit system services dhcp-local-server authentication username-include],
[edit system services dhcp-local-server dhcpv6 authentication username-include],
[edit system services dhcp-local-server dhcpv6 group *group-name* authentication username-include],
[edit system services dhcp-local-server group *group-name* authentication username-include]

Description

Specify the user prefix that is concatenated with the username during the subscriber authentication or DHCP client authentication process.

Options

user-prefix-string—User prefix string.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.1.

RELATED DOCUMENTATION

Specifying Authentication Support

vlan-id (Dynamic VLANs)

IN THIS SECTION

Syntax

```
vlan-id number;
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number input-vlan-map],
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number output-vlan-map]
```

Description

For dynamic VLAN interfaces, specify the line VLAN identifiers to be rewritten at the input or output interface.

You cannot include the `vlan-id` statement with the `swap` statement, `swap-push` statement, `push-push` statement, or `push-swap` statement at the `[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number output-vlan-map]` hierarchy level. If you include any of those statements in the output VLAN map, the VLAN ID in the outgoing frame is rewritten to the `vlan-id` statement that you include at the `[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number]` hierarchy level.

Options

number A valid VLAN identifier. When used for input VLAN maps, you can specify the `$junos-vlan-map-id` predefined variable to dynamically obtain the VLAN identifier.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 10.4.

RELATED DOCUMENTATION

- Rewriting the VLAN Tag on Tagged Frames
- Binding VLAN IDs to Logical Interfaces

vlan-model

IN THIS SECTION

Syntax

```
vlan-model one-to-one;
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit routing-instances routing-instance-name]
```

Description

Define the network VLAN model.

Options

one-to-one—Specify that any received, dual-tagged VLAN packet triggers the provisioning process in a Layer 2 Wholesale network. Using this option, the router learns VLAN tags for each individual client. The router learns both the outer tag and inner tag of the incoming packets, when the instance-role statement is defined as access, or the outer VLAN tag only, when the instance-role statement is defined as nni.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 11.2.

RELATED DOCUMENTATION

Configuring Separate Access Routing Instances for Layer 2 Wholesale Service Retailers | 112

Configuring Separate NNI Routing Instances for Layer 2 Wholesale Service Retailers | 115

vlan-ranges

IN THIS SECTION

Syntax

```
vlan-ranges {
    access-profile profile-name;
    authentication {
        packet-types  [packet-types];
        password password-string;
        username-include {
            circuit-type;
            circuit-id;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-name;
            mac-address;
            option-18;
            option-37;
            option-82 <circuit-id> <remote-id>;
            radius-realm radius-realm-string;
            remote-id;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    dynamic-profile profile-name {
        accept (any | dhcp-v4 | inet);
        accept-out-of-band protocol;
        access-profile vlan-dynamic-profile-name;
        ranges (any | low-tag)-(any | high-tag);
    }
    override;
}
```

Hierarchy Level

```
[edit interfaces interface-name auto-configure]
```

Description

Configure multiple VLANs. Each VLAN is assigned a VLAN ID number from the range.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

RELATED DOCUMENTATION

> *Configuring an Interface to Use the Dynamic Profile Configured to Create Single-Tag VLANs*
>
> *Configuring Interfaces to Support Both Single and Stacked VLANs*

vlan-tags

IN THIS SECTION

Syntax

```
vlan-tags outer [tpid].vlan-id [inner [tpid].vlan-id];
```

Hierarchy Level

```
[edit dynamic-profiles profile-name interfaces interface-name unit logical-unit-number]
```

Description

For Gigabit Ethernet IQ and IQE interfaces only, binds TPIDs and 802.1Q VLAN tag IDs to a logical interface. You must include the `stacked-vlan-tagging` statement at the `[edit interfaces interface-name]` hierarchy level.

NOTE: The `inner-range vid1-vid2` option is supported on IQE PICs only.

Options

inner **[*tpid*].*vlan-id***

A TPID (optional) and a valid VLAN identifier in the format *tpid.vlan-id*. When used in the `dynamic-profiles` hierarchy, specify the `$junos-vlan-id` predefined variable to dynamically obtain the VLAN ID.

NOTE: On the network-to-network (NNI) or egress interfaces of provider edge (PE) routers, you cannot configure the `inner-range tpid. vid1-vid2` option with the `vlan-tags` statement for ISP-facing interfaces.

- **Range:** For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.

outer **[*tpid*].*vlan-id***

A TPID (optional) and a valid VLAN identifier in the format *tpid.vlan-id*. When used in the `dynamic-profiles` hierarchy, specify the `$junos-stacked-vlan-id` predefined variable.

- **Range:** For VLAN ID, 1 through 511 for normal interfaces, and 512 through 4094 for VLAN CCC interfaces. VLAN ID 0 is reserved for tagging the priority of frames.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.5.

VLAN demux interface support introduced in Junos OS Release 10.2.

RELATED DOCUMENTATION

Configuring Dual VLAN Tags

vlan-tags (Stacked VLAN Tags)

IN THIS SECTION

Syntax

```
vlan-tags inner tpid.vlan-id inner-list value inner-range vid1–vid2 outer tpid.vlan-id;
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]
```

Description

Bind TPIDs and 802.1Q VLAN tag IDs to a logical interface. TPID fields are used to identify the frame as an IEEE 802.1Q-tagged frame.

Options

inner *tpid.vlan-id*

A TPID and a valid VLAN identifier. TPID is a 16-bit field set to a value of 0x8100 in order to identify the frame as an IEEE 802.1Q-tagged frame.

- **Range:** (most routers) For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames. For PTX Series, VLAN ID 0 is not supported.

inner-list *value*

List or a set of VLAN identifiers.

> **NOTE**: This is supported on MX Series routers with Trio-based FPCs.

inner-range *tpid. vid1-vid2*

Specify a TPID and a range of VLAN IDs where vid1 is the start of the range and vid2 is the end of the range.

> **NOTE**: On the network-to-network (NNI) or egress interfaces of provider edge (PE) routers, you cannot configure the `inner-range` *tpid. vid1–vid2* option with the `vlan-tags` statement for ISP-facing interfaces.

- **Range:** For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.

outer *tpid.vlan-id*

A TPID and a valid VLAN identifier.

- **Range:** (most routers) For VLAN ID, 1 through 511 for normal interfaces, and 512 through 4094 for VLAN CCC interfaces. VLAN ID 0 is reserved for tagging the priority of frames. For PTX Series, VLAN ID 0 is not supported.

> **NOTE**: Configuring `inner-range` with the entire vlan-id range consumes system resources and is not a best practice. The `inner-range` must be used only when a subset of VLAN IDs of inner tag (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1 through 4094), it has the same

result as not specifying a range; however, it consumes Packet Forwarding Engine resources such as VLAN lookup table entries, and so on.

The following examples illustrate this further:

1. **Inefficient**

```
[edit interfaces  interface-name]stacked-vlan-tagging;
unit number {
    vlan-tags outer vid inner-range 1-4094;
}
```

2. **Best Practice**

```
[edit interfaces interface-name]
vlan-tagging;
unit number {
    vlan-id vid;
}
```

NOTE: Configuring `inner-range` with the entire vlan-id range consumes system resources and is not a best practice. The `inner-range` must be used only when a subset of VLAN IDs of inner tag (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1 through 4094), it has the same result as not specifying a range; however, it consumes Packet Forwarding Engine resources such as VLAN lookup table entries, and so on.

The following examples illustrate this further:

1. **Inefficient**

```
[edit interfaces  interface-name]
stacked-vlan-tagging;
unit number {
    vlan-tags outer vid inner-range 1-4094;
}
```

2. **Best Practice**

```
[edit interfaces interface-name]
vlan-tagging;
unit number {
    vlan-id vid;
}
```

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

RELATED DOCUMENTATION

- Configuring Dual VLAN Tags
- Configuring Flexible VLAN Tagging on PTX Series Packet Transport Routers
- stacked-vlan-tagging

vpls (Routing Instance)

IN THIS SECTION

Syntax

```
vpls {
    mac-pinning;
    active-interface {
        any;
        primary interface-name;
    }
    community COMM;
    connectivity-type (ce | irb);
    control-word;
    encapsulation-type ethernet;
    ignore-encapsulation-mismatch;
    ignore-mtu-mismatch;
    import-labeled-routes [ routing-instance-name ];
    interface interface-name;
    interface-mac-limit limit;
    label-block-size size;
    mac-flush [ explicit-mac-flush-message-options ];
    mac-table-aging-time time;
    mac-table-size size;
    mesh-group mesh-group-name {
        interface interface-name;
        l2vpn-id (as-number:id | ip-address:id);
        local-switching;
        mac-flush [ explicit-mac-flush-message-options ];
        neighbor address {...};
        peer-as all;
        pseudowire-status-tlv hot-standby-vc-on;
        route-distinguisher (as-number:id | ip-address:id);
        vpls-id number;
        vrf-export [ policy-names ];
        vrf-import [ policy-names ];
        vrf-target {
            community;
            import community-name;
            export community-name;
        }
    }
    mtu mtu;
    no-control-word;
    no-tunnel-services;
```

```
    service-type single;
    site site-name {
        active-interface interface-name {
            any;
            primary preference-value;
        }
        best-site;
        interface interface-name {
            interface-mac-limit limit;
        }
        mesh-group mesh-group-name;
        multi-homing;
        site-identifier identifier;
        site-preference preference-value {
            backup;
            primary;
        }
    }
    site-range number;
    traceoptions {
        file filename <files number> <size size> <world-readable | no-world-readable>;
        flag flag <flag-modifier> <disable>;
    }
    tunnel-services {
        devices device-names;
        primary primary-device-name;
    }
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols],
[edit routing-instances routing-instance-name protocols]
```

Description

Configure a virtual private LAN service (VPLS) routing instance.

The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.

Options

`service-type single`—Allows one vlan per routing instance.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

`mac-flush` option introduced in Junos OS Release 10.0.

`hot-standby-vc-on`, `import-labeled-routes [ routing-instance-name ]`, and `interface interface` options introduced in Junos OS Release 15.1R2.

RELATED DOCUMENTATION

Configuring VPLS Routing Instances

vrf-export

IN THIS SECTION

Syntax

```
vrf-export [ policy-names ];
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name
protocols                              vpls mesh-group mesh-group-name]
[edit protocols evpn interconnect]
[edit routing-instances routing-instance-name]
[edit routing-instances routing-instance-name protocols evpn interconnect]
[edit routing-instances routing-instance-name protocols vpls mesh-group mesh-group-name]
[edit switch-options]
```

Description

Specify how routes are exported from the local device' s routing table (*routing-instance-name*.inet.0) to the remote device. If the value `vrf` is specified for the `instance-type` statement included in the routing instance configuration, this statement is required.

You can configure multiple export policies on the router or switch.

Default

If the instance-type is `vrf`, `vrf-export` is a required statement. The default action is to reject.

Options

policy-names—Names for the export policies.

Required Privilege Level

routing— To view this statement in the configuration.

routing-control— To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

Support at the following hierarchy levels introduced in Junos OS Release 20.3R1 on QFX Series switches: `[edit protocols evpn interconnect]` and `[edit routing-instances routing-instance-name protocols evpn interconnect]`.

RELATED DOCUMENTATION

Implementing EVPN-VXLAN for Data Centers

instance-type

Configuring Policies for the VRF Table on PE Routers in VPNs

vrf-import

IN THIS SECTION

Syntax

```
vrf-import [ policy-names ];
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit  logical-systems logical-system-name routing-instances routing-instance-name
protocols                          vpls mesh-group mesh-group-name]
[edit protocols evpn interconnect]
[edit routing-instances routing-instance-name]
[edit routing-instances routing-instance-name protocols evpn interconnect]
[edit routing-instances routing-instance-name protocols vpls mesh-group mesh-group-name]
[edit switch-options]
```

Description

Specify how routes are imported into the routing table (*routing-instance-name*.inet.0) of the local device from the remote device.

You can configure multiple import policies on the device.

One of the following statements are required for importing routes:

- **vrf-target** - When you configure only the `vrf-target` statement without the `vrf-import` statement, by default all routes matching the specified target community are accepted.
- **vrf-import** - When you configure only the `vrf-import` statement, there is no default action. Only routes accepted in the configured `vrf-import` policy statement are imported.

Options

policy-names—Names for the import policies.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

Support at the following hierarchy levels introduced in Junos OS Release 20.3R1 on QFX Series switches: `[edit protocols evpn interconnect]` and `[edit routing-instances routing-instance-name protocols evpn interconnect]`.

RELATED DOCUMENTATION

Implementing EVPN-VXLAN for Data Centers

instance-type

Configuring Policies for the VRF Table on PE Routers in VPNs

vrf-target

IN THIS SECTION

Syntax

```
vrf-target {
    community;
    auto
    import community-name;
    export community-name;
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols
l2vpn mesh-group mesh-group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name protocols vpls
mesh-group mesh-group-name],
[edit protocols evpn interconnect],
[edit routing-instances routing-instance-name protocols evpn interconnect],
[edit routing-instances routing-instance-name protocols evpn vni-options],
[edit routing-instances routing-instance-name protocols l2vpn mesh-group mesh-group-name],
[edit routing-instances routing-instance-name protocols vpls mesh-group mesh-group-name],
[edit switch-options]
```

Description

Specify a virtual routing and forwarding (VRF) target community. If you configure the *community* option only, default VRF import and export policies are generated that accept and tag routes with the specified target community. The purpose of the `vrf-target` statement is to simplify the configuration by allowing you to configure most statements at the `[edit routing-instances]` hierarchy level. In effect, this statement configures a single policy for import and a single policy for export to replace the per-VRF policies for every community.

You can still create more complex policies by explicitly configuring VRF import and export policies using the `import` and `export` options.

Options

community—Community name.

auto—Automatically derives the route target (RT). The auto-derived route targets have higher precedence over manually configured RT in vrf-target, vrf-export policies, and vrf-import policies.

> **NOTE**: Auto-derived route targets are supported only in virtual switch and EVPN routing instances.

`import` *community-name*—Allowed communities accepted from neighbors.

`export` *community-name*—Allowed communities sent to neighbors.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 7.4.

`auto option` added in Junos OS Release 19.1R1 for MX series.

Support at the following hierarchy levels introduced in Junos OS Release 20.3R1 on QFX Series switches: `[edit protocols evpn interconnect]` and `[edit routing-instances routing-instance-name protocols evpn interconnect]`.

RELATED DOCUMENTATION

> *Configuring Policies for the VRF Table on PE Routers in VPNs*
>
> *Example: Configuring FEC 129 BGP Autodiscovery for VPWS*

CHAPTER 13

Operational Commands

IN THIS CHAPTER

clear ancp access-loop

IN THIS SECTION

Syntax

```
clear ancp access-loop
(neighbor ip-address | subscriber-interface physical-interface-name)
circuit-id aci
remote-id ari
outer-vlan-id vlan-id
```

Description

Clear the connection for the subscriber on the specified access loop for an ANCP-triggered, autosensed dynamic VLAN. The autoconfiguration daemon (autoconfd) deletes any existing cached information about the subscriber. This command simulates a CPE connection reset as seen when the access node sends a Port Down message followed by a Port Up message.

Options

aci	ANCP Access-Loop-Circuit-ID TLV that identifies the subscriber-side access loop logical port and partially identifies an access loop to clear.
ari	ANCP Access-Loop-Remote-ID TLV that uniquely identifies the subscriber on the access loop and partially identifies an access loop to clear.
ip-address	ANCP neighbor's IP address that specifies an access loop to clear.
physical-interface-name	Subscriber interface that specifies an access loop to clear.
vlan-id	ANCP Access-Aggregation-Circuit-ID-Binary TLV that identifies the logical circuit identifier on the NAS side and partially identifies an access loop to clear.

Required Privilege Level

clear

Output Fields

When you enter this command, you are provided no feedback on the status of your request. You can enter the `show ancp neighbor` command before and after clearing the access loop to verify the clear operation.

Sample Output

clear ancp access-loop

```
user@host> clear ancp-access-loop neighbor 192.168.25.31 circuit-id line-aci-1 remote-id line-ari-1 outer-vlan-id 126
```

Release Information

Command introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

- Clearing ANCP Access Loops | 156
- Triggering ANCP OAM to Simulate ANCP Port Down and Port Up Messages | 151
- Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

clear ancp neighbor

IN THIS SECTION

Syntax

```
clear ancp neighbor
<ip-address ip-address>
<system-name mac-address>
```

Description

Clear the ANCP agent connection with all ANCP neighbors or with the specified ANCP neighbor. This command deletes information for subscribers associated with the neighbor, causing the adjusted traffic rates to revert to the configured rate for the subscriber interfaces. The neighbor remains configured (its administrative state is *enabled*) and can reestablish adjacencies.

This command initiates logout of ANCP-triggered dynamic VLAN sessions on the physical interface associated with the specified neighbor; conventionally autosensed dynamic VLAN sessions and their associated logical interfaces are not affected.

Options

none	Clear all ANCP neighbors.
ip-address *ip-address*	(Optional) Clear the ANCP neighbor specified by the IP address.
system-name *mac-address*	(Optional) Clear the ANCP neighbor specified by the MAC address.

Required Privilege Level

clear

Output Fields

When you enter this command, you are provided no feedback on the status of your request. You can enter the `show ancp neighbor` command before and after clearing the ANCP neighbors to verify the clear operation.

Sample Output

clear ancp neighbor

```
user@host> clear ancp neighbor
```

show ancp neighbor

The following sample output displays the connections with ANCP neighbors before and after the `clear ancp neighbor` command was issued.

```
user@host> show ancp neighbor

  IP Address        MAC Address         State         Subscriber   Capabilities
                                                        Count
  203.0.113.102     00:00:5e:00:53:10  Established    5              Topo
  203.0.113.122     00:00:5e:00:53:12  Established    5              Topo
  203.0.113.132     00:00:5e:00:53:13  Established    5              Topo
  203.0.113.142     00:00:5e:00:53:14  Established    5              Topo


user@host> clear ancp neighbor ip-address 203.0.113.102

user@host> show ancp neighbor

  IP Address        MAC Address         State         Subscriber   Capabilities
                                                        Count
  203.0.113.122     00:00:5e:00:53:12  Established    5              Topo
  203.0.113.132     00:00:5e:00:53:13  Established    5              Topo
  203.0.113.142     00:00:5e:00:53:14  Established    5              Topo
```

Release Information

Command introduced in Junos OS Release 9.4.

RELATED DOCUMENTATION

show ancp neighbor | 577

clear dhcp relay binding

IN THIS SECTION

Syntax

```
clear dhcp relay binding
<address>
<all>
<dual-stack>
<interface interface-name>
<interfaces-vlan>
<interfaces-wildcard>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Description

Clear the binding state of a Dynamic Host Configuration Protocol (DHCP) client from the client table.

Options

address	(Optional) Clear the binding state for the DHCP client, using one of the following entries: • *ip-address*—The specified IP address. • *mac-address*—The specified MAC address. • *session-id*—The specified session ID.
all	(Optional) Clear the binding state for all DHCP clients.
dual-stack	(Optional) Clear the binding state for DHCPv4 clients and the associated DHCPv6 bindings in the single-session DHCP dual stack. DHCPv6 clients created in a DHCPv6-only stack are not affected.
interface *interface-name*	(Optional) Clear the binding state for DHCP clients on the specified interface.
interfaces-vlan	(Optional) Clear the binding state on the interface VLAN ID and S-VLAN ID.
interfaces-wildcard	(Optional) The set of interfaces on which to clear bindings. This option supports the use of the wildcard character (*).
logical-system *logical-system-name*	(Optional) Clear the binding state for DHCP clients on the specified logical system.
routing-instance *routing-instance-name*	(Optional) Clear the binding state for DHCP clients on the specified routing instance.

Required Privilege Level

view

Output Fields

See "show dhcp relay binding" on page 605 for an explanation of output fields.

Sample Output

clear dhcp relay binding

The following sample output displays the address bindings in the DHCP client table before and after the `clear dhcp relay binding` command is issued.

```
user@host> show dhcp relay binding
IP address       Hardware address   Type     Lease expires at
198.51.100.32     00:00:5e:00:53:01  active   2007-02-08 16:41:17 EST
192.168.14.8      00:00:5e:00:53:02  active   2007-02-10 10:01:06 EST


user@host> clear dhcp relay binding 198.51.100.32

user@host> show dhcp relay binding
IP address       Hardware address   Type     Lease expires at
192.168.14.8      00:00:5e:00:53:02  active   2007-02-10 10:01:06 EST
```

clear dhcp relay binding all

The following command clears all DHCP relay agent bindings:

```
user@host> clear dhcp relay binding all
```

clear dhcp relay binding dual-stack all

The following command clears all DHCP relay agent bindings for all DHCPv4 clients and the associated DHCPv6 bindings in the single-session DHCP dual stack. DHCPv6 clients created in a DHCPv6-only stack are not affected.

```
user@host> clear dhcp relay binding dual-stack all
```

clear dhcp relay binding interface

The following command clears DHCP relay agent bindings on a specific interface:

```
user@host> clear dhcp relay binding interface fe-0/0/3
```

clear dhcp relay binding <interfaces-vlan>

The following command uses the *interfaces-vlan* option to clear all DHCP relay agent bindings on top of the underlying interface `ae0`, which clears DHCP bindings on all demux VLANs on top of `ae0`:

```
user@host> clear dhcp relay binding interface ae0
```

clear dhcp relay binding <interfaces-wildcard>

The following command uses the *interfaces-wildcard* option to clear all DHCP relay agent bindings over a specific interface:

```
user@host> clear dhcp relay binding ge-1/0/0.*
```

Release Information

Command introduced in Junos OS Release 8.3.

Options `all` and `interface` added in Junos OS Release 8.4.

Options *interfaces-vlan* and *interfaces-wildcard* added in Junos OS Release 12.1.

Option `dual-stack` added in Junos OS Release 15.1.

RELATED DOCUMENTATION

> *Viewing and Clearing DHCP Bindings*
>
> *show dhcp relay binding*

clear dhcp relay statistics

IN THIS SECTION

Syntax

```
clear dhcp relay statistics
<bulk-leasequery-connections>
<leasequery>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Syntax

Syntax for EX Series switches:

```
show dhcp relay statistics
<routing-instance routing-instance-name>
```

Description

Clear all Dynamic Host Configuration Protocol (DHCP) relay statistics.

Options

bulk-leasequery-connections	(Optional) Clear DHCP relay bulk leasequery statistics.
leasequery	(Optional) Clear DHCP relay individual leasequery statistics.
logical-system *logical-system-name*	(On routers only) (Optional) Perform this operation on the specified logical system. If you do not specify a logical system name, statistics are cleared for the default logical system.
routing-instance *routing-instance-name*	(Optional) Perform this operation on the specified routing instance. If you do not specify a routing instance name, statistics are cleared for the default routing instance.

Required Privilege Level

view

Output Fields

See `show dhcp relay statistics` for an explanation of output fields.

Sample Output

clear dhcp relay statistics

The following sample output displays the DHCP relay statistics before and after the `clear dhcp relay statistics` command is issued.

```
user@host> show dhcp relay statistics
Packets dropped:
    Total                     1
    Lease Time Violated       1

Messages received:
    BOOTREQUEST               116
    DHCPDECLINE               0
    DHCPDISCOVER              11
    DHCPINFORM                0
    DHCPRELEASE               0
```

```
    DHCPREQUEST                105

Messages sent:
    BOOTREPLY                  44
    DHCPOFFER                  11
    DHCPACK                    11
    DHCPNAK                    11


user@host> clear dhcp relay statistics

user@host> show dhcp relay statistics
Packets dropped:
    Total                      0

Messages received:
    BOOTREQUEST                0
    DHCPDECLINE                0
    DHCPDISCOVER               0
    DHCPINFORM                 0
    DHCPRELEASE                0
    DHCPREQUEST                0

Messages sent:
    BOOTREPLY                  0
    DHCPOFFER                  0
    DHCPACK                    0
    DHCPNAK                    0
```

Release Information

Command introduced in Junos OS Release 8.3.

`bulk-leasequery-connections` option introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

show dhcp relay statistics | 614

clear dhcp server binding

IN THIS SECTION

Syntax

```
clear dhcp server binding
<address>
<all>
<interface interface-name>
<interfaces-vlan>
<interfaces-wildcard>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
<dual-stack>
```

Description

Clear the binding state of a Dynamic Host Configuration Protocol (DHCP) client from the client table on the extended DHCP local server.

NOTE: If you delete the DHCP server configuration, DHCP server bindings might still remain. To ensure that DHCP bindings are removed, issue the `clear dhcp server binding` command before you delete the DHCP server configuration.

Options

address	(Optional) Clear the binding state for the DHCP client, using one of the following entries: • *ip-address*—The specified IP address. • *mac-address*—The specified MAC address. • *session-id*—The specified session ID.
all	(Optional) Clear the binding state for all DHCP clients.
interface *interface-name*	(Optional) Clear the binding state for DHCP clients on the specified interface. **NOTE**: This option clears all bindings whose initial login requests were received over the specified interface. Dynamic demux login requests are not received over the dynamic demux interface, but rather the underlying interface of the dynamic demux interface. To clear a specific dynamic demux interface, use the *ip-address* or *mac-address* options.
interfaces-vlan	(Optional) Clear the binding state on the interface VLAN ID and S-VLAN ID.
interfaces-wildcard	(Optional) Clear bindings on a set of interfaces. This option supports the use of the wildcard character (*).
logical-system *logical-system-name*	(Optional) Clear the binding state for DHCP clients on the specified logical system.
routing-instance *routing-instance-name*	(Optional) Clear the binding state for DHCP clients on the specified routing instance.
dual-stack	(Optional) Remove either both arms or single arm of dual-stack. **NOTE**: • The `dual-stack` command is added in the syntax removes both arms of the dual-stack with a single command entry.

- When the `dual-stack` command is not added in the syntax, the `clear dhcpv6 server binding` command clears only the family specific arm of the dual-stack.

Required Privilege Level

view

Output Fields

See "show dhcp server binding" on page 621 for an explanation of output fields.

Sample Output

clear dhcp server binding <ip-address>

The following sample output displays the address bindings in the DHCP client table on the extended DHCP local server before and after the `clear dhcp server binding` command is issued.

```
user@host> show dhcp server binding

2 clients, (0 bound, 0 selecting, 0 renewing, 0 rebinding)

IP address       Hardware address   Type     Lease expires at
198.51.100.1      00:00:5e:00:53:01  active   2007-01-17 11:38:47 PST
198.51.100.3      00:00:5e:00:53:02  active   2007-01-17 11:38:41 PST


user@host> clear dhcp server binding 198.51.100.1

user@host> show dhcp server binding

1 clients, (0 bound, 0 selecting, 0 renewing, 0 rebinding)

IP address       Hardware address   Type     Lease expires at
198.51.100.3      00:00:5e:00:53:02  active   2007-01-17 11:38:41 PST
```

clear dhcp server binding all

The following command clears all DHCP local server bindings:

```
user@host> clear dhcp server binding all
```

clear dhcp server binding interface

The following command clears DHCP local server bindings on a specific interface:

```
user@host> clear dhcp server binding interface fe-0/0/2
```

clear dhcp server binding <interfaces-vlan>

The following command uses the *interfaces-vlan* option to clear all DHCP local server bindings on top of the underlying interface `ae0`, which clears DHCP bindings on all demux VLANs on top of `ae0`:

```
user@host> clear dhcp server binding ae0
```

clear dhcp server binding <interfaces-wildcard>

The following command uses the *interfaces-wildcard* option to clear all DHCP local server bindings over a specific interface:

```
user@host> clear dhcp server binding ge-1/0/0.*
```

clear dhcp server binding dual-stack all

The following command clears all the dual-stack local server bindings.

```
user@host> clear dhcp server binding dual-stack all
```

Release Information

Command introduced in Junos OS Release 9.0.

Options *interfaces-vlan* and *interfaces-wildcard* added in Junos OS Release 12.1.

Command updated with `dual-stack` statement in Junos OS Release 17.3.

RELATED DOCUMENTATION

Viewing and Clearing DHCP Bindings

show dhcp server binding

clear dhcp server statistics

IN THIS SECTION

Syntax

```
clear dhcp server statistics
<bulk-leasequery-connections>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Description

Clear all extended Dynamic Host Configuration Protocol (DHCP) local server statistics.

Options

bulk-leasequery-connections	(Optional) Clear DHCPv4 local server bulk leasequery statistics.
logical-system *logical-system-name*	(Optional) Clear the statistics for DHCP clients on the specified logical system. If you do not specify a logical system, statistics are cleared for the default logical system.
routing-instance *routing-instance-name*	(Optional) Clear the statistics for DHCP clients on the specified routing instance. If you do not specify a routing instance, statistics are cleared for the default routing instance.

Required Privilege Level

view

Output Fields

See "show dhcp server statistics" on page 631 for an explanation of output fields.

Sample Output

clear dhcp server statistics

The following sample output displays the extended DHCP local server statistics before and after the `clear dhcp server statistics` command is issued.

```
user@host> show dhcp server statistics
Packets dropped:
    Total                     1
    Lease Time Violation      1

Messages received:
    BOOTREQUEST               89163
    DHCPDECLINE               0
    DHCPDISCOVER              8110
```

```
    DHCPINFORM                  0
    DHCPRELEASE                 0
    DHCPREQUEST                 81053

Messages sent:
    BOOTREPLY                   32420
    DHCPOFFER                   8110
    DHCPACK                     8110
    DHCPNAK                     8100


user@host> clear dhcp server statistics

user@host> show dhcp server statistics
Packets dropped:
    Total                       0

Messages received:
    BOOTREQUEST                 0
    DHCPDECLINE                 0
    DHCPDISCOVER                0
    DHCPINFORM                  0
    DHCPRELEASE                 0
    DHCPREQUEST                 0

Messages sent:
    BOOTREPLY                   0
    DHCPOFFER                   0
    DHCPACK                     0
    DHCPNAK                     0
```

Release Information

Command introduced in Junos OS Release 9.0.

`bulk-leasequery-connections` option introduced in Junos OS Release 16.1.

clear dhcpv6 server binding

IN THIS SECTION

Syntax

```
clear dhcpv6 server binding
<address>
<all>
<interface interface-name>
<interfaces-vlan>
<interfaces-wildcard>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
<dual-stack>
```

Description

Clear the binding state of a Dynamic Host Configuration Protocol for IPv6 (DHCPv6) client from the client table on the extended DHCPv6 local server.

Options

address (Optional) Clear the binding state for the DHCPv6 client, using one of the following entries:

- *CID*—The specified Client ID (CID).
- *ipv6-prefix*—The specified IPv6 prefix.
- *session-id*—The specified session ID.

all (Optional) Clear the binding state for all DHCPv6 clients.

interface *interface-name* (Optional) Clear the binding state for DHCPv6 clients on the specified interface.

interfaces-vlan (Optional) Clear the binding state on the interface VLAN ID and S-VLAN ID.

interfaces-wildcard (Optional) Clear bindings on a set of interfaces. This option supports the use of the wildcard character (*).

logical-system *logical-system-name* (Optional) Clear the binding state for DHCPv6 clients on the specified logical system.

routing-instance *routing-instance-name* (Optional) Clear the binding state for DHCPv6 clients on the specified routing instance.

dual-stack (Optional) Remove either both arms or single arm of dual-stack.

NOTE:

- The `dual-stack` command is added in the syntax removes both arms of the dual-stack with a single command entry.
- When the `dual-stack` command is not added in the syntax, the `clear dhcpv6 server binding` command clears only the family specific arm of the dual-stack.

Required Privilege Level

clear

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear dhcpv6 server binding all

The following command clears all DHCPv6 local server bindings:

```
user@host> clear dhcpv6 server binding all
```

clear dhcpv6 server binding <ipv6-prefix>

The following command clears DHCPv6 local server bindings for a specific IPv6 prefix:

```
user@host> clear dhcpv6 server binding 14/0x00010001/0x02b3be8f/0x00109400/0x0005
```

clear dhcpv6 server binding interface

The following command clears DHCPv6 local server bindings on a specific interface:

```
user@host> clear dhcpv6 server binding interface fe-0/0/2
```

clear dhcpv6 server binding <interfaces-vlan>

The following command uses the *interfaces-vlan* option to clear all DHCPv6 local server bindings on top of the underlying interface `ae0`, which clears DHCPv6 bindings on all demux VLANs on top of `ae0`:

```
user@host> clear dhcpv6 server binding interface ae0
```

clear dhcpv6 server binding <interfaces-wildcard>

The following command uses the *interfaces-wildcard* option to clear all DHCPv6 local server bindings over a specific interface:

```
user@host> clear dhcpv6 server binding ge-1/0/0.*
```

clear dhcpv6 server binding dual-stack all

The following command clears all the dual-stack local server bindings.

```
user@host> clear dhcpv6 server binding dual-stack all
```

Release Information

Command introduced in Junos OS Release 9.6.

Options *interfaces-vlan* and *interfaces-wildcard* added in Junos OS Release 12.1.

Command updated with `dual-stack` statement in Junos OS Release 17.3.

RELATED DOCUMENTATION

> *Viewing and Clearing DHCP Bindings*
>
> *show dhcpv6 server binding*

clear dhcpv6 server statistics

IN THIS SECTION

Syntax

```
clear dhcpv6 server statistics
<bulk-leasequery-connections>
<interface interface-name>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Description

Clear all extended Dynamic Host Configuration Protocol for IPv6 (DHCPv6) local server statistics.

Options

bulk-leasequery-connections	(Optional) Clear DHCPv6 local server bulk leasequery statistics.
logical-system *logical-system-name*	(Optional) Clear the statistics for DHCPv6 clients on the specified logical system. If you do not specify a logical system, statistics are cleared for the default logical system.
routing-instance *routing-instance-name*	(Optional) Clear the statistics for DHCPv6 clients on the specified routing instance. If you do not specify a routing instance, statistics are cleared for the default routing instance.

Required Privilege Level

clear

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear dhcpv6 server statistics

```
user@host> clear dhcpv6 server statistics
```

Release Information

Command introduced in Junos OS Release 9.6.

`bulk-leasequery-connections` option introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

show dhcpv6 server statistics | 647

clear network-access aaa subscriber

IN THIS SECTION

Syntax

```
clear network-access aaa subscriber
<session-id identifier <reconnect>>
```

```
<statistics username username>
<username username <reconnect>>
```

Description

Clear AAA subscriber statistics and log out subscribers. You can log out subscribers based on the username or on the subscriber session identifier. Use the session identifier when more than one session has the same username string.

Options

reconnect (Optional) Reconnect as a Layer 2 wholesale session when the subscriber session has been fully logged out. This option is equivalent to issuing a RADIUS-initiated disconnect with reconnect semantics; that is, when the message includes Acct-Terminate-Cause (RADIUS attribute 49) with a value of callback (16). You can apply this option to either a Layer 2 wholesale session or a conventionally auto-sensed dynamic VLAN supporting a PPPoE session.

In the latter case, this option triggers a PPPoE session logout and removal of the dynamic VLAN logical interface. This is followed by authorization of the access-line to attempt creation of a dynamic VLAN IFL supporting Layer 2 wholesale session in its place.

session-id *identifier* (Optional) Log out the subscriber based on the subscriber session identifier.

statistics username *username* (Optional) Clear AAA subscriber statistics and log out the subscriber.

username *username* (Optional) Log out the AAA subscriber.

Required Privilege Level

maintenance

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear network-access aaa subscriber statistics username

```
user@host> clear network-access aaa subscriber statistics username user22@example.com
```

clear network-access aaa subscriber statistics username (Tenant systems)

```
user@host:TSYS1> clear network-access aaa subscriber statistics username user22@example.com
```

clear network-access aaa subscriber username

```
user@host> clear network-access aaa subscriber username user22@example.com
```

clear network-access aaa subscriber username (Tenant systems)

```
user@host:TSYS1> clear network-access aaa subscriber username user22@example.com
```

clear network-access aaa subscriber session-id

```
user@host> clear network-access aaa subscriber session-id 18367425
```

clear network-access aaa subscriber session-id (Tenant systems)

```
user@host:TSYS1> clear network-access aaa subscriber session-id 1
```

Release Information

Command introduced in Junos OS Release 9.1.

`reconnect` and `session-id` options added in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Verifying and Managing Subscriber AAA Information

request ancp oam port-down

IN THIS SECTION

Syntax

```
request ancp oam port-down
(neighbor ip-address | subscriber-interface physical-interface-name)
circuit-id aci remote-id ari outer-vlan-id vlan-id
```

Description

Simulate an ANCP Port Down message on the specified access loop for troubleshooting or to mitigate an abnormal condition. Triggers removal of the corresponding out-of-band triggered, autosensed dynamic VLAN session for which no ANCP-sourced information exists. You must specify an ACI, an ARI, and an outer VLAN tag. This command is overridden by a genuine ANCP Port-Up message, meaning that you cannot use this command to initiate a Port Down condition when the access node has already reported a Port Up condition.

Options

aci	ANCP Access-Loop-Circuit-ID TLV that corresponds to a subscriber interface on the access node; used to identify the access node from which the message is simulated.
ari	ANCP Access-Loop-Remote-ID TLV that identifies the subscriber associated with an interface on the access node; used to identify the access node from which the message is simulated.
ip-address	IP address that specifies the access node from which the message is simulated.
physical-interface-name	Name of the access-facing subscriber interface that specifies the access node on whose local loop the loopback test is run.
vlan-id	ANCP Access-Aggregation-Circuit-ID-Binary TLV, the outer VLAN tag inserted by the access node on upstream traffic; used to identify the access node from which the message is simulated.

Required Privilege Level

view

Output Fields

When you enter this command, you are provided no feedback on the status of your request. You can enter the `show ancp neighbor detail`, `show subscribers client-type vlan-oob detail`, and the `show subscribers summary` commands before and after initiating the Port Down message to verify the operation.

Sample Output

request ancp oam port-down neighbor circuit-id remote-id outer-vlan-id

```
user@host> request ancp oam port-down neighbor 192.168.25.31 circuit-id line-aci-1 remote-id
line-ari-1 outer-vlan-id 126
```

Release Information

Command introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Triggering ANCP OAM to Simulate ANCP Port Down and Port Up Messages | 151

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

request ancp oam port-up

IN THIS SECTION

Syntax

```
request ancp oam port-up
(neighbor ip-address | subscriber-interface physical-interface-name)
circuit-id aci remote-id ari outer-vlan-id vlan-id
```

Description

Simulate an ANCP Port Up message on the specified access loop for troubleshooting or to mitigate an abnormal condition. You must specify an ACI, an ARI, and an outer VLAN tag. This command is overridden by a genuine ANCP Port Down message, meaning that you cannot use this command to initiate a Port Up condition when the access node has already reported a Port Down condition.

Options

aci	ANCP Access-Loop-Circuit-ID TLV that corresponds to a subscriber interface on the access node; used to identify the access node from which the message is simulated.
ip-address	IP address that specifies the access node from which the message is simulated.
ari	ANCP Access-Loop-Remote-ID TLV that identifies the subscriber associated with an interface on the access node; used to identify the access node from which the message is simulated.
physical-interface-name	Name of the access-facing subscriber interface that specifies the access node on whose local loop the loopback test is run.
vlan-id	ANCP Access-Aggregation-Circuit-ID-Binary TLV, the outer VLAN tag inserted by the access node on upstream traffic; used to identify the access node from which the message is simulated.

Required Privilege Level

view

Output Fields

When you enter this command, you are provided no feedback on the status of your request. You can enter the `show ancp neighbor detail`, `show subscribers client-type vlan-oob detail`, and the `show subscribers summary` commands before and after initiating the Port Up message to verify the operation.

Sample Output

request ancp oam port-up neighbor circuit-id remote-id outer-vlan-id

```
user@host> request ancp oam port-up neighbor 192.168.25.31 circuit-id line-aci-1 remote-id line-
ari-1 outer-vlan-id 126
```

Release Information

Command introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Triggering ANCP OAM to Simulate ANCP Port Down and Port Up Messages | 151

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

request auto-configuration reconnect-pending

IN THIS SECTION

Syntax

```
request auto-configuration reconnect-pending
```

Description

Initiate reestablishment of Layer 2 wholesale sessions that correspond to access lines that are in the pending state. Ordinarily, the most likely situations with pending sessions are handled automatically This statement is intended to be used only when an uncommon condition might prevent automatic reestablishment. This command has no effect when no pending sessions are present.

Required Privilege Level

view

Output Fields

When you enter this command, you are provided no feedback on the status of your request. You can enter the `show ancp neighbor detail`, `show subscribers client-type vlan-oob detail`, and the `show subscribers summary` commands before and after initiating the Port Up message to verify the operation.

Sample Output

request auto-configuration reconnect-pending

```
user@host> request auto-configuration reconnect-pending
```

Release Information

Command introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Reestablishing Pending Access Line Sessions for Layer 2 Wholesale | 155

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

show ancp neighbor

IN THIS SECTION

Syntax

```
show ancp neighbor
<brief | detail>
<ip-address ip-address
<system-name mac-address>
```

Description

Display information about all ANCP neighbors or the specified ANCP neighbor, regardless of operational state.

Options

brief | detail	(Optional) Display the specified level of detail.
ip-address *ip-address*	(Optional) Display information about the neighbor (access node) specified by the IP address.
system-name *mac-address*	(Optional) Display information about the neighbor (access node) specified by the MAC address.

Required Privilege Level

view

Output Fields

Table 8 on page 579 lists the output fields for the `show ancp neighbor` command. Output fields are listed in the approximate order in which they appear.

Table 8: show ancp neighbor Output Fields

Field Name	Field Description	Level of Output
Version	Version of the ANCP implementation: • `0x31`—General Switch Management Protocol (GSMP) version 3, sub-version 1; ANCP version before *RFC 6320, Protocol for Access Node Control Mechanism in Broadband Networks*. • `0x32`—ANCP version 1, defined in *RFC 6320, Protocol for Access Node Control Mechanism in Broadband Networks*.	`brief detail` none
`IP Address`	IP address of the ANCP neighbor.	`brief detail` none
`PartId`	Number that associates the ANCP message with a specific partition.	`brief` none
`State`	Operational state of the ANCP adjacency: • Configured—The neighbor has been configured, but has never been in the `Established` state. An asterisk (*) is prefixed to the neighbor entry for this state. • Establishing—Adjacency negotiations are in progress for the neighbor. An asterisk (*) is prefixed to the neighbor entry for this state. This state is rarely seen because the adjacency is established so quickly. • `Established`—Adjacency negotiations have succeeded for the neighbor and an ANCP session has been established. • Not Estblshed—Not Established; adjacency negotiations are ready to begin. Indicates that this neighbor previously had been in the `Established` state; that is, it has lost a previously established adjacency. An asterisk (*) is prefixed to the neighbor entry for this state.	All levels
`Time`	How long the adjacency has been up in one of the following formats: • *nwndnh*—number of weeks, days, and hours • *nd hh:mm:ss*—number of days, hours, minutes, and seconds	`brief detail` none

Table 8: show ancp neighbor Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Subscriber Count`	Number of subscribers associated with the ANCP neighbor (access local loop).	`brief` none
`Capabilities`	Negotiated ANCP capability: • `Topo`—Topology discovery. • `OAM`—Performance of local Operations Administration Maintenance (OAM) procedures on an access loop controlled by the router.	All levels
`System Name`	MAC address of the ANCP neighbor.	`detail`
`TCP Port`	TCP port on which ANCP messages are exchanged.	`detail`
`System Instance`	Number identifying the ANCP link instance from the edge device's perspective.	`detail`
`Peer Instance`	Number identifying the ANCP instance from the access node's perspective. This number is unique and changes when the node or link comes back up after going down.	`detail`
`Timer`	Adjacency timer value advertised by the ANCP peer in 100 ms increments; the interval between ANCP ACK messages. This value remains constant for the duration of an ANCP session.	`detail`
`Partition Type`	Number that identifies whether partitions are used and how the ID is negotiated: • `0`—No partition. • `1`—Fixed partition requested. • `2`—Fixed partition assigned.	`detail`

Table 8: show ancp neighbor Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Partition Flag`	Number that specifies the type of partition requested: 1 (new adjacency) or 2 (recovered adjacency).	`detail`
`Partition Identifier`	Number that identifies a logical partition of an access node with which the ANCP agent has formed an adjacency. A value of zero indicates that the agent supports each neighbor on an IP address over a single TCP session with a partition ID of zero. This is the default support case. A nonzero value indicates that the agent supports each neighbor on an IP address over a single TCP session with a nonzero partition ID.	`detail`
`Partition Adjacencies`	Number of adjacencies that share the partition.	`detail`
`Dead Timer`	Remaining period that the edge device waits for adjacency packets from a neighbor before declaring the neighbor to be down. The maximum dead time value is three times the configured adjacency timer value. This field displays the current value based on the time that the last adjacency packet was received.	`detail`
`Received Syn Count`	Number of synchronization messages received from neighbors to maintain adjacencies.	`detail`
`Received Synack Count`	Number of synchronization acknowledgment messages received from neighbors in response to the node's synchronization messages.	`detail`
`Received Rstack Count`	Number of messages received from neighbors indicating that the link to the neighbor needs to be reset.	`detail`
`Received Ack Count`	Number of acknowledgment messages periodically received from neighbors after an adjacency has been established.	`detail`

Table 8: show ancp neighbor Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Received Port Up Count	Number of status messages received from neighbors indicating that a port has transitioned to the up state.	detail
Received Port Down Count	Number of status messages received from neighbors indicating that a port has transitioned to the down state.	detail
Received Generic Resp Count	Number of generic response messages received from neighbors.	detail
Received Adjacency Update Count	Number of adjacency update messages received from neighbors.	detail
Received OAM Count	Number of OAM responses received from neighbors in reply to request commands.	detail
Received Other Count	Number of all other ANCP message packets received from neighbors that do not fit into one of the other categories.	detail
Sent Syn Count	Number of synchronization messages sent to neighbors to maintain adjacencies.	detail
Sent Synack Count	Number of synchronization acknowledgment messages sent to neighbors in response to the their synchronization messages.	detail
Sent Rstack Count	Number of messages sent to neighbors indicating that the link to the neighbor needs to be reset.	detail
Sent Ack Count	Number of acknowledgment messages periodically sent to neighbors after an adjacency has been established.	detail
Sent Generic Resp Count	Number of generic response messages sent to neighbors.	detail

Table 8: show ancp neighbor Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Sent OAM Count	Number of OAM request commands sent to neighbors.	detail
Max Discovery Limit Exceed Count	Number of times that the maximum number of discovery table entries accepted from the neighbor has been exceeded.	detail
Result Codes	Number of generic response messages sent to neighbors that include each of the following result codes: • Invalid Request Message Count—A properly formed request message violated the protocol because of timing (such as a race condition) or direction of transmission. • Specified Port(s) Down Count—One or more of the specified ports are down because of a state mismatch between the router and an ANCP control application. • Out of Resources Count—ANCP is out of resources, probably not related to the access lines. This result code is sent only by an access node. • Request Msg Not Implemented Count— • Malformed Msg Count—Message is malformed because it was corrupted in transit or there was an implementation error at either end of the connection. • TLV Missing Count—One or more mandatory TLVs was missing from a request. • Invalid TLV Contents Count—The contents of one or more TLVs in the request do not match its required specification. • Non-Existent Port(s) Count—One or more of the ports specified in a request do not exist, possibly because of a configuration mismatch between the access node and the router or AAA.	detail

Sample Output

show ancp neighbor

```
user@host> show ancp neighbor
  Version IP Address       PartID  State         Time        Subscriber    Capabilities
                                                             Count
  0x31    203.0.113.13         0       Established   11:24       2             Topo
  0x31    203.0.113.15         0       Not Estblshd  2:45        2             Topo
* 0x0     198.51.100.102       0       Establishing  0           0
* 0x0     192.0.2.0            0       Configured    0           0
* 0x0     192.0.2.1            0       Configured    0           0
```

show ancp neighbor detail

```
user@host> show ancp neighbor detail
  Neighbor Information
      Version                 : 0x31
      IP Address              : 192.0.2.85
      System Name             : 00:00:5e:00:53:01
          Up Time                          : 26
          TCP Port                         : 32666
          State                            : Established
          Subscriber Count                 : 4
          Capabilities                     : Topo
          System Instance                  : 2
          Peer Instance                    : 20
          Adjacency Timer (in 100ms)       : 100
          Peer Adjacency Timer (in 100ms)  : 100
          Partition Type                   : 0
          Partition Flag                   : 1
          Partition Identifier             : 0
          Partition Adjacencies            : 0
          Dead Timer                       : 23
          Received Syn Count               : 1
          Received Synack Count            : 1
          Received Rstack Count            : 0
          Received Ack Count               : 4
          Received Port Up Count           : 10
          Received Port Down Count         : 0
```

```
        Received Generic Resp Count      : 0
        Received Adjacency Update Count  : 0
        Received OAM Count               : 0
        Received Other Count             : 0
        Sent Syn Count                   : 1
        Sent Synack Count                : 2
        Sent Rstack Count                : 0
        Sent Ack Count                   : 3
        Sent Generic Resp Count          : 0
        Sent OAM Count                   : 0
        Max Discovery Limit Exceed Count : 0
    Result Codes:                          Received              Sent
        Invalid Request Message Count    : 0                     0
        Specified Port(s) Down Count     : 0                     0
        Out of Resources Count           : 0                     0
        Request Msg Not Implemented Count: 0                     0
        Malformed Msg Count              : 0                     0
        TLV Missing Count                : 0                     0
        Invalid TLV Contents Count       : 0                     0
        Non-Existent Port(s) Count       : 0                     0


    Version                 : 0x32
    IP Address              : 192.168.9.1
    System Name             : 00:00:5e:00:53:02
        Up Time                          : 36
        TCP Port                         : 61408
        State                            : Not Established
        Subscriber Count                 : 1
        Capabilities                     : Topology Discovery
        System Instance                  : 12
        Peer Instance                    : 1
        Adjacency Timer (in 100ms)       : 50
        Peer Adjacency Timer (in 100ms)  : 100
        Partition Type                   : 0
        Partition Flag                   : 1
        Partition Identifier             : 0
        Partition Adjacencies            : 0
        Dead Timer                       : 23
        Received Syn Count               : 24
        Received Synack Count            : 20
        Received Rstack Count            : 2
        Received Ack Count               : 9
```

```
            Received Port Up Count           : 5
            Received Port Down Count         : 0
            Received Generic Resp Count      : 0
            Received Adjacency Update Count  : 0
            Received OAM Responses Count     : 2
            Received Other Count             : 0
            Sent Syn Count                   : 20
            Sent Synack Count                : 24
            Sent Rstack Count                : 1
            Sent Generic Resp Count          : 0
            Sent Ack Count                   : 9
            Sent OAM Requests Count          : 4
            Max Discovery Limit Exceed Count : 0
        Result Codes:                          Received              Sent
            Invalid Request Message Count    : 0                     0
            Specified Port(s) Down Count     : 0                     0
            Out of Resources Count           : 0                     0
            Request Msg Not Implemented Count: 0                     0
            Malformed Msg Count              : 0                     0
            TLV Missing Count                : 0                     0
            Invalid TLV Contents Count       : 0                     0
            Non-Existent Port(s) Count       : 0                     0
```

show ancp neighbor ip-address

```
user@host> show ancp neighbor ip-address 192.0.2.85

Neighbor Information
      Version                 : 0x32
      IP Address   : 192.0.2.85
      System Name  : 00:00:5e:00:53:ba
          Up Time                          : 26
          TCP Port                         : 32666
          State                            : Established
          Subscriber Count                 : 4
          Capabilities                     : Topo
          System Instance                  : 2
          Peer Instance                    : 20
          Adjacency Timer (in 100ms)       : 100
          Peer Adjacency Timer (in 100ms)  : 100
          Partition Type                   : 0
```

```
          Partition Flag                   : 1
          Partition Identifier             : 0
          Partition Adjacencies            : 0
          Dead Timer                       : 23
          Received Syn Count               : 1
          Received Synack Count            : 1
          Received Rstack Count            : 0
          Received Ack Count               : 4
          Received Port Up Count           : 10
          Received Port Down Count         : 0
          Received Generic Resp Count      : 0
          Received Adjacency Update Count  : 0
          Received OAM Count               : 0
          Received Other Count             : 0
          Sent Syn Count                   : 1
          Sent Synack Count                : 2
          Sent Rstack Count                : 0
          Sent Ack Count                   : 3
          Sent Generic Resp Count          : 0
          Sent OAM Count                   : 0
          Max Discovery Limit Exceed Count : 0
      Result Codes:                          Received              Sent
          Invalid Request Message Count    : 0                     0
          Specified Port(s) Down Count     : 0                     0
          Out of Resources Count           : 0                     0
          Request Msg Not Implemented Count: 0                     0
          Malformed Msg Count              : 0                     0
          TLV Missing Count                : 0                     0
          Invalid TLV Contents Count       : 0                     0
          Non-Existent Port(s) Count       : 0                     0
```

show ancp neighbor system-name

```
user@host> show ancp neighbor 00:00:5e:00:53:ba detail

Neighbor Information
   Version                : 0x31
   IP Address             : 203.0.113.101
   System Name            : 00:00:5e:00:53:ba
     Up Time                             : 19
     TCP Port                            : 1028
```

```
    State                               : Established
    Subscriber Count                    : 2
    Capabilities                        : Topology Discovery, OAM
    System Instance                     : 1
    Peer Instance                       : 10
    Adjacency Timer (in 100ms)          : 100
    Peer Adjacency Timer (in 100ms)     : 250
    Partition Type                      : 0
    Partition Flag                      : 1
    Partition Identifier                : 0
    Partition Adjacencies               : 0
    Dead Timer                          : 55
    Received Syn Count                  : 1
    Received Synack Count               : 1
    Received Rstack Count               : 0
    Received Ack Count                  : 1
    Received Port Up Count              : 34
    Received Port Down Count            : 0
    Received Generic Resp Count         : 0
    Received Adjacency Update Count     : 0
    Received OAM Responses Count        : 2
    Received Other Count                : 0
    Sent Syn Count                      : 1
    Sent Synack Count                   : 1
    Sent Rstack Count                   : 0
    Sent Ack Count                      : 3
    Sent Generic Resp Count             : 0
    Sent OAM Requests Count             : 4
    Max Discovery Limit Exceed Count    : 3
  Result Codes:                         Received              Sent
    Invalid Request Message Count       : 0                     0
    Specified Port(s) Down Count        : 0                     0
    Out of Resources Count              : 0                     0
    Request Msg Not Implemented Count   : 0                     0
    Malformed Msg Count                 : 0                     0
    TLV Missing Count                   : 0                     0
    Invalid TLV Contents Count          : 0                     0
    Non-Existent Port(s) Count          : 0                     0
```

Release Information

Command introduced in Junos OS Release 9.4.

RELATED DOCUMENTATION

show ancp cos

show ancp subscriber

show ancp subscriber

IN THIS SECTION

Syntax

```
show ancp subscriber
<brief | detail>
<access-aggregation-circuit-id circuit-identifier>
<identifier identifier>
<ip-address ip-address>
<system-name mac-address>
```

Description

Display information about active subscribers regardless of the subscriber's operational state, for all subscribers (local access loops), the subscriber associated with the access line specified by an ACI, or the subscriber associated with the specified ANCP neighbor (access node).

After an ancpd restart, this command displays orphaned entries (marked with an o) for subscriber sessions that were established before the restart but which have not yet been reestablished. As sessions

are reestablished, the number of orphaned entries displayed by the command decreases. The number reaches zero when all sessions are reestablished or when the orphaned-interface timer expires.

Options

none	Display information about all subscribers.
brief | detail	(Optional) Display the specified level of detail.
access-aggregation-circuit-id *circuit-identifier*	(Optional) Display information about ANCP subscribers whose Access-Aggregation-Circuit-ID-ASCII attribute (TLV 0x0003) matches the specified value. A *circuit-identifier* that begins with the# character indicates a backhaul line identifier. You can specify a wildcard (*) anywhere in the string.
identifier *identifier*	(Optional) Display information about the subscriber associated with the access line (ACI) specified by the access identifier.
ip-address *ip-address*	(Optional) Display information about the subscribers connected to the access node specified by the IP address.
system-name *mac-address*	(Optional) Display information about the subscribers connected to the access node specified by the MAC address.

Required Privilege Level

view

Output Fields

Table 9 on page 591 lists the output fields for the `show ancp subscriber` command. Output fields are listed in the approximate order in which they appear.

Table 9: show ancp subscriber Output Fields

Field Name	Field Description	Level of Output
Loop Identifier	Access loop identifier as sent by the access node and configured to map the subscriber to an interface. An asterisk (*) indicates that the information might be stale due to receiving a Port Down message with a DSL Line State of Idle. Two asterisks (**) indicate that the neighbor associated with the subscriber has lost its adjacency. In this case, the DSL Line State might be Established. An o indicates that the entry is for an orphaned interface and represents a previously established subscriber session that has not been reestablished after an ancpd restart. The number of orphaned entries decreases as the ANCP neighbors reestablish adjacencies and the protocol subscriber sessions are reestablished. The command output indicates this by removing the o marker. Eventually the number of orphaned entries reaches zero, because either all the adjacencies and subscriber sessions have been reestablished or any remaining orphaned entries are removed when the orphaned-interface timer expires.	brief none
DSL Line State	State of the DSL line: Idle, Showtime, or Silent.	brief detail
Access Type	Type of access line employed by the access node: ADSL1, ADSL2, ADSL2+, VDSL1, VDSL2, SDSL, G.fast, VDSL2 Annex Q, SDSL bonded, VDSL2 bonded, G.fast bonded VDSL2 Annex Q bonded or OTHER.	brief detail none
Interface	Name of the interface set or logical interface.	brief detail none
Rate Kbps	Actual downstream data rate for this local loop.	brief none
Neighbor	IP address of ANCP neighbor (access node).	brief none

Table 9: show ancp subscriber Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Access Loop Circuit Identifier`	Access loop circuit identifier as sent by the access node and configured to map the subscriber to an interface. An asterisk (*) indicates that the information might be stale due to receiving a Port Down message with a DSL Line State of Idle. Two asterisks (**) indicate that the neighbor associated with the subscriber has lost its adjacency. In this case, the DSL Line State might be Established.	`detail`
`Neighbor IP Address`	IP address of the ANCP neighbor (access node).	`detail`
`Aggregate Circuit Identifier`	ASCII identifier for the subscriber access loop; value of the Access-Aggregation-Circuit-ID-ASCII attribute (TLV 0x0003).	`detail`
`Aggregate Circuit Identifier Binary`	Binary identifier for the VLAN circuit ID.	`detail`
`Tech Type`	Type of technology employed by the subscriber. Currently Junos OS supports `DSL` technology type only.	`detail`
`DSL Line Data Link`	Data link protocol employed on the access loop: `AAL5` or `Ethernet`.	`detail`
`DSL Line Encapsulation`	Encapsulation type on the access loop, for Ethernet only: • `0`—NA, type not conveyed • `1`—Untagged Ethernet • `2`—Single-tagged Ethernet	`detail`

Table 9: show ancp subscriber Output Fields *(Continued)*

Field Name	Field Description	Level of Output
DSL Line Encapsulation Payload	Payload carried across the access loop: • 0—NA, type not conveyed • 1—PPPoA LLC • 2—PPPoA null • 3—IPoA LLC • 4—IPoA null • 5—Ethernet over AAL5 LLC with FCS • 6—Ethernet over AAL5 LLC without FCS • 7—Ethernet over AAL5 null with FCS • 8—Ethernet over AAL5 null without FCS	detail
Interface Type	Type of interface employed for subscriber traffic: ifl for a single VLAN or interface-set for a configured group of VLANs.	detail
Actual Net Data Upstream	Actual upstream data rate for this local loop, in Kbps.	detail
Actual Net Data Downstream	Actual downstream data rate for this local loop, in Kbps.	detail
Minimum Net Data Upstream	Minimum upstream data rate desired by the operator for this local loop, in Kbps.	detail
Minimum Net Data Downstream	Minimum downstream data rate desired by the operator for this local loop, in Kbps.	detail

Table 9: show ancp subscriber Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Maximum Net Data Upstream`	Maximum upstream data rate desired by the operator for this local loop, in Kbps.	`detail`
`Maximum Net Data Downstream`	Maximum downstream data rate desired by the operator for this local loop, in Kbps.	`detail`
`Attainable Net Data Upstream`	Maximum attainable upstream data rate for this local loop, in Kbps.	`detail`
`Attainable Net Data Downstream`	Maximum attainable downstream data rate for this local loop, in Kbps.	`detail`
`Minimum Low Power Data Downstream`	Minimum downstream data rate desired by the operator for this local loop in low power state, in Kbps.	`detail`
`Minimum Low Power Data Upstream`	Minimum upstream data rate desired by the operator for this local loop in low power state, in Kbps.	`detail`
`Maximum Interleave Delay Downstream`	Maximum interleaving delay for downstream data, in milliseconds.	`detail`
`Maximum Interleave Delay Upstream`	Maximum interleaving delay for upstream data, in milliseconds.	`detail`
`Actual Interleave Delay Downstream`	Actual interleaving delay for downstream data, in milliseconds.	`detail`
`Actual Interleave Delay Upstream`	Actual interleaving delay for upstream data, in milliseconds.	`detail`

Sample Output

show ancp subscriber

```
user@host> show ancp subscriber
  Loop Identifier        DSL Line  Tech Type     Access Type   Interface       Rate   Neighbor
                         State                                 Kbps
**circuit 101            Idle      DSL       ADSL1    ----             32       203.0.113.13
**circuit 102            Idle      DSL       ADSL1    ----             32       203.0.113.13
  circuit 301            Showtime  DSL       ADSL1    ----             32       203.0.113.15
  circuit 302            Showtime  DSL       ADSL1    ----             32       203.0.113.15
```

show ancp subscriber (After ancpd Restart)

```
user@host> show ancp subscriber
  Loop Identifier        DSL Line  Tech Type     Access Type  Interface         Rate     Neighbor
                         State                                 Kbps
o circuit 201            Showtime  DSL        ADSL1    ----             222222
o circuit 202            Showtime  DSL        ADSL1    ----             222222
```

show ancp subscriber brief

```
user@host> show ancp subscriber brief

  Loop Identifier          Type      Interface        Rate          Neighbor
                                                      Kbps
  port-1-10                VDSL2     set-ge-10410      64       203.0.113.102
  port-1-11                VDSL2     set-ge-10411      64       203.0.113.111
  port-2-10                VDSL2     ge-1/0/4.12       64       203.0.113.112
  port-2-11                VDSL2     ge-1/0/4.13       64       203.0.113.113
```

show ancp subscriber detail

```
user@host> show ancp subscriber detail
 Subscriber Information
*  Access Loop Circuit Identifier : circuit 101
     Neighbor IP Address                 : 203.0.113.13
```

```
     Aggregate Circuit Identifier Binary  : 0/0
     Tech Type                                                          : DSL
     Access Type                          : ADSL1
     DSL Line State                       : Idle
     DSL Line Data Link                   : Data link 2
     DSL Line Encapsulation               : N/A
     DSL Line Encapsulation Payload       : N/A
     Interface Type                       : N/A
     Interface                            : ----
     Actual Net Data Upstream             : 32
     Actual Net Data Downstream           : 32
     Minimum Net Data Upstream            : 0
     Minimum Net Data Downstream          : 0
     Maximum Net Data Upstream            : 0
     Maximum Net Data Downstream          : 0
     Attainable Net Data Upstream         : 1024
     Attainable Net Data Downstream       : 8192
     Minimum Low Power Data Downstream    : 32
     Minimum Low Power Data Upstream      : 32
     Maximum Interleave Delay Downstream  : 20
     Maximum Interleave Delay Upstream    : 20
     Actual Interleave Delay Downstream   : 20
     Actual Interleave Delay Upstream     : 20
*  Access Loop Circuit Identifier: circuit 102
     Neighbor IP Address                  : 213.0.113.13
     Aggregate Circuit Identifier Binary  : 0/0
     Tech Type                                                          : DSL
     Access Type                          : ADSL1
     DSL Line State                       : Idle
     DSL Line Data Link                   : Data link 2
     DSL Line Encapsulation               : N/A
     DSL Line Encapsulation Payload       : N/A
     Interface Type                       : N/A
     Interface                            : ----
     Actual Net Data Upstream             : 32
     Actual Net Data Downstream           : 32
     Minimum Net Data Upstream            : 0
     Minimum Net Data Downstream          : 0
     Maximum Net Data Upstream            : 0
     Maximum Net Data Downstream          : 0
     Attainable Net Data Upstream         : 1024
     Attainable Net Data Downstream       : 8192
     Minimum Low Power Data Downstream    : 32
```

```
     Minimum Low Power Data Upstream      : 32
     Maximum Interleave Delay Downstream  : 20
     Maximum Interleave Delay Upstream    : 20
     Actual Interleave Delay Downstream   : 20
     Actual Interleave Delay Upstream     : 20
...
```

show ancp subscriber access-aggregation-circuit-id detail

```
user@host> show ancp subscriber access-aggregation-circuit-id "#TEST-DPU-C-100" detail
Subscriber Information
 * Access Loop Circuit Identifier : circuit 201
     Neighbor IP Address                  : 192.0.2.1
     Access Loop Remote Identifier        : remote 123
     Aggregate Circuit Identifier         : #TEST-DPU-C-100
     Aggregate Circuit Identifier Binary  : 50
     Tech Type:                           : DSL
     Interface Type                       : interface
     Interface                            : ge-1/0/0.3221225475
     Actual Net Data Upstream             : 1024
     Actual Net Data Downstream           : 2048
     Maximum Net Data Upstream            : 0
     Maximum Net Data Downstream          : 0
* Access Loop Circuit Identifier : circuit 202
     Neighbor IP Address                  : 192.0.2.1
     Access Loop Remote Identifier        : remote 185
     Aggregate Circuit Identifier         : #TEST-DPU-C-100
     Aggregate Circuit Identifier Binary  : 50
     Tech Type:                           : DSL
     Interface Type                       : interface
     Interface                            : ge-1/0/0.3221225476
     Actual Net Data Upstream             : 1024
     Actual Net Data Downstream           : 2048
     Maximum Net Data Upstream            : 0
     Maximum Net Data Downstream          : 0
```

show ancp subscriber identifier identifier-string detail

```
user@host> show ancp subscriber identifier port-1-11 detail
```

```
Access Loop Identifier : port-1-11
    Neighbor IP Address                 : 203.0.113.112
    Aggregate Circuit Identifier Binary  : 0/0
    DSL Type                            :  DSL  0
    Interface Type                      : interface-set
    Interface                           : set-ge-10411
    DSL Line State                      : Show Time
    Actual Net Data Upstream            : 64
    Actual Net Data Downstream          : 64
    DSL Line Data Link                  : AAL5
    DSL Line Encapsulation              : N/A
    DSL Line Encapsulation Payload      : N/A
    Minimum Net Data Upstream           : 64
    Minimum Net Data Downstream         : 64
    Maximum Net Data Upstream           : 64
    Maximum Net Data Downstream         : 64
    Attainable Net Data Upstream        : 64
    Attainable Net Data Downstream      : 64
    Minimum Low Power Data Downstream   : 64
    Minimum Low Power Data Upstream     : 64
    Maximum Interleave Delay Downstream  : 50
    Maximum Interleave Delay Upstream   : 50
    Actual Interleave Delay Downstream  : 50
    Actual Interleave Delay Upstream    : 50
```

Release Information

Command introduced in Junos OS Release 9.4.

`neighbor` option replaced with `ip-address` in Junos OS Release 16.1.

`system-name` option introduced in Junos OS Release 16.1.

`access-aggregation-circuit-id` option introduced in Junos OS Release 18.4R1.

RELATED DOCUMENTATION

clear ancp subscriber

show ancp cos

show ancp neighbor | 577

show ancp statistics

show auto-configuration out-of-band

IN THIS SECTION

Syntax

```
show auto-configuration out-of-band
< brief | count | detail>
< all | pending>
< circuit-id>
< interface>
```

Description

Display information about ANCP-triggered out-of-band subscriber sessions. You can display all such subscribers or subscribers associated with a particular ACI or interface. You can also display information for sessions that are in the pending state. Sessions transition to the pending state when the Layer 2 wholesale session is authorized and assigned to an existing, nondefault routing instance, but subsequently profile instantiation to create the dynamic VLAN logical interface fails.

Options

brief | count | detail (Optional) Display the specified level of output. The default output level is the same as `brief`. The `count` level displays the number of out-of-band subscribers and sessions.

all (Optional) Display information for all out-of-band subscriber sessions, including pending sessions.

circuit-id (Optional) Limit the display to subscriber sessions on the specified access loop circuit identifier.

interface (Optional) Limit the display to out-of-band subscriber sessions on the specified interface.

pending (Optional) Display access lines in the pending state per routing instance.

Required Privilege Level

view

Output Fields

Table 10 on page 600 lists the output fields for the `show auto-configuration out-of-band` command.

Table 10: show auto-configuration out-of-band Output Fields

Field Name	Field Description	Level of Output
`Agent Circuit ID`	Agent circuit ID (ACI, access loop circuit identifier) that maps the subscriber to an interface.	`detail`
`Agent Remote ID`	Agent remote ID (ARI, access loop remote identifier) that identifies the subscriber associated with an interface and therefore the access node.	`detail`
`Circuit Id`	Agent circuit ID (ACI, access loop circuit identifier) that maps the subscriber to an interface.	`brief` none
`Core IFL name`	Name of the core-facing logical interface.	`detail`

Table 10: show auto-configuration out-of-band Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Inner Vlan Map Id	Inner VLAN tag that replaces the outer VLAN tag when the subscriber traffic is tunneled to the network service provider router.	detail
Login Time	Timestamp when the subscriber logged in.	detail
Out-of-band subscribers	Number of active out-of-band subscribers.	brief none
Pending count	Number of subscriber sessions in the routing instance that are in the pending state.	brief none
Remote Id	Agent remote ID (ARI, access loop remote identifier) for the subscriber.	brief none
Routing-Instance	Name of the routing instance for which the pending count is displayed.	brief none
Session ID	Subscriber session identifier.	All levels
Subscriber IFL	Name of the subscriber logical interface.	brief none
Subscriber Interface	Name of the subscriber logical interface.	detail
total entries	Total number of active plus pending subscriber sessions.	brief none
VLAN	VLAN ID of the subscriber' s incoming interface.	brief none
VLAN ID	VLAN ID of the subscriber' s incoming interface.	detail
Vlan Map Id	Trunk VLAN ID assigned to the core-facing physical interface within its input VLAN map.	detail

Sample Output

show auto-configuration out-of-band

```
user@host> show auto-configuration out-of-band
Circuit Id                  Remote Id              Subscriber IFL        Session ID  VLAN
203.0.13.3/0.0.0.0 eth 1/0  arn.1211.00000000002   ge-2/1/1.1689443721   1301         200
```

show auto-configuration out-of-band (All Sessions)

```
user@host> show auto-configuration out-of-band all
Circuit Id                  Remote Id              Subscriber IFL         Session ID  VLAN
203.0.13.2/0.0.0.0 eth 1/0  arn.4312.00000000002   ge-2/0/4.2547532212    1287        100
203.0.13.3/0.0.0.0 eth 1/0  arn.1211.00000000002   ge-2/1/1.1689443721    1301        200
203.0.13.4/0.0.0.0 eth 1/0  arn.5628.00000000002   ge-2/1/2.7697428544    1628        300
```

show auto-configuration out-of-band (All Sessions, Detail)

```
user@host> show auto-configuration out-of-band all detail
Agent Circuit ID: 203.0.13.2/0.0.0.0 eth 1/0
Agent Remote ID: arn.4312.00000000002
Subscriber interface: ge-2/0/4.2547532212
Session ID: 1287
VLAN ID: 100
Core IFL name: ae1.0
Vlan Map Id: 2
Inner Vlan Map Id: 1010
Login Time: 2018-06-25 09:05:14 EST
Agent Circuit ID: 203.0.13.3/0.0.0.0 eth 1/0
Agent Remote ID: arn.1211.00000000002
Subscriber interface: ge-2/1/1.1689443721
Session ID: 1301
VLAN ID: 200
Core IFL name: ae1.1
Vlan Map Id: 3
Inner Vlan Map Id: 1020
Login Time: 2018-06-25 09:11:21 EST
Agent Circuit ID: 203.0.13.4/0.0.0.0 eth 1/0
```

```
Agent Remote ID: arn.5628.00000000002
Subscriber interface: ge-2/1/2.7697428544
Session ID: 1628
VLAN ID: 300
Core IFL name: ae1.2
Vlan Map Id: 4
Inner Vlan Map Id: 1030
Login Time: 2018-06-25 09:11:58 EST
```

show auto-configuration out-of-band (Brief)

```
user@host> show auto-configuration out-of-band brief
Circuit Id                  Remote Id               Subscriber IFL        Session ID  VLAN
203.0.13.3/0.0.0.0 eth 1/0  arn.1211.00000000002    ge-2/1/1.1689443721   1301         200
```

show auto-configuration out-of-band (Circuit ID)

```
user@host> show auto-configuration out-of-band circuit-id "203.0.13.2/0.0.0.0 eth 1/0"
Circuit Id                  Remote Id               Subscriber IFL        Session ID  VLAN
203.0.13.2/0.0.0.0 eth 1/0  arn.4312.00000000002    ge-2/0/4.2547532212   1287         100
```

show auto-configuration out-of-band (Circuit ID, Detail)

```
user@host> show auto-configuration out-of-band circuit-id "203.0.13.2/0.0.0.0 eth 1/0" detail
Agent Circuit ID: 203.0.13.2/0.0.0.0 eth 1/0
Agent Remote ID: arn.4312.00000000002
Subscriber interface: ge-2/0/4.2547532212
Session ID: 1287
VLAN ID: 100
Core IFL name: ae1.0
Vlan Map Id: 2
Inner Vlan Map Id: 1010
Login Time: 2018-06-25 09:05:14 EST
```

show auto-configuration out-of-band (Count)

```
user@host> show auto-configuration out-of-band count
Out-of-band subscribers: 1, total entries: 1
```

show auto-configuration out-of-band (Detail)

```
user@host> show auto-configuration out-of-band detail
Agent Circuit ID: ACI.0001.aa1000000111
Agent Remote ID: remote-id
Subscriber interface: ge-1/0/0.3221225472
Session ID: 1
VLAN ID: 51
Core IFL name: ge-1/0/4.0
Vlan Map Id: 20
Inner Vlan Map Id: 1
Login Time: 2018-07-10 10:27:55 EDT
```

show auto-configuration out-of-band (Interface)

```
user@host> show auto-configuration out-of-band interface ge-2/0/4.2547532212
Circuit Id                  Remote Id               Subscriber IFL        Session ID  VLAN
203.0.13.2/0.0.0.0 eth 1/0  arn.4312.00000000002    ge-2/0/4.2547532212   1287         100
```

show auto-configuration out-of-band (Interface, Detail)

```
user@host> show auto-configuration out-of-band interface ge-2/0/4.2547532212 detail
Agent Circuit ID: 203.0.13.2/0.0.0.0 eth 1/0
Agent Remote ID: arn.4312.00000000002
Subscriber interface: ge-2/0/4.2547532212
Session ID: 1287
VLAN ID: 100
Core IFL name: ae1.0
Vlan Map Id: 2
Inner Vlan Map Id: 1010
Login Time: 2018-06-25 09:05:14 EST
```

show auto-configuration out-of-band (Pending Sessions)

```
user@host> show auto-configuration out-of-band pending
Circuit Id                  Remote Id              Subscriber IFL        Session ID  VLAN
203.0.13.2/0.0.0.0 eth 1/0  arn.4312.00000000002    ge-2/0/4.2547532212                100
```

Release Information

Command introduced in Junos OS Release 16.1R4.

`all`, `circuit-id`, `count`, and `interface` options introduced in Junos OS Release 17.3R1.

RELATED DOCUMENTATION

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show dhcp relay binding

IN THIS SECTION

Syntax

```
show dhcp relay binding
<address>
```

```
<brief>
<detail>
<interface interface-name>
<interface-tag interface-tag-name>
<interfaces-vlan>
<interfaces-wildcard>
<ip-address | mac-address>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
<summary>
```

Description

Display the address bindings in the Dynamic Host Configuration Protocol (DHCP) client table.

Options

address	(Optional) Display DHCP binding information for a specific client identified by one of the following entries: • *ip-address*—The specified IP address. • *mac-address*—The specified MAC address. • *session-id*—The specified session ID.
brief	(Optional) Display brief information about the active client bindings. This is the default, and produces the same output as `show dhcp relay binding`.
detail	(Optional) Display detailed client binding information.
interface ***interface-name***	(Optional) Perform this operation on the specified interface. You can optionally filter on VLAN ID and SVLAN ID.
interface-tag ***interface-tag-name***	(Optional) Displays the binding information for the specified interface-tag.
interfaces-vlan	(Optional) Show the binding state information on the interface VLAN ID and S-VLAN ID.
interfaces-wildcard	(Optional) The set of interfaces on which to show binding state information. This option supports the use of the wildcard character (*).
logical-system ***logical-system-name***	(Optional) Perform this operation on the specified logical system.

routing-instance *routing-instance-name* (Optional) Perform this operation on the specified routing instance.

summary (Optional) Display a summary of DHCP client information.

Required Privilege Level

view

Output Fields

Table 11 on page 607 lists the output fields for the `show dhcp relay binding` command. Output fields are listed in the approximate order in which they appear.

Table 11: show dhcp relay binding Output Fields

Field Name	Field Description	Level of Output
number clients,(*number* init, *number* bound, *number* selecting, *number* requesting, *number* renewing, *number* rebinding, *number* releasing)	Summary counts of the total number of DHCP clients and the number of DHCP clients in each state.	summary
IP address	IP address of the DHCP client.	brief detail
Session Id	Session ID of the subscriber session.	brief detail
Generated Remote ID	Remote ID generated by the Option 82 Agent Remote ID (suboption 1)	detail
Hardware address	Hardware address of the DHCP client.	brief detail
Expires	Number of seconds in which the lease expires.	brief detail

Table 11: show dhcp relay binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
State	State of the DHCP relay address binding table on the DHCP client: • BOUND—Client has an active IP address lease. • INIT—Initial state. • REBINDING—Client is broadcasting a request to renew the IP address lease. • RELEASE—Client is releasing the IP address lease. • RENEWING—Client is sending a request to renew the IP address lease. • REQUESTING—Client is requesting a DHCP server. • SELECTING—Client is receiving offers from DHCP servers.	brief detail
Interface	Incoming client interface.	brief
Lease Expires	Date and time at which the client's IP address lease expires.	detail
Lease Expires in	Number of seconds in which the lease expires.	detail
Lease Start	Date and time at which the client's IP address lease started.	detail
Lease time violated	Lease time violation has occurred.	detail
Incoming Client Interface	Client's incoming interface.	detail
Interface tag	Name of the Interface tag.	detail

Table 11: show dhcp relay binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Server IP Address	IP address of the DHCP server.	detail
Server Interface	Interface of the DHCP server.	detail
Bootp Relay Address	IP address of BOOTP relay.	detail
Type	Type of DHCP packet processing performed on the router: • active—Router actively processes and relays DHCP packets. • passive—Router passively snoops DHCP packets passing through the router.	All levels
Lease expires at	Date and time at which the client's IP address lease expires.	All levels
Dual Stack Group	Name of dual stack that is configured with the DHCP binding.	detail
Dual Stack Peer Prefix	Prefix of dual stack DHCPv6 peer.	detail
Dual Stack Peer Address	Address of the dual stack DHCPv6 peer.	detail

Sample Output

show dhcp relay binding

```
user@host> show dhcp relay binding
IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.11     41          00:00:5e:00:53:01  86371       BOUND      ge-1/0/0.0
192.51.100.12     42          00:00:5e:00:53:02  86371       BOUND      ge-1/0/0.0
```

```
192.51.100.13     43          00:00:5e:00:53:03  86371       BOUND      ge-1/0/0.0
192.51.100.14     44          00:00:5e:00:53:04  86371       BOUND      ge-1/0/0.0
192.51.100.15     45          00:00:5e:00:53:05  86371       BOUND      ge-1/0/0.0
```

show dhcp relay binding detail

```
user@host> show dhcp relay binding detail


Client IP Address:  192.51.100.11
     Hardware Address:             00:00:5e:00:53:01
     State:                        BOUND(DHCP_RELAY_STATE_BOUND_ON_INTF_DELETE)
     Lease Expires:                2009-07-21 11:00:06 PDT
     Lease Expires in:             86361 seconds
     Lease Start:                  2009-07-20 11:00:06 PDT
     Lease time violated:          yes
     Last Packet Received:         2009-07-20 11:00:06 PDT
     Incoming Client Interface:    ge-1/0/0.0
     Interface tag:                None
     Server Ip Address:            192.51.100.22
     Server Interface:             none
     Bootp Relay Address:          192.51.100.32
     Session Id:                   41
     Dual Stack Group:             dual-stack-retail6
     Dual Stack Peer Prefix:       2001:db8:0:4::/64
     Dual Stack Peer Address:      2001:db8:1:0:8003::1/128

Client IP Address:  192.51.100.12
     Hardware Address:             00:00:5e:00:53:02
     State:                        BOUND(DHCP_RELAY_STATE_BOUND_ON_INTF_DELETE)
     Lease Expires:                2009-07-21 11:00:06 PDT
     Lease Expires in:             86361 seconds
     Lease Start:                  2009-07-20 11:00:06 PDT
     Last Packet Received:         2009-07-20 11:00:06 PDT
     Incoming Client Interface:    ge-1/0/0.0
     Interface tag:                None
     Server Ip Address:            192.51.100.22
     Server Interface:             none
     Bootp Relay Address:          192.51.100.32
```

```
     Session Id:                  42
     Generated Remote ID          host:ge-1/0/0:100
```

show dhcp relay binding interface

```
user@host> show dhcp relay binding interface fe-0/0/2

IP address       Hardware address   Type     Lease expires at
192.51.100.1      00:00:5e:00:53:01  active   2007-03-27 15:06:20 EDT
```

show dhcp relay binding interface vlan-id

```
user@host> show dhcp relay binding interface ge-1/1/0:100

IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.15      6           00:00:5e:00:53:94  86124       BOUND      ge-1/1/0:100
```

show dhcp relay binding interface svlan-id

```
user@host> show dhcp relay binding interface ge-1/1/0:10-100

IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.16      7           00:00:5e:00:53:92  86124       BOUND      ge-1/1/0:10-100
```

show dhcp relay binding interface-tag <*interface-tag-name*>

```
user@host> show dhcp relay binding interface-tag sample_tag

IP address        Session Id  Hardware address   Expires     State      Interface
192.2.1.1          2           00:10:94:00:00:01     740       BOUND      ge-0/0/1.3221225472
```

show dhcp relay binding interface-tag *interface-tag-name* detail

```
user@host> show dhcp relay binding interface-tag AGF_IFD detail
     Client IP Address:  192.168.0.100
```

```
    Hardware Address:             00:34:44:44:44:44
    State:                        BOUND(RELAY_STATE_BOUND)
    Lease Expires:                2023-05-02 11:22:44 PDT
    Lease Expires in:             2575 seconds
    Lease Start:                  2023-05-02 09:52:44 PDT
    Last Packet Received:         2023-05-02 10:22:44 PDT
    Incoming Client Interface:    demux0.3221225472
    Interface tag name:           AGF_IFD
    Client Interface Svlan Id:    1
    Client Interface Vlan Id:     1
    Demux Interface:              demux0.3221225491
    Server Ip Address:            192.168.0.50
    Server Interface:             none
    Bootp Relay Address:          192.168..1
    Session Id:                   8
    Client Profile Name:          dhcp-profile
    Generated Circuit ID:         aci1
    Generated Remote ID:          ari1
    Relay Id Length:              31
    Relay Id:                     /0x00020000/0x00000583/0x01000000/0x00000000
    Relay Id:                     /0x30303a32/0x363a3838/0x3a64373a/0x66373a
```

show dhcp relay binding ip-address

```
user@host> show dhcp relay binding 192.51.100.13
IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.13      43          00:00:5e:00:53:03  86293       BOUND      ge-1/0/0.0
```

show dhcp relay binding mac-address

```
user@host> show dhcp relay binding 00:00:5e:00:53:05
IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.15      45          00:00:5e:00:53:05  86279       BOUND      ge-1/0/0.0
```

show dhcp relay binding session-id

```
user@host> show dhcp relay binding 41
 IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.11      41          00:00:5e:00:53:53  86305       BOUND      ge-1/0/0.0
```

show dhcp relay binding <interfaces-vlan>

```
user@host> show dhcp relay binding ge-1/0/0:100-200
IP address        Session Id  Hardware address   Expires     State      Interface
192.168.0.17       42          00:00:5e:00:53:02  86346       BOUND      ge-1/0/0.1073741827
192.168.0.16       41          00:00:5e:00:53:01  86346       BOUND      ge-1/0/0.1073741827
```

show dhcp relay binding <interfaces-wildcard>

```
user@host> show dhcp relay binding ge-1/3/*
IP address        Session Id  Hardware address   Expires     State      Interface
192.168.0.9        24          00:00:5e:00:53:04  86361       BOUND      ge-1/3/0.110
192.168.0.8        23          00:00:5e:00:53:03  86361       BOUND      ge-1/3/0.110
192.168.0.7        22          00:00:5e:00:53:02  86361       BOUND      ge-1/3/0.110
```

show dhcp relay binding summary

```
user@host> show dhcp relay binding summary
3 clients, (2 init, 1 bound, 0 selecting, 0 requesting, 0 renewing, 0 rebinding, 0 releasing)
```

Release Information

Command introduced in Junos OS Release 8.3.

Options `interface` and *mac-address* added in Junos OS Release 8.4.

Options *interfaces-vlan* and *interfaces-wildcard* added in Junos OS Release 12.1.

RELATED DOCUMENTATION

Viewing and Clearing DHCP Bindings

clear dhcp relay binding

show dhcp relay statistics

IN THIS SECTION

Syntax

```
show dhcp relay statistics
<bulk-leasequery-connections>
<leasequery>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Syntax

Syntax for EX Series switches:

```
show dhcp relay statistics
<routing-instance routing-instance-name>
```

Description

Display Dynamic Host Configuration Protocol (DHCP) relay statistics.

Options

bulk-leasequery-connections	(Optional) Display information about DHCP relay bulk leasequery statistics.
leasequery	(Optional) Display information about DHCP relay individual leasequery statistics.
logical-system *logical-system-name*	(On routers only) (Optional) Perform this operation on the specified logical system. If you do not specify a logical system name, statistics are displayed for the default logical system.
routing-instance *routing-instance-name*	(Optional) Perform this operation on the specified routing instance. If you do not specify a routing instance name, statistics are displayed for the default routing instance.

Required Privilege Level

view

Output Fields

Table 12 on page 616 lists the output fields for the `show dhcp relay statistics` command. Output fields are listed in the approximate order in which they appear.

Table 12: show dhcp relay statistics Output Fields

Field Name	Field Description
Packets dropped	Number of packets discarded by the extended DHCP relay agent application due to errors. Only nonzero statistics appear in the Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears. • Total—Total number of packets discarded by the extended DHCP relay agent application. • Bad hardware address—Number of packets discarded because an invalid hardware address was specified. • Bad opcode—Number of packets discarded because an invalid operation code was specified. • Bad options—Number of packets discarded because invalid options were specified. • Invalid server address—Number of packets discarded because an invalid server address was specified. • Lease Time Violation—Number of packets discarded because of a lease time violation • No available addresses—Number of packets discarded because there were no addresses available for assignment. • No interface match—Number of packets discarded because they did not belong to a configured interface. • No routing instance match—Number of packets discarded because they did not belong to a configured routing instance. • No valid local address—Number of packets discarded because there was no valid local address. • Packet too short—Number of packets discarded because they were too short. • Read error—Number of packets discarded because of a system read error. • Send error—Number of packets that the extended DHCP relay application could not send. • Option 60—Number of packets discarded containing DHCP option 60 vendor-specific information. • Option 82—Number of packets discarded because DHCP option 82 information could not be added.

Table 12: show dhcp relay statistics Output Fields *(Continued)*

Field Name	Field Description
`Messages received`	Number of DHCP messages received. • `BOOTREQUEST`—Number of BOOTP protocol data units (PDUs) received • `DHCPDECLINE`—Number of DHCP PDUs of type DECLINE received • `DHCPDISCOVER`—Number of DHCP PDUs of type DISCOVER received • `DHCPINFORM`—Number of DHCP PDUs of type INFORM received • `DHCPRELEASE`—Number of DHCP PDUs of type RELEASE received • `DHCPREQUEST`—Number of DHCP PDUs of type REQUEST received • `DHCPLEASEACTIVE`—Number of active DHCP leases • `DHCPLEASEUNASSIGNED`—Number of DHCP leases that are managed by the server but have not yet been assigned • `DHCPLEASEUNKNOWN`—Number of unknown DHCP leases • `DHCPLEASEQUERYDONE`—The leasequery is complete
`Messages sent`	Number of DHCP messages sent. • `BOOTREPLY`—Number of BOOTP PDUs transmitted • `DHCPOFFER`—Number of DHCP OFFER PDUs transmitted • `DHCPACK`—Number of DHCP ACK PDUs transmitted • `DHCPNACK`—Number of DHCP NACK PDUs transmitted • `DHCPFORCERENEW`—Number of DHCP FORCERENEW PDUs transmitted • `DHCPLEASEQUERY`—Number of DHCP leasequery messages transmitted • `DHCPLEASEBULKLEASEQUERY`—Number of DHCP bulk leasequery messages transmitted
`External Server Response`	State of the external DHCP server responsiveness.

Table 12: show dhcp relay statistics Output Fields *(Continued)*

Field Name	Field Description
Packets forwarded	Number of packets forwarded. • BOOTREQUEST—Number of BOOTREQUEST protocol data units (PDUs) forwarded • BOOTREPLY—Number of BOOTREPLY protocol data units (PDUs) forwarded
External Server Response	State of the external DHCP server responsiveness.
Total Requested Servers	Total number of servers with which the DHCP relay agent has requested a bulk leasequery connection.
Total Attempted Servers	Total number of servers with which the DHCP relay agent has attempted to create a bulk leasequery connection.
Total Connected	Total number of servers that have formed a bulk leasequery connection with the DHCP relay agent.
Total Terminated by Server	Total number of servers that have terminated a bulk leasequery connection with the DHCP relay agent.
Total Max Attempted	Total number of servers where the DHCP relay agent reached the maximum retry limit when it attempted to create a bulk leasequery connection.
Total Closed due to Errors	Total number of bulk leasequery connections that closed due to an internal error on the DHCP relay agent.
In-Flight Connected	Number of current bulk leasequery connections on the DHCP relay agent.
Bulk Leaasequery Reply Packet Retries	Number of bulk leasequery reply packets that the DHCP relay agent has retried.

Sample Output

show dhcp relay statistics

```
user@host> show dhcp relay statistics
Packets dropped:
    Total                       34
    Bad hardware address        1
    Bad opcode                  1
    Bad options                 3
    Invalid server address      5
    Lease Time Violation        1
    No available addresses      1
    No interface match          2
    No routing instance match   9
    No valid local address      4
    Packet too short            2
    Read error                  1
    Send error                  1
    Option 60                   1
    Option 82                   2

Messages received:
    BOOTREQUEST                 116
    DHCPDECLINE                 0
    DHCPDISCOVER                11
    DHCPINFORM                  0
    DHCPRELEASE                 0
    DHCPREQUEST                 105
    DHCPLEASEACTIVE             0
    DHCPLEASEUNASSIGNED         0
    DHCPLEASEUNKNOWN            0
    DHCPLEASEQUERYDONE          0

Messages sent:
    BOOTREPLY                   0
    DHCPOFFER                   2
    DHCPACK                     1
    DHCPNAK                     0
    DHCPFORCERENEW              0
    DHCPLEASEQUERY              0
    DHCPBULKLEASEQUERY          0
```

```
Packets forwarded:
    Total                     4
    BOOTREQUEST               2
    BOOTREPLY                 2

External Server Response:
    State                     Responding
```

show dhcp relay statistics bulk-leasequery-connections

```
user@host> show dhcp relay statistics bulk-leasequery-connections

Total Requested Servers:    0
Total Attempted Servers:    0
Total Connected:            0
Total Terminated by Server: 0
Total Max Attempted:        0
Total Closed due to Errors: 0
In-Flight Connected:        0
Bulk Leasequery Reply Packet Retries:   0
```

Release Information

Command introduced in Junos OS Release 8.3.

`bulk-leasequery-connections` option introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

clear dhcp relay statistics | 554

show dhcp server binding

IN THIS SECTION

Syntax

```
show dhcp server binding
<address>
<interfaces-vlan><brief | detail | summary>
<interface interface-name>
<interface-tag interface-tag-name>
<interfaces-vlan>
<interfaces-wildcard>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Description

Display the address bindings in the client table on the extended Dynamic Host Configuration Protocol (DHCP) local server.

NOTE: If you delete the DHCP server configuration, DHCP server bindings might still remain. To ensure that DHCP bindings are removed, issue the `clear dhcp server binding` command before you delete the DHCP server configuration.

Options

address	(Optional) Display DHCP binding information for a specific client identified by one of the following entries: • *ip-address*—The specified IP address. • *mac-address*—The specified MAC address. • *session-id*—The specified session ID.
brief | detail | summary	(Optional) Display the specified level of output about active client bindings. The default is `brief`, which produces the same output as `show dhcp server binding`.
interface *interface-name*	(Optional) Display information about active client bindings on the specified interface. You can optionally filter on VLAN ID and SVLAN ID.
interface-tag *interface-tag-name*	(Optional) Displays the binding information for the specified interface-tag.
interfaces-vlan	(Optional) Show the binding state information on the interface VLAN ID and S-VLAN ID.
interfaces-wildcard	(Optional) The set of interfaces on which to show the binding state information. This option supports the use of the wildcard character (*).
logical-system *logical-system-name*	(Optional) Display information about active client bindings for DHCP clients on the specified logical system.
routing-instance *routing-instance-name*	(Optional) Display information about active client bindings for DHCP clients on the specified routing instance.

Required Privilege Level

view

Output Fields

Table 13 on page 623 lists the output fields for the `show dhcp server binding` command. Output fields are listed in the approximate order in which they appear.

Table 13: show dhcp server binding Output Fields

Field Name	Field Description	Level of Output
number clients, (*number* init, *number* bound, *number* selecting, *number* requesting, *number* renewing, *number* releasing)	Summary counts of the total number of DHCP clients and the number of DHCP clients in each state.	summary
IP address	IP address of the DHCP client.	brief detail
Session Id	Session ID of the subscriber session.	brief detail
Hardware address	Hardware address of the DHCP client.	brief detail
Expires	Number of seconds in which lease expires.	brief detail
State	State of the address binding table on the extended DHCP local server: • BOUND—Client has active IP address lease. • FORCERENEW—Client has received forcerenew message from server. • INIT—Initial state. • RELEASE—Client is releasing IP address lease. • RENEWING—Client sending request to renew IP address lease. • REQUESTING—Client requesting a DHCP server. • SELECTING—Client receiving offers from DHCP servers.	brief detail

Table 13: show dhcp server binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Interface	Interface on which the request was received.	brief
Lease Expires	Date and time at which the client's IP address lease expires.	detail
Lease Expires in	Number of seconds in which lease expires.	detail
Lease Start	Date and time at which the client's IP address lease started.	detail
Lease time violated	Lease time violation has occurred.	detail
Last Packet Received	Date and time at which the router received the last packet.	detail
Incoming Client Interface	Client's incoming interface.	detail
Interface tag	Name of the Interface tag.	detail
Client Interface Svlan Id	S-VLAN ID of the client's incoming interface.	detail
Client Interface Vlan Id	VLAN ID of the client's incoming interface.	detail
Demux Interface	Name of the IP demultiplexing (demux) interface.	detail
Server IP Address or Server Identifier	IP address of DHCP server.	detail
Server Interface	Interface of DHCP server.	detail

Table 13: show dhcp server binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Client Pool Name`	Name of address pool used to assign client IP address lease.	`detail`

Table 13: show dhcp server binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Liveness Detection State`	State of the liveness detection status for a subscriber's Bidirectional Forwarding Detection (BFD) protocol session: **NOTE**: This output field displays status only when liveness detection has been explicitly configured for a subscriber and the liveness detection protocol is actively functioning for that subscriber. • `DOWN`—Liveness detection has been enabled for a subscriber but the broadband network gateway (BNG) detects that the liveness detection session for the BFD protocol is in the `DOWN` state. A liveness detection session that was previously in an `UP` state has transitioned to a `DOWN` state, beginning with a liveness detection failure, and ending with the deletion of the client binding. The `DOWN` state is reported only during this transition period of time. • `UNKNOWN`—Liveness detection has been enabled for a subscriber but the actual liveness detection state has not yet been determined. The `UNKNOWN` state is reported after a DHCP subscriber initially logs in while the underlying liveness detection protocol handshake, such as BFD, is still processing and the BFD session has not yet reached the `UP` state. • `UP`—Liveness detection has been enabled for a subscriber, and the BNG and the subscriber or client have *both* determined that the liveness detection session for the BFD protocol is in the `UP` state. • `WENT_DOWN`—State is functionally equivalent to the `DOWN` state. A liveness detection session that was previously in an `UP` state has transitioned to a `DOWN` state implying a liveness detection failure.	`detail`

Table 13: show dhcp server binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	The WENT_DOWN state applies to the internal distribution of the liveness detection mechanism between the Junos DHCP Daemon for Subscriber Services (JDHCPd), the BFD plug-in within the Broadband Edge Subscriber Management Daemon (BBE-SMGD), and the Packet Forwarding Engine.	
ACI Interface Set Name	Internally generated name of the dynamic agent circuit identifier (ACI) interface set.	detail
ACI Interface Set Index	Index number of the dynamic ACI interface set.	detail
ACI Interface Set Session ID	Identifier of the dynamic ACI interface set entry in the session database.	detail
Client Profile Name	DHCP client profile name.	detail
Dual Stack Group	DHCP server profile name.	detail
Dual Stack Peer Prefix	IPv6 prefix of peer.	detail
Dual Stack Peer Address	IPv6 address of peer.	detail

Sample Output

show dhcp server binding

```
user@host> show dhcp server binding
IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.15     6           00:00:5e:00:53:01  86180       BOUND      ge-1/0/0.0
192.51.100.16     7           00:00:5e:00:53:02  86180       BOUND      ge-1/0/0.0
192.51.100.17     8           00:00:5e:00:53:03  86180       BOUND      ge-1/0/0.0
```

```
192.51.100.18     9           00:00:5e:00:53:04  86180       BOUND      ge-1/0/0.0
192.51.100.19     10          00:00:5e:00:53:05  86180       BOUND      ge-1/0/0.0
```

show dhcp server binding detail

```
user@host> show dhcp server binding detail
Client IP Address:  192.51.100.15
     Hardware Address:             00:00:5e:00:53:01
     State:                        BOUND(LOCAL_SERVER_STATE_BOUND_ON_INTF_DELETE)
     Lease Expires:                2009-07-21 10:10:25 PDT
     Lease Expires in:             86151 seconds
     Lease Start:                  2009-07-20 10:10:25 PDT
     Incoming Client Interface:    ge-1/0/0.0
     Interface tag:                None
     Server Ip Address:            192.51.100.9
     Server Interface:             none
     Session Id:                   6
     Client Pool Name:             6
     Liveness Detection State:     UP
 Client IP Address:            192.51.100.16
     Hardware Address:             00:00:5e:00:53:02
     State:                        BOUND(LOCAL_SERVER_STATE_BOUND_ON_INTF_DELETE)
     Lease Expires:                2009-07-21 10:10:25 PDT
     Lease Expires in:             86151 seconds
     Lease Start:                  2009-07-20 10:10:25 PDT
     Lease time violated:          yes
     Incoming Client Interface:    ge-1/0/0.0
     Server Ip Address:            192.51.100.9
     Server Interface:             none
     Session Id:                   7
     Client Pool Name:             7
     Liveness Detection State:     UP
```

When DHCP binding is configured with dual-stack, we get the following output:

```
user@host> show dhcp server binding detail
Client IP Address:  192.51.100.10
     Hardware Address:             00:00:64:03:01:02
     State:                        BOUND(LOCAL_SERVER_STATE_BOUND)
     Protocol-Used:                DHCP
```

```
    Lease Expires:                2016-11-07 08:30:39 PST
    Lease Expires in:             43706 seconds
    Lease Start:                  2016-11-04 11:00:37 PDT
    Last Packet Received:         2016-11-06 09:00:39 PST
    Incoming Client Interface:    ae0.3221225472
    Interface tag:                None
    Client Interface Svlan Id:    2000
    Client Interface Vlan Id:     1
    Server Ip Address:            192.51.100.2
    Session Id:                   2
    Client Pool Name:             my-v4-pool
    Client Profile Name:          dhcp-retail
    Dual Stack Group:             my-dual-stack
    Dual Stack Peer Prefix:       2001:db8:ffff:0:4::/64
    Dual Stack Peer Address:      2001:db8:0:8003::1/128
```

show dhcp server binding detail (ACI Interface Set Configured)

```
user@host> show dhcp server binding detail
Client IP Address:  192.51.100.14
    Hardware Address:             00:00:5e:00:53:02
    State:                        BOUND(LOCAL_SERVER_STATE_BOUND)
    Lease Expires:                2012-03-13 09:53:32 PDT
    Lease Expires in:             82660 seconds
    Lease Start:                  2012-03-12 10:23:32 PDT
    Last Packet Received:         2012-03-12 10:23:32 PDT
    Incoming Client Interface:    demux0.1073741827
    Interface tag:                None
    Client Interface Svlan Id:    1802
    Client Interface Vlan Id:     302
    Demux Interface:              demux0.1073741832
    Server Identifier:            192.51.100.202
    Session Id:                   11
    Client Pool Name:             poolA
    Client Profile Name:          DEMUXprofile
    Liveness Detection State:     UP
    ACI Interface Set Name:       aci-1002-demux0.1073741827
    ACI Interface Set Index:      2
    ACI Interface Set Session ID: 6
```

show dhcp server binding interface <vlan-id>

```
user@host> show dhcp server binding interface ge-1/1/0:100
IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.15      6           00:00:5e:00:53:01  86124       BOUND      ge-1/1/0:100
```

show dhcp server binding interface <svlan-id>

```
user@host> show dhcp server binding interface ge-1/1/0:10-100
IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.16      7          00:00:5e:00:53:02  86124       BOUND      ge-1/1/0:10-100
```

show dhcp server binding <ip-address>

```
user@host> show dhcp server binding 192100.19
IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.19      10          00:00:5e:00:53:05  86081       BOUND      ge-1/0/0.0
```

show dhcp server binding <session-id>

```
user@host> show dhcp server binding 6
IP address        Session Id  Hardware address   Expires     State      Interface
192.51.100.15      6           00:00:5e:00:53:01  86124       BOUND      ge-1/0/0.0
```

show dhcp server binding summary

```
user@host> show dhcp server binding summary
3 clients, (2 init, 1 bound, 0 selecting, 0 requesting, 0 renewing, 0 releasing)
```

show dhcp server binding <interfaces-vlan>

```
user@host> show dhcp server binding ge-1/0/0:100-200
IP address        Session Id  Hardware address   Expires     State      Interface
```

```
192.168.0.17      42          00:00:5e:00:53:02  86346      BOUND      ge-1/0/0.1073741827
192.168.0.16      41          00:00:5e:00:53:01  86346      BOUND      ge-1/0/0.1073741827
```

show dhcp server binding <interfaces-wildcard>

```
user@host> show dhcp server binding ge-1/3/*
IP address        Session Id  Hardware address   Expires     State      Interface
192.168.0.9       24          00:00:5e:00:53:04  86361       BOUND      ge-1/3/0.110
192.168.0.8       23          00:00:5e:00:53:03  86361       BOUND      ge-1/3/0.110
192.168.0.7       22          00:00:5e:00:53:02  86361       BOUND      ge-1/3/0.110
```

Release Information

Command introduced in Junos OS Release 9.0.

Options *interfaces-vlan* and *interfaces-wildcard* added in Junos OS Release 12.1.

RELATED DOCUMENTATION

Viewing and Clearing DHCP Bindings

Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration

clear dhcp server binding

show dhcp server statistics

IN THIS SECTION

Syntax

```
show dhcp server statistics
<bulk-leasequery-connections>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Description

Display extended Dynamic Host Configuration Protocol (DHCP) local server statistics.

Options

bulk-leasequery-connections	(Optional) Display information about DHCP local server bulk leasequery statistics.
logical-system *logical-system-name*	(Optional) Display information about extended DHCP local server statistics on the specified logical system. If you do not specify a logical system, statistics are displayed for the default logical system.
routing-instance *routing-instance-name*	(Optional) Display information about extended DHCP local server statistics on the specified routing instance. If you do not specify a routing instance, statistics are displayed for the default routing instance.

Required Privilege Level

view

Output Fields

Table 14 on page 633 lists the output fields for the `show dhcp server statistics` command. Output fields are listed in the approximate order in which they appear.

Table 14: show dhcp server statistics Output Fields

Field Name	Field Description
Packets dropped	Number of packets discarded by the extended DHCP local server because of errors. Only nonzero statistics appear in the Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears. • Total—Total number of packets discarded by the extended DHCP local server • Authentication—Number of packets discarded because they could not be authenticated • Bad hardware address—Number of packets discarded because an invalid hardware address was specified • Bad opcode—Number of packets discarded because an invalid operation code was specified • Bad options—Number of packets discarded because invalid options were specified • Dynamic profile—Number of packets discarded due to dynamic profile information • Invalid server address—Number of packets discarded because an invalid server address was specified • Lease Time Violation—Number of packets discarded because of a lease time violation • No available addresses—Number of packets discarded because there were no addresses available for assignment • No interface match—Number of packets discarded because they did not belong to a configured interface • No routing instance match—Number of packets discarded because they did not belong to a configured routing instance • No valid local address—Number of packets discarded because there was no valid local address • Packet too short—Number of packets discarded because they were too short • Read error—Number of packets discarded because of a system read error • Send error—Number of packets that the extended DHCP local server could not send

Table 14: show dhcp server statistics Output Fields *(Continued)*

Field Name	Field Description
`Offer Delay`	Number of DHCPv4 offer messages delayed. • `DELAYED`—Number of DHCPv4 offer packets that have been sent after being delayed. • `INPROGRESS`—Number of DHCPv4 offer packets that are in the delay queue. • `TOTAL`—Total number of delayed DHCPv4 offer messages; sum of `DELAYED` and `INPROGRESS`.
`Messages received`	Number of DHCP messages received. • `BOOTREQUEST`—Number of BOOTP protocol data units (PDUs) received • `DHCPDECLINE`—Number of DHCP PDUs of type DECLINE received • `DHCPDISCOVER`—Number of DHCP PDUs of type DISCOVER received • `DHCPINFORM`—Number of DHCP PDUs of type INFORM received • `DHCPRELEASE`—Number of DHCP PDUs of type RELEASE received • `DHCPREQUEST`—Number of DHCP PDUs of type REQUEST received • `DHCPLEASEQUERY`—Number of DHCP leasequery messages received. • `DHCPBULKLEASEQUERY`—Number of DHCP bulk leasequery messages received. • `DHCPRENEW`—Number of DHCP renew messages received; subset of `DHCPREQUEST` counter. • `DHCPREBIND`—Number of DHCP rebind messages received; subset of `DHCPREQUEST` counter.

Table 14: show dhcp server statistics Output Fields *(Continued)*

Field Name	Field Description
Messages sent	Number of DHCP messages sent. • BOOTREPLY—Number of BOOTP PDUs transmitted • DHCPOFFER—Number of DHCP OFFER PDUs transmitted • DHCPACK—Number of DHCP ACK PDUs transmitted • DHCPNACK—Number of DHCP NACK PDUs transmitted • DHCPFORCERENEW—Number of DHCP FORCERENEW PDUs transmitted • DHCPLEASEUNASSIGNED—Number of DHCP leases that are managed by the server but have not yet been assigned • DHCPLEASEUNKNOWN—Number of unknown DHCP leases • DHCPLEASEACTIVE—Number of active DHCP leases • DHCPLEASEQUERYDONE—The leasequery is complete
Total Accepted Connections	Total number of bulk leasequery connections accepted by the server.
Total Not-Accepted Connections	Total number of bulk leasequery connections not accepted by the server.
Connections Closed due to Errors	Number of bulk leasequery connections that the server closed due to an internal error.
Connections Closed due to max-empty-replies	Number of bulk leasequery connections that the server closed because the maximum number of empty replies was reached.
In-flight Connections	Number of bulk leasequery connections on the server.

Sample Output

show dhcp server statistics

```
user@host> show dhcp server statistics
Packets dropped:
    Total                     1
    Lease Time Violation      1

Offer Delay:
    DELAYED                   3
    INPROGRESS                9
    TOTAL                    12

Messages received:
    BOOTREQUEST              25
    DHCPDECLINE              0
    DHCPDISCOVER             10
    DHCPINFORM               0
    DHCPRELEASE              4
    DHCPREQUEST              10
    DHCPRENEW                4
    DHCPREBIND               2

Messages sent:
    BOOTREPLY                20
    DHCPOFFER                10
    DHCPACK                  10
    DHCPNAK                  0
    DHCPFORCERENEW           0
```

show dhcp server statistics

```
user@host> show dhcp server statistics verbose
Packets dropped:
    Total                     0

Messages received:
    BOOTREQUEST              238
    DHCPDECLINE              0
```

```
    DHCPDISCOVER                1
    DHCPINFORM                  0
    DHCPRELEASE                 0
    DHCPREQUEST                 237
    DHCPRENEW                   236
    DHCPREBIND                  0

Messages sent:
    BOOTREPLY                   20
    DHCPOFFER                   10
    DHCPACK                     10
    DHCPNAK                     0
    DHCPFORCERENEW              0
```

Release Information

Command introduced in Junos OS Release 9.0.

`bulk-leasequery-connections` option introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

clear dhcp server statistics | 561

show dhcpv6 server binding

IN THIS SECTION

Syntax

```
show dhcpv6 server binding
<address>
<brief | detail | summary>
<interface interface-name>
<interface-tag interface-tag-name>
<interfaces-vlan>
<interfaces-wildcard>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Description

Display the address bindings in the client table on the extended Dynamic Host Configuration Protocol for IPv6 (DHCPv6) local server.

Options

address	(Optional) One of the following identifiers for the DHCPv6 client whose binding state you want to show: • *CID*—The specified Client ID (CID). • *ipv6-prefix*—The specified IPv6 prefix. • *session-id*—The specified session ID.
brief | detail | summary	(Optional) Display the specified level of output about active client bindings. The default is `brief`, which produces the same output as `show dhcpv6 server binding`.
interface *interface-name*	(Optional) Display information about active client bindings on the specified interface. You can optionally filter on VLAN ID and SVLAN ID.
interface-tag *interface-tag-name*	(Optional) Displays the binding information for the specified interface-tag.
interfaces-vlan	(Optional) Interface VLAN ID or S-VLAN ID interface on which to show binding state information.
interfaces-wildcard	(Optional) Set of interfaces on which to show binding state information. This option supports the use of the wildcard character (*).

logical-system *logical-system-name* — (Optional) Display information about active client bindings for DHCPv6 clients on the specified logical system.

routing-instance *routing-instance-name* — (Optional) Display information about active client bindings for DHCPv6 clients on the specified routing instance.

Required Privilege Level

view

Output Fields

Table 15 on page 639 lists the output fields for the `show dhcpv6 server binding` command. Output fields are listed in the approximate order in which they appear.

Table 15: show dhcpv6 server binding Output Fields

Field Name	Field Description	Level of Output
number clients, (*number* init, *number* bound, *number* selecting, *number* requesting, *number* renewing, *number* releasing)	Summary counts of the total number of DHCPv6 clients and the number of DHCPv6 clients in each state.	summary
Prefix	Client's DHCPv6 prefix, or prefix used to support multiple address assignment.	brief detail
Session Id	Session ID of the subscriber session.	brief detail
Expires	Number of seconds in which lease expires.	brief detail

Table 15: show dhcpv6 server binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
State	State of the address binding table on the extended DHCPv6 local server: • BOUND—Client has active IP address lease. • INIT—Initial state. • RECONFIGURE—Server has sent reconfigure message to client. • RELEASE—Client is releasing IP address lease. • RENEWING—Client sending request to renew IP address lease. • REQUESTING—Client requesting a DHCPv6 server. • SELECTING—Client receiving offers from DHCPv6 servers.	brief detail
Interface	Interface on which the DHCPv6 request was received.	brief
Client IPv6 Address	Client's IPv6 address.	detail
Client IPv6 Prefix	Client's IPv6 prefix.	detail
Client IPv6 Excluded Prefix	IPv6 Prefix of the DHCP client excluded.	detail
Client DUID	Client's DHCP Unique Identifier (DUID).	brief detail
Lease expires	Date and time at which the client's IP address lease expires.	detail
Lease expires in	Number of seconds in which lease expires.	detail

Table 15: show dhcpv6 server binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Preferred Lease Expires	Date and UTC time at which the client's IPv6 prefix expires.	detail
Preferred Lease Expires in	Number of seconds at which client's IPv6 prefix expires.	detail
Lease Start	Date and time at which the client's address lease was obtained.	detail
Lease time violated	Lease time violation has occurred.	detail
Incoming Client Interface	Client's incoming interface.	detail
Server IP Address	IP address of DHCPv6 server.	detail
Interface tag	Name of the Interface tag.	detail
Server Interface	Interface of DHCPv6 server.	detail
Client Pool Name	Address pool used to assign IPv6 address.	detail
Client Prefix Pool Name	Address pool used to assign IPv6 prefix.	detail
Client Id length	Length of the DHCPv6 client ID, in bytes.	detail
Client Id	ID of the DHCPv6 client.	detail
Server Id	DHCP unique identifier (DUID) for the DHCPv6 server.	detail

Table 15: show dhcpv6 server binding Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Client Interface Svlan Id`	S-VLAN ID of the client's incoming interface.	`detail`
`Client Interface Vlan Id`	VLAN ID of the client's incoming interface.	`detail`
`Dual Stack Group`	DHCPv6 server profile name.	`detail`
`Dual Stack Peer Address`	DHCPv6 Peer IP address.	`detail`

Sample Output

show dhcpv6 server binding

```
user@host> show dhcpv6 server binding
Prefix                  Session Id  Expires  State    Interface    Client DUID
2001:db8:1111:2222::/64 6           86321    BOUND    ge-1/0/0.0
LL_TIME0x1-0x2e159c0-00:10:94:00:00:01
2001:db8:1111:2222::/64 7           86321    BOUND    ge-1/0/0.0
LL_TIME0x1-0x2e159c0-00:10:94:00:00:02
2001:db8:1111:2222::/64 8           86321    BOUND    ge-1/0/0.0
LL_TIME0x1-0x2e159c0-00:10:94:00:00:03
2001:db8:1111:2222::/64 9           86321    BOUND    ge-1/0/0.0
LL_TIME0x1-0x2e159c1-00:10:94:00:00:04
2001:db8:1111:2222::/64 10          86321    BOUND    ge-1/0/0.0
LL_TIME0x1-0x2e159c1-00:10:94:00:00:05
2001:db8:2002::1/74 11              86321    BOUND    ge-1/0/0.0
LL_TIME0x1-0x2e159c1-00:10:94:00:00:06
```

show dhcpv6 server binding detail

```
user@host> show dhcpv6 server binding detail
Session Id:  2
     Client IPv6 Prefix:                  2001:db8:ffff:0:4::/64
     Client IPv6 Address:                 2001:db8:0:8003::1/128
     Client DUID:                         LL0x1-00:00:64:01:01:02
     State:                               BOUND(DHCPV6_LOCAL_SERVER_STATE_BOUND)
     Lease Expires:                       2016-11-07 08:30:39 PST
     Lease Expires in:                    43706 seconds
     Preferred Lease Expires:             2016-11-07 08:30:39 PST
     Preferred Lease Expires in:          43706 seconds
     Lease Start:                         2016-11-04 11:00:37 PDT
     Last Packet Received:                2016-11-06 09:00:39 PST
     Incoming Client Interface:           ae0.3221225472
     Interface tag:                       None
     Client Interface Svlan Id:           2000
     Client Interface Vlan Id:            1
     Server Ip Address:                   2001:db8::2
     Server Interface:                    none
     Client Profile Name:                 my-dual-stack
     Client Id Length:                    10
     Client Id:                           /0x00030001/0x00006401/0x0102
     Dual Stack Group:                    my-dual-stack
     Dual Stack Peer Address:             192.0.2.10
```

command-name

When DHCPv6 binding is configured with prefix exclude option, we get the following output:

```
user@host> show dhcpv6 server binding detail
Session Id:  5
     Client IPv6 Address:                 2001:db8:2:3::d/128
     Lease Expires:                       2017-12-11 07:45:15 IST
     Lease Expires in:                    9999995 seconds
     Preferred Lease Expires:             2017-12-11 07:45:15 IST
     Preferred Lease Expires in:          9999995 seconds
     Client IPv6 Prefix:                  2001:db8::1000:0:0/68
       Client IPv6 Excluded Prefix:         2001:db8::1fff:ffff:ff00/120
     Lease Expires:                       2017-12-11 07:45:15 IST
```

```
    Lease Expires in:                       9999995 seconds
    Preferred Lease Expires:                2017-12-11 07:45:15 IST
    Preferred Lease Expires in:             9999995 seconds
    Client DUID:                            LL_TIME0x1-0x599553b0-00:10:94:00:00:01
    State:                                  BOUND(DHCPV6_LOCAL_SERVER_STATE_BOUND)
    Lease Start:                            2017-08-17 13:58:32 IST
    Last Packet Received:                   2017-08-17 13:58:36 IST
    Incoming Client Interface:              ge-0/0/0.0
    Interface tag:                          None
    Client Interface Vlan Id:               100
    Client Pool Name:                       ia_na_pool
    Client Prefix Pool Name:                prefix_delegate_pool
    Client Id Length:                       14
    Client Id:                              /0x00010001/0x599553b0/0x00109400/0x0001
    Relay Id Length:                        31
    Relay Id:                               /0x00020000/0x05830130/0x303a3035/0x3a38363a
    Relay Id:                               /0x34343a65/0x323a6330/0x00000000/0x000000
```

show dhcpv6 server binding interface

```
user@host> show dhcpv6 server binding interface ge-1/0/0:10-101
Prefix                  Session Id  Expires  State    Interface    Client DUID
2001:db8:1111:2222::/64 1           86055    BOUND    ge-1/0/0.100
LL_TIME0x1-0x4b0a53b9-00:10:94:00:00:01
```

show dhcpv6 server binding interface detail

```
user@host> show dhcpv6 server binding interface ge-1/0/0:10-101 detail
Session Id:  7
    Client IPv6 Prefix:                     2001:db8:1111:2222::/64
    Client DUID:                            LL_TIME0x1-0x2e159c0-00:10:94:00:00:02
    State:                                  BOUND(bound)
    Lease Expires:                          2009-07-21 10:41:15 PDT
    Lease Expires in:                       86136 seconds
    Preferred Lease Expires:                2012-07-24 00:18:14 UTC
    Preferred Lease Expires in:             600 seconds
    Lease Start:                            2009-07-20 10:41:15 PDT
    Incoming Client Interface:              ge-1/0/0.0
    Interface tag:                          None
    Server Ip Address:                      0.0.0.0
```

```
     Server Interface:                    none
     Client Id Length:                    14
     Client Id:                           /0x00010001/0x02e159c0/0x00109400/0x0002
```

show dhcpv6 server binding (IPv6 Prefix)

```
user@host> show dhcpv6 server binding 14/0x00010001/0x02b3be8f/0x00109400/0x0005 detail
Session Id:  7
     Client IPv6 Prefix:                  2001:db8:1111:2222::/64
     Client DUID:                         LL_TIME0x1-0x2e159c0-00:10:94:00:00:02
     State:                               BOUND(bound)
     Lease Expires:                       2009-07-21 10:41:15 PDT
     Lease Expires in:                    86136 seconds
     Preferred Lease Expires:             2012-07-24 00:18:14 UTC
     Preferred Lease Expires in:          600 seconds
     Lease Start:                         2009-07-20 10:41:15 PDT
     Incoming Client Interface:           ge-1/0/0.0
     Interface tag:                       None
     Server Ip Address:                   0.0.0.0
     Server Interface:                    none
     Client Id Length:                    14
     Client Id:                           /0x00010001/0x02e159c0/0x00109400/0x0002
```

show dhcpv6 server binding (Session ID)

```
user@host> show dhcpv6 server binding 8
Prefix           Session Id  Expires  State    Interface    Client DUID
2001:db8::/32    8           86235    BOUND    ge-1/0/0.0
LL_TIME0x1-0x2e159c0-00:10:94:00:00:03
```

show dhcpv6 server binding (Interfaces VLAN)

```
user@host> show dhcpv6 server binding ge-1/0/0:100-200
Prefix            Session Id  Expires  State    Interface            Client DUID
2001:db8::/32     11          87583    BOUND    ge-1/0/0.1073741827
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
```

```
2001:db8:19::/32     12       87583    BOUND    ge-1/0/0.1073741827
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
```

show dhcpv6 server binding (Interfaces Wildcard)

```
user@host> show dhcpv6 server binding demux0
Prefix            Session Id  Expires  State    Interface           Client DUID
2001:db8::/32     30          79681    BOUND    demux0.1073741824
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:db8:19::/32     31       79681    BOUND    demux0.1073741825
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:db8:C9::/32     32       79681    BOUND    demux0.1073741826
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
```

show dhcpv6 server binding (Interfaces Wildcard)

```
user@host> show dhcpv6 server binding ge-1/3/*
Prefix            Session Id  Expires  State    Interface      Client DUID
2001:db8::/32     22          79681    BOUND    ge-1/3/0.110
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:db8:19::/32     33       79681    BOUND    ge-1/3/0.110
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:db8:C9::/32     24       79681    BOUND    ge-1/3/0.110
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
```

show dhcpv6 server binding summary

```
user@host> show dhcpv6 server binding summary
5 clients, (0 init, 5 bound, 0 selecting, 0 requesting, 0 renewing, 0 releasing)
```

show dhcpv6 server binding interface-tag <*interface-tag-name*>

```
user@host> show dhcpv6 server binding interface-tag sample_tag
IP address Session Id Hardware address Expires State Interface
2001:db8:1001::1:a/128 00:10:94:00:00:01 740 BOUND ge-0/0/1.3221225472
```

Release Information

Command introduced in Junos OS Release 9.6.

Options *interfaces-vlan* and *interfaces-wildcard* added in Junos OS Release 12.1.

RELATED DOCUMENTATION

Viewing and Clearing DHCP Bindings

clear dhcpv6 server binding

show dhcpv6 server statistics

IN THIS SECTION

Syntax

```
show dhcpv6 server statistics
<bulk-leasequery-connections>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Description

Display extended Dynamic Host Configuration Protocol for IPv6 (DHCPv6) local server statistics.

Options

bulk-leasequery-connections	(Optional) Display information about DHCPv6 local server bulk leasequery statistics.
logical-system *logical-system-name*	(Optional) Display information about extended DHCPv6 local server statistics on the specified logical system. If you do not specify a logical system, statistics are displayed for the default logical system.
routing-instance *routing-instance-name*	(Optional) Display information about extended DHCPv6 local server statistics on the specified routing instance. If you do not specify a routing instance, statistics are displayed for the default routing instance.

Required Privilege Level

view

Output Fields

Table 16 on page 649 lists the output fields for the `show dhcpv6 server statistics` command. Output fields are listed in the approximate order in which they appear.

Table 16: show dhcpv6 server statistics Output Fields

Field Name	Field Description
Packets dropped	Number of packets discarded by the extended DHCPv6 local server because of errors. Only nonzero statistics appear in the Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears. • Total—Total number of packets discarded by the extended DHCPv6 local server • Strict Reconfigure—Number of solicit messages discarded because the client does not support reconfiguration • Bad hardware address—Number of packets discarded because an invalid hardware address was specified • Bad opcode—Number of packets discarded because an invalid operation code was specified • Bad options—Number of packets discarded because invalid options were specified • Client MAC validation—Number of packets discarded because validation of the client MAC address failed. • Invalid server address—Number of packets discarded because an invalid server address was specified • Lease Time Violation—Number of packets discarded because of a lease time violation • No available addresses—Number of packets discarded because there were no addresses available for assignment • No interface match—Number of packets discarded because they did not belong to a configured interface • No routing instance match—Number of packets discarded because they did not belong to a configured routing instance • No valid local address—Number of packets discarded because there was no valid local address • Packet too short—Number of packets discarded because they were too short • Read error—Number of packets discarded because of a system read error • Send error—Number of packets that the extended DHCPv6 local server could not send

Table 16: show dhcpv6 server statistics Output Fields *(Continued)*

Field Name	Field Description
Advertise Delay	Number of DHCP advertise messages delayed. • DELAYED—Number of DHCPv6 advertise packets that have been sent after being delayed. • INPROGRESS—Number of DHCPv6 advertise packets that are in the delay queue. • TOTAL—Total number of delayed DHCPv6 advertise messages; sum of DELAYED and INPROGRESS.
Messages received	Number of DHCPv6 messages received. • DHCPV6_CONFIRM—Number of DHCPv6 CONFIRM PDUs received. • DHCPV6_DECLINE—Number of DHCPv6 DECLINE PDUs received. • DHCPV6_INFORMATION_REQUEST—Number of DHCPv6 INFORMATION-REQUEST PDUs received. • DHCPV6_REBIND—Number of DHCPv6 REBIND PDUs received. • DHCPV6_RELAY_FORW—Number of DHCPv6 RELAY-FORW PDUs received. • DHCPV6_RELAY_REPL—Number of DHCPv6 RELAY-REPL PDUs received. • DHCPV6_RELEASE—Number of DHCPv6 RELEASE PDUs received. • DHCPV6_RENEW—Number of DHCPv6 RENEW PDUs received. • DHCPV6_REQUEST—Number of DHCPv6 REQUEST PDUs received. • DHCPV6_SOLICIT—Number of DHCPv6 SOLICIT PDUs received. • DHCPV6_LEASEQUERY—Number of DHCPv6 leasequery messages received.

Table 16: show dhcpv6 server statistics Output Fields *(Continued)*

Field Name	Field Description
Messages sent	Number of DHCPv6 messages sent. • DHCPV6_ADVERTISE—Number of DHCPv6 ADVERTISE PDUs transmitted. • DHCPV6_REPLY—Number of DHCPv6 ADVERTISE PDUs transmitted. • DHCPV6_LOGICAL_NAK—Number of logical NAK messages sent, signifying T1 and T2 timers with values of zero; subset of DHCPV6_REPLY counter. (Displays only at verbose level. • DHC6_RECONFIGURE—Number of DHCPv6 RECONFIGURE PDUs transmitted. • DHCPV6_RELAY_REPL—Number of DHCPv6 RELAY-REPL PDUs transmitted. • DHCPV6_RELAY_FORW—Number of DHCPv6 RELAY-FORW PDUs transmitted. • DHCPV6_LEASEQUERY_REPLY—Number of DHCPv6 leasequery replies transmitted to the DHCPv6 relay agent. • DHCPV6_LEASEQUERY_DATA—Number of DHCPv6 LEASEQUERY-DATA packets transmitted. • DHCPV6_LEASEQUERY_DONE—Number of DHCPv6 LEASEQUERY-DONE packets sent.

Sample Output

show dhcpv6 server statistics

```
user@host> show dhcpv6 server statistics
Dhcpv6 Packets dropped:
    Total                      2
    Lease Time Violation       1
    Client MAC validation      1

Advertise Delay:
    DELAYED                    3
    INPROGRESS                 9
    TOTAL                     12

Messages received:
    DHCPV6_DECLINE             0
```

```
    DHCPV6_SOLICIT             9
    DHCPV6_INFORMATION_REQUEST 0
    DHCPV6_RELEASE             0
    DHCPV6_REQUEST             5
    DHCPV6_CONFIRM             0
    DHCPV6_RENEW               0
    DHCPV6_REBIND              0
    DHCPV6_RELAY_FORW          0

    DHCPV^_LEASEQUERY          0

Messages sent:
    DHCPV6_ADVERTISE           9
    DHCPV6_REPLY               5
    DHCPV6_RECONFIGURE         0
    DHCPV6_RELAY_REPL          0
    DHCPV6_LEASEQUERY_REPLY    0
    DHCPV6_LEASEQUERY_DATA     0
    DHCPV6_LEASEQUERY_DONE     0
```

show dhcpv6 server statistics bulk-leasequery-connections

```
user@host> show dhcpv6 server statistics bulk-leasequery-connections

Total Accepted Connections:                    0
Total Not-Accepted Connections:                0
Connections Closed due to Errors:              0
Connections Closed due to max-empty-replies:   0
In-flight Connections:                         0
```

Release Information

Command introduced in Junos OS Release 9.6.

`bulk-leasequery-connections` option introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

clear dhcpv6 server statistics | 567

show extensible-subscriber-services counters

IN THIS SECTION

Syntax

```
show extensible-subscriber-services counters
```

Description

Display number of times various events were processed by Extensible Subscriber Services Manager.

Required Privilege Level

view

Output Fields

Table 17 on page 654 describes the output fields for the `show extensible-subscriber-services counters` command. Output fields are listed in the approximate order in which they appear.

Table 17: show extensible-subscriber-services counters Output Fields

Field Name	Field Description
Total Sessions	Number of extensible-subscriber-service control sessions that are currently in the system
Total Services	Number of extensible-subscriber-services that are currently in the system
Active Services	Number of extensible-subscriber-services that are currently in active state
Op-script execution	Total number of operational scripts executed: • Successful—Operational scripts that are executed without error • Unsuccessful—Operational scripts that encountered errors
Commit execution	Total number of commit scripts executed: • Successful—Commit scripts that are executed without error • Unsuccessful—Commit scripts that encountered errors
Application execution	Number of applications executed: • Successful—Applications that are executed without error • Unsuccessful—Applications that encountered errors
Service requests	Number of service requests received by the daemon. It has counters for total number of requests received, acknowledged (Acked), and negatively acknowledged (Nacked).

Sample Output

command-name

```
# show extensible-subscriber-services counters

Total Sessions:         7
```

```
Total Services:         14
Active Services:        14

Op-script execution:
    Successful          30
    Unsuccessful        0
Commit execution:
    Successful          4
    Unsuccessful        0
Application execution:
    Successful          0
    Unsuccessful        0
Service requests:
    Received            30
    Acked               30
    Nacked              0
```

Release Information

Command introduced in Junos OS Release 15.1.

RELATED DOCUMENTATION

clear extensible-subscriber-services counters

show extensible-subscriber-services debug-information

IN THIS SECTION

Syntax

```
show extensible-subscriber-services debug-information
```

Description

Write service session information to a file.

Required Privilege Level

view

Output Fields

Table 18 on page 656 lists the output fields for the `show extensible-subscriber-services debug-information` command.

Table 18: show extensible-subscriber-services debug-information Output Fields

Field Name	Field Description
File Name	Name of the file that contains the service session information

Sample Output

command-name

```
#show extensible-subscriber-services debug-information
File Name: /var/tmp/dump_session_record
```

Release Information

Command introduced in Junos OS Release 15.1.

show extensible-subscriber-services dictionary

IN THIS SECTION

Syntax

```
show extensible-subscriber-services dictionary
```

Description

Display contents of the dictionary including attributes and services.

Required Privilege Level

view

Output Fields

Table 19 on page 658 lists the output fields for the `show extensible-subscriber-services dictionary` command. Output fields are listed in the approximate order in which they appear.

Table 19: show extensible-subscriber-services dictionary Output Fields

Field Name	Field Description
Acct-Session-Id	Unique accounting identifier that makes it easy to match start and stop records in a log file. The identifier can be in one of the following formats: • `decimal`—For example, `435264` • `description`—In the generic format, `jnpr` *`interface-specifier`*`:`*`subscriber-session-id`*; For example, `jnpr fastEthernet 3/2.6:1010101010101`
ERX-Service-Activate	Service to be activated for the subscriber.
Service-Type	Type of service the user has requested or the type of service to be provided.
ADSL-Agent-Remote-Id	Identifier for the subscriber on the digital subscriber line access multiplexer (DSLAM) interface that initiated the service request.
ERX-Med-Port-Number	UDP port in the mediation device to which mirrored traffic is forwarded
NAS-Port-Id	Text string that identifies the physical interface of the NAS that is authenticating the user.
ERX-Med-Dev-Handle	Identifier that associates mirrored traffic with a specific subscriber
ERX-Service-Deactivate	Service to be deactivated for the subscriber.
NAS-IP-Address	IP address of the network access server (NAS) that is requesting authentication of the user.
NAS-Identifier	Name of the NAS that originated the authentication or accounting request.
ERX-Service-Acct-Interval	Amount of time between accounting updates for the service type

Table 19: show extensible-subscriber-services dictionary Output Fields *(Continued)*

Field Name	Field Description
ADSL-Agent-Circuit-Id	Identifier for subscriber's access node and the digital subscriber line (DSL) on the access node.
ERX-LI-Action	Traffic mirroring action. For dynamic CoA, VSA 26-58 changes the action on the mirrored traffic identified by VSA 26–59. CoA-Request messages that include any of the RADIUS-based mirroring attributes (VSAs 26–58, 26–59, 26–60, or 26–61) must always include all four VSAs. If the CoA action is to stop mirroring (VSA 26–58 value is 0), then the values of the other three attributes in the CoA message must match the existing attribute values, or the action fails.
ERX-Med-Ip-Address	IP address of content destination device to which mirrored traffic is forwarded.

Sample Output

command-name

```
root@ce-bras-mx240-g> show extensible-subscriber-services dictionary

RADIUS DICTIONARY

  Attribute Name             Vendor ID   Attribute Code    Attribute Type    Has Tag   Config
Type
  Class                      0           25                string            FALSE
INVALID
  Acct-Session-Id            0           44                string            FALSE
INVALID
  ERX-Service-Activate       4874        65                string            TRUE
SERVICE_ACTIVATE
  Service-Type               4874        173               integer           TRUE
INVALID
  ADSL-Agent-Remote-Id       3561        2                 string            FALSE
INVALID
```

```
  ERX-Med-Port-Number         4874        61              OctetString       FALSE
INVALID
  NAS-Port-Id                 0           87              text              FALSE
INVALID
  ERX-Med-Dev-Handle          4874        59              OctetString       FALSE
INVALID
  ERX-Service-Deactivate      4874        66              string            TRUE
SERVICE_DEACTIVATE
  NAS-IP-Address              0           4               address           FALSE
INVALID
  NAS-Identifier              0           32              string            FALSE
INVALID
  ERX-Service-Acct-Interval   4874        140             integer           TRUE
INVALID
  ADSL-Agent-Circuit-Id       3561        1               string            FALSE
INVALID
  ERX-LI-Action               4874        58              OctetString       FALSE
SERVICE_ACTIVATE
  ERX-Med-Ip-Address          4874        60              OctetString       FALSE
INVALID

  Services List

  Service Name: ngcoco
    Service Attribute Name      : ERX-Service-Activate

    PROVISION ACTION
      Action Type               : OP-SCRIPT
      Action Version            : 1
      Action Name               : iceaaa_ngcoco_add

      PARAMETERS
        Acct-Session-Id
        NAS-Port-Id
        ERX-Service-Activate

    DE-PROVISION ACTION
      Action Type               : OP-SCRIPT
      Action Version            : 1
      Action Name               : iceaaa_del

      PARAMETERS
        Acct-Session-Id
```

```
      NAS-Port-Id
      ERX-Service-Activate

Service Name: dhcprelay
  Service Attribute Name      : ERX-Service-Activate

  PROVISION ACTION
    Action Type               : OP-SCRIPT
    Action Version            : 1
    Action Name               : iceaaa_dhcprelay_add

    PARAMETERS
      Acct-Session-Id
      NAS-Port-Id
      ERX-Service-Activate

  DE-PROVISION ACTION
    Action Type               : OP-SCRIPT
    Action Version            : 1
    Action Name               : iceaaa_del

    PARAMETERS
      Acct-Session-Id
      NAS-Port-Id
      ERX-Service-Activate

Service Name: default
  Service Attribute Name      : ERX-LI-Action

  PROVISION ACTION
    Action Type               : APPLICATION
    Action Version            : 1
    Action Name               : LI

    PARAMETERS
      ERX-Med-Dev-Handle
      ERX-Med-Ip-Address
      ERX-Med-Port-Number

Service Name: dhcprelay
  Service Attribute Name      : ERX-Service-Deactivate

  DE-PROVISION ACTION
```

```
      Action Type               : OP-SCRIPT
      Action Version            : 1
      Action Name               : iceaaa_del

      PARAMETERS
        Acct-Session-Id
        NAS-Port-Id
        ERX-Service-Deactivate

  Service Name: ngcoco
    Service Attribute Name      : ERX-Service-Deactivate

    DE-PROVISION ACTION
      Action Type               : OP-SCRIPT
      Action Version            : 1
      Action Name               : iceaaa_del

      PARAMETERS
        Acct-Session-Id
        NAS-Port-Id
        ERX-Service-Deactivate
```

Release Information

Command introduced in Junos OS Release 15.1.

RELATED DOCUMENTATION

dictionary

request services extensible-subscriber-services reload-dictionary

show extensible-subscriber-services dictionary attributes | **663**

show extensible-subscriber-services dictionary services | **667**

Understanding the Dictionary File | **92**

show extensible-subscriber-services dictionary attributes

IN THIS SECTION

Syntax

```
show extensible-subscriber-services dictionary attributes
```

Description

Display contents of the dictionary file. It shows only the parameter attributes in the dictionary.

Required Privilege Level

view

Output Fields

Table 20 on page 664lists the output fields for the `show extensible-subscriber-services dictionary attributes` command. Output fields are listed in the approximate order in which they appear.

Table 20: show extensible-subscriber-services dictionary attributes Output Fields

Field Name	Field Description
Acct-Session-Id	Unique accounting identifier that makes it easy to match start and stop records in a log file. The identifier can be in one of the following formats: • `decimal`—For example, `435264` • `description`—In the generic format, `jnpr` *`interface-specifier`*`:`*`subscriber-session-id`*; For example, `jnpr fastEthernet 3/2.6:1010101010101`
ERX-Service-Activate	Service to be activated for the subscriber.
Service-Type	Type of service the user has requested or the type of service to be provided.
ADSL-Agent-Remote-Id	Identifier for the subscriber on the digital subscriber line access multiplexer (DSLAM) interface that initiated the service request.
ERX-Med-Port-Number	UDP port in the mediation device to which mirrored traffic is forwarded
NAS-Port-Id	Text string that identifies the physical interface of the NAS that is authenticating the user.
ERX-Med-Dev-Handle	Identifier that associates mirrored traffic with a specific subscriber
ERX-Service-Deactivate	Service to be deactivated for the subscriber.
NAS-IP-Address	IP address of the network access server (NAS) that is requesting authentication of the user.
NAS-Identifier	Name of the NAS that originated the authentication or accounting request.
ERX-Service-Acct-Interval	Amount of time between accounting updates for the service type

Table 20: show extensible-subscriber-services dictionary attributes Output Fields *(Continued)*

Field Name	Field Description
ADSL-Agent-Circuit-Id	Identifier for subscriber's access node and the digital subscriber line (DSL) on the access node.
ERX-LI-Action	Traffic mirroring action. For dynamic CoA, VSA 26-58 changes the action on the mirrored traffic identified by VSA 26–59. CoA-Request messages that include any of the RADIUS-based mirroring attributes (VSAs 26–58, 26–59, 26–60, or 26–61) must always include all four VSAs. If the CoA action is to stop mirroring (VSA 26–58 value is 0), then the values of the other three attributes in the CoA message must match the existing attribute values, or the action fails.
ERX-Med-Ip-Address	IP address of content destination device to which mirrored traffic is forwarded.

Sample Output

command-name

```
root@ce-bras-mx240-g> show extensible-subscriber-services dictionary attributes

RADIUS DICTIONARY

  Attribute Name             Vendor ID   Attribute Code   Attribute Type  Has Tag  Config Type
  Class                      0           25               string          FALSE
INVALID
  Acct-Session-Id            0           44               string          FALSE
INVALID
  ERX-Service-Activate       4874        65               string          TRUE
SERVICE_ACTIVATE
  Service-Type               4874        173              integer         TRUE
INVALID
  ADSL-Agent-Remote-Id       3561        2                string          FALSE
INVALID
  ERX-Med-Port-Number        4874        61               OctetString     FALSE
```

```
INVALID
  NAS-Port-Id                0          87              text           FALSE
INVALID
  ERX-Med-Dev-Handle         4874       59              OctetString    FALSE
INVALID
  ERX-Service-Deactivate     4874       66              string         TRUE
SERVICE_DEACTIVATE
  NAS-IP-Address             0          4               address        FALSE
INVALID
  NAS-Identifier             0          32              string         FALSE
INVALID
  ERX-Service-Acct-Interval  4874       140             integer        TRUE
INVALID
  ADSL-Agent-Circuit-Id      3561       1               string         FALSE
INVALID
  ERX-LI-Action              4874       58              OctetString    FALSE
SERVICE_ACTIVATE
  ERX-Med-Ip-Address         4874       60              OctetString    FALSE
INVALID
```

Release Information

Command introduced in Junos OS Release 15.1.

RELATED DOCUMENTATION

dictionary

request services extensible-subscriber-services reload-dictionary

show extensible-subscriber-services dictionary | 657

show extensible-subscriber-services dictionary services | 667

Understanding the Dictionary File | 92

show extensible-subscriber-services dictionary services

IN THIS SECTION

Syntax

```
show extensible-subscriber-services dictionary services
```

Description

Display services configured in the dictionary file and their attributes.

Required Privilege Level

view

Output Fields

Table 21 on page 667lists the output fields for the `show extensible-subscriber-services dictionary services` command. Output fields are listed in the approximate order in which they appear.

Table 21: show extensible-subscriber-services dictionary services Output Fields

Field Name	Field Description
Service Name	Name of the service specified in the dictionary.

Table 21: show extensible-subscriber-services dictionary services Output Fields *(Continued)*

Field Name	Field Description
Service Attribute Name	Name of the service attribute.
PROVISION ACTION	Name, type, and version of the provisioning action
DE-PROVISION ACTION	Name, type, and version of the deprovisioning action
PARAMETERS	Parameters to be processed for the provisioning or deprovisioning action.

Sample Output

command-name

```
root@ce-bras-mx240-g> show extensible-subscriber-services dictionary services

RADIUS DICTIONARY

  Services List

  Service Name: ngcoco
    Service Attribute Name      : ERX-Service-Activate

    PROVISION ACTION
      Action Type               : OP-SCRIPT
      Action Version            : 1
      Action Name               : iceaaa_ngcoco_add

      PARAMETERS
        Acct-Session-Id
        NAS-Port-Id
        ERX-Service-Activate

    DE-PROVISION ACTION
      Action Type               : OP-SCRIPT
      Action Version            : 1
```

```
    Action Name               : iceaaa_del

    PARAMETERS
      Acct-Session-Id
      NAS-Port-Id
      ERX-Service-Activate

Service Name: dhcprelay
  Service Attribute Name      : ERX-Service-Activate

  PROVISION ACTION
    Action Type               : OP-SCRIPT
    Action Version            : 1
    Action Name               : iceaaa_dhcprelay_add

    PARAMETERS
      Acct-Session-Id
      NAS-Port-Id
      ERX-Service-Activate

  DE-PROVISION ACTION
    Action Type               : OP-SCRIPT
    Action Version            : 1
    Action Name               : iceaaa_del

    PARAMETERS
      Acct-Session-Id
      NAS-Port-Id
      ERX-Service-Activate
Service Name: default
  Service Attribute Name      : ERX-LI-Action

  PROVISION ACTION
    Action Type               : APPLICATION
    Action Version            : 1
    Action Name               : LI

    PARAMETERS
      ERX-Med-Dev-Handle
      ERX-Med-Ip-Address
      ERX-Med-Port-Number

Service Name: dhcprelay
```

```
    Service Attribute Name      : ERX-Service-Deactivate

    DE-PROVISION ACTION
      Action Type               : OP-SCRIPT
      Action Version            : 1
      Action Name               : iceaaa_del

      PARAMETERS
        Acct-Session-Id
        NAS-Port-Id
        ERX-Service-Deactivate

  Service Name: ngcoco
    Service Attribute Name      : ERX-Service-Deactivate

    DE-PROVISION ACTION
      Action Type               : OP-SCRIPT
      Action Version            : 1
      Action Name               : iceaaa_del

      PARAMETERS
        Acct-Session-Id
        NAS-Port-Id
        ERX-Service-Deactivate
```

Release Information

Command introduced in Junos OS Release 15.1.

RELATED DOCUMENTATION

dictionary

request services extensible-subscriber-services reload-dictionary

show extensible-subscriber-services dictionary | **657**

show extensible-subscriber-services dictionary attributes | **663**

Understanding the Dictionary File | **92**

show extensible-subscriber-services sessions

IN THIS SECTION

Syntax

```
show extensible-subscriber-services sessions accounting-session-id
```

Description

Display session information. It displays a list of the services applied and their current state. Specify the accounting session ID to view information about a specific session. If an accounting session ID is not specified in the command, the command displays details of all the sessions.

Options

accounting-session-id	Identifier of the session you want information about.

Required Privilege Level

view

Output Fields

Table 22 on page 672 describes the output fields for the `show extensible-subscriber-services sessions` command. Output fields are listed in the approximate order in which they appear.

Table 22: show extensible-subscriber-services sessions Output Fields

Field Name	Field Description
Session ID	Session ID. Accounting session ID must be enclosed in quotation marks.
Timestamp	Time when the session was started
Service Name	Name of the service
Commit State	Commit state: `Init`, `Queued`, or `Success`.
Service ID	Service ID

Sample Output

command-name

```
#show extensible-subscriber-services sessions
Session ID: jnpr demux0.1073762028:46422
    Timestamp: Fri Mar  8 04:58:27 2013
    Service Name: ngcoco
    Service Name: dhcprelay

Total Sessions: 1

# show extensible-subscriber-services sessions "jnpr demux0.1073762028:46422"

Service ID: jnpr demux0.1073762028:46422:46425
    Timestamp: Fri Mar  8 04:58:27 2013
    Service Name: ngcoco
    Commit State: Success

Service ID: jnpr demux0.1073762028:46422:46426
    Timestamp: Fri Mar  8 04:58:27 2013
    Service Name: dhcprelay
    Commit State: Success
```

```
Total Services: 2
```

Release Information

Command introduced in Junos OS Release 15.1.

RELATED DOCUMENTATION

clear extensible-subscriber-services sessions

show extensible-subscriber-services service

IN THIS SECTION

Syntax

```
show extensible-subscriber-services service
```

Description

Display service information. It displays the service name specified in the dictionary, scripts used for provisioning and deprovisioning, and the number of services. A service can have more than one version. Each version is grouped using an action set. The number of action sets is equal to the number of versions for the service. Number of services in all the versions is displayed in **Total Services**.

Required Privilege Level

view

Output Fields

Table 23 on page 674 lists the output fields for the `show extensible-subscriber-services service` command. Output fields are listed in the approximate order in which they appear.

Table 23: show extensible-subscriber-services service Output Fields

Field Name	Field Description
Service Name	Name of the service
Action	Name and number of services provisioned or deprovisioned.
Total Services	Total number of services provisioned or deprovisioned.

Sample Output

command-name

```
#show extensible-subscriber-services services
Service Name: ngcoco
    Action:
        Provision:            iceaaa_ngcoco_add_1
        Deprovision:          iceaaa_del_1
        Services:                 1301

    Total Services:             1301

Service Name: dhcprelay
    Action:
        Provision:            iceaaa_dhcprelay_add_1
        Deprovision:          iceaaa_del_1
        Services:                 1301
```

```
    Total Services:             1301
```

Release Information

Command introduced in Junos OS Release 15.1.

RELATED DOCUMENTATION

Understanding the Dictionary File | 92

show interfaces (Fast Ethernet)

IN THIS SECTION

Syntax

```
show interfaces interface-type
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index snmp-index>
<statistics>
```

Description

Display status information about the specified Fast Ethernet interface.

Options

interface-type	On M Series and T Series routers, the interface type is `fe-`*`fpc/pic/port`*.
brief | detail | extensive | terse	(Optional) Display the specified level of output.
descriptions	(Optional) Display interface description strings.
media	(Optional) Display media-specific information about network interfaces.
snmp-index *snmp-index*	(Optional) Display information for the specified SNMP index of the interface.
statistics	(Optional) Display static interface statistics.

Required Privilege Level

view

Output Fields

Table 24 on page 676 lists the output fields for the `show interfaces` (Fast Ethernet) command. Output fields are listed in the approximate order in which they appear.

Table 24: show interfaces Fast Ethernet Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
`Physical interface`	Name of the physical interface.	All levels
`Enabled`	State of the interface. Possible values are described in the “Enabled Field” section under Common Output Fields Description.	All levels

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Interface index`	Index number of the physical interface, which reflects its initialization sequence.	`detail extensive` none
`SNMP ifIndex`	SNMP index number for the physical interface.	`detail extensive` none
`Generation`	Unique number for use by Juniper Networks technical support only.	`detail extensive`
`Link-level type`	Encapsulation being used on the physical interface.	All levels
`MTU`	Maximum transmission unit size on the physical interface.	All levels
`Link-mode`	Type of link connection configured for the physical interface: `Full-duplex` or `Half-duplex`	`extensive`
`Speed`	Speed at which the interface is running.	All levels
`Loopback`	Loopback status: `Enabled` or `Disabled`. If loopback is enabled, type of loopback: `Local` or `Remote`.	All levels
`Source filtering`	Source filtering status: `Enabled` or `Disabled`.	All levels
`LAN-PHY mode`	10-Gigabit Ethernet interface operating in Local Area Network Physical Layer Device (LAN PHY) mode. LAN PHY allows 10-Gigabit Ethernet wide area links to use existing Ethernet applications.	All levels
`WAN-PHY mode`	10-Gigabit Ethernet interface operating in Wide Area Network Physical Layer Device (WAN PHY) mode. WAN PHY allows 10-Gigabit Ethernet wide area links to use fiber-optic cables and other devices intended for SONET/SDH.	All levels

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Unidirectional`	Unidirectional link mode status for 10-Gigabit Ethernet interface: `Enabled` or `Disabled` for parent interface; `Rx-only` or `Tx-only` for child interfaces.	All levels
`Flow control`	Flow control status: `Enabled` or `Disabled`.	All levels
`Auto-negotiation`	(Gigabit Ethernet interfaces) Autonegotiation status: `Enabled` or `Disabled`.	All levels
`Remote-fault`	(Gigabit Ethernet interfaces) Remote fault status: • `Online`—Autonegotiation is manually configured as online. • `Offline`—Autonegotiation is manually configured as offline.	All levels
`Device flags`	Information about the physical device. Possible values are described in the “Device Flags” section under Common Output Fields Description.	All levels
`Interface flags`	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
`Link flags`	Information about the link. Possible values are described in the “Links Flags” section under Common Output Fields Description.	All levels
`Wavelength`	(10-Gigabit Ethernet dense wavelength-division multiplexing [DWDM] interfaces) Displays the configured wavelength, in nanometers (nm).	All levels
`Frequency`	(10-Gigabit Ethernet DWDM interfaces only) Displays the frequency associated with the configured wavelength, in terahertz (THz).	All levels
`CoS queues`	Number of CoS queues configured.	`detail extensive` none
`Schedulers`	(GigabitEthernet intelligent queuing 2 (IQ2) interfaces only) Number of CoS schedulers configured.	`extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	detail extensive
Current address	Configured MAC address.	detail extensive none
Hardware address	Hardware MAC address.	detail extensive none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is Last flapped: *year-month-day hour*:*minute*:*second*:*timezone* (*hour*:*minute*:*second* ago). For example, Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago).	detail extensive none
Input Rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output Rate	Output rate in bps and pps.	None specified
Statistics last cleared	Time when the statistics for the interface were last set to zero.	detail extensive

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Traffic statistics`	Number and rate of bytes and packets received and transmitted on the physical interface. • `Input bytes`—Number of bytes received on the interface • `Output bytes`—Number of bytes transmitted on the interface. • `Input packets`—Number of packets received on the interface. • `Output packets`—Number of packets transmitted on the interface. Gigabit Ethernet and 10-Gigabit Ethernet IQ PICs count the overhead and CRC bytes. For Gigabit Ethernet IQ PICs, the input byte counts vary by interface type. For more information, see Table 31 under the show interfaces command.	`detail extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Input errors`	Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • `Errors`—Sum of the incoming frame terminations and FCS errors. • `Drops`—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • `Framing errors`—Number of packets received with an invalid frame checksum (FCS). • `Runts`—Number of frames received that are smaller than the runt threshold. • `Policed discards`—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • `L3 incompletes`—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. L3 incomplete errors can be ignored by configuring the `ignore-l3-incompletes` statement. • `L2 channel errors`—Number of times the software did not find a valid logical interface for an incoming frame. • `L2 mismatch timeouts`—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • `FIFO errors`—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning. • `Resource errors`—Sum of transmit drops.	`extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Output errors`	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • `Carrier transitions`—Number of times the interface has gone from `down` to `up`. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning. • `Errors`—Sum of the outgoing frame terminations and FCS errors. • `Drops`—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • `Collisions`—Number of Ethernet collisions. The Gigabit Ethernet PIC supports only full-duplex operation, so for Gigabit Ethernet PICs, this number should always remain 0. If it is nonzero, there is a software bug. • `Aged packets`—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware. • `FIFO errors`—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning. • `HS link CRC errors`—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • `MTU errors`—Number of packets whose size exceeded the MTU of the interface. • `Resource errors`—Sum of transmit drops.	`extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Egress queues`	Total number of egress queues supported on the specified interface. **NOTE**: In DPCs that are not of the enhanced type, such as DPC 40x 1GE R, DPCE 20x 1GE + 2x 10GE R, or DPCE 40x 1GE R, you might notice a discrepancy in the output of the `show interfaces` command because incoming packets might be counted in the Egress queues section of the output. This problem occurs on non-enhanced DPCs because the egress queue statistics are polled from IMQ (Inbound Message Queuing) block of the I-chip. The IMQ block does not differentiate between ingress and egress WAN traffic; as a result, the combined statistics are displayed in the egress queue counters on the Routing Engine. In a simple VPLS scenorio, if there is no MAC entry in DMAC table (by sending unidirectional traffic), traffic is flooded and the input traffic is accounted in IMQ. For bidirectional traffic (MAC entry in DMAC table), if the outgoing interface is on the same I-chip then both ingress and egress statistics are counted in a combined way. If the outgoing interface is on a different I-chip or FPC, then only egress statistics are accounted in IMQ. This behavior is expected with non-enhanced DPCs	`detail extensive`
`Queue counters (Egress)`	CoS queue number and its associated user-configured forwarding class name. • `Queued packets`—Number of queued packets. • `Transmitted packets`—Number of transmitted packets. • `Dropped packets`—Number of packets dropped by the ASIC's RED mechanism.	`detail extensive`
`Ingress queues`	Total number of ingress queues supported on the specified interface. Displayed on IQ2 interfaces.	`extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Queue counters (Ingress)`	CoS queue number and its associated user-configured forwarding class name. Displayed on IQ2 interfaces. • `Queued packets`—Number of queued packets. • `Transmitted packets`—Number of transmitted packets. • `Dropped packets`—Number of packets dropped by the ASIC's RED mechanism.	`extensive`
`Active alarms and Active defects`	Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the routing device configuration, an alarm can ring the red or yellow alarm bell on the routing device, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value `None` or `Link`. • `None`—There are no active defects or alarms. • `Link`—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.	`detail extensive` none
`OTN FEC statistics`	The forward error correction (FEC) counters provide the following statistics:. • `Corrected Errors`—The count of corrected errors in the last second. • `Corrected Error Ratio`—The corrected error ratio in the last 25 seconds. For example, 1e-7 is 1 error per 10 million bits.	
`PCS statistics`	(10-Gigabit Ethernet interfaces) Displays Physical Coding Sublayer (PCS) fault conditions from the WAN PHY or the LAN PHY device. • `Bit errors`—The number of seconds during which at least one bit error rate (BER) occurred while the PCS receiver is operating in normal mode. • `Errored blocks`—The number of seconds when at least one errored block occurred while the PCS receiver is operating in normal mode.	`detail extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
MAC statistics	Receive and Transmit statistics reported by the PIC's MAC subsystem, including the following: • Total octets and total packets—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type. For more information, see Table 31 under the show interfaces command. • Unicast packets, Broadcast packets, and Multicast packets—Number of unicast, broadcast, and multicast packets. • CRC/Align errors—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error). • FIFO error—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC or a cable is probably malfunctioning. • MAC control frames—Number of MAC control frames. • MAC pause frames—Number of MAC control frames with pause operational code. • Oversized frames—Number of frames that exceed 1518 octets. • Jabber frames—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms. • Fragment frames—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.	extensive

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	• `VLAN tagged frames`—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not. • `Code violations`—Number of times an event caused the PHY to indicate “Data reception error” or “invalid data symbol error.”	
`OTN Received Overhead Bytes`	APS/PCC0: 0x02, APS/PCC1: 0x11, APS/PCC2: 0x47, APS/PCC3: 0x58 Payload Type: 0x08	`extensive`
`OTN Transmitted Overhead Bytes`	APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00 Payload Type: 0x08	`extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Filter statistics`	`Receive` and `Transmit` statistics reported by the PIC's MAC address filter subsystem. The filtering is done by the content-addressable memory (CAM) on the PIC. The filter examines a packet's source and destination MAC addresses to determine whether the packet should enter the system or be rejected. • `Input packet count`—Number of packets received from the MAC hardware that the filter processed. • `Input packet rejects`—Number of packets that the filter rejected because of either the source MAC address or the destination MAC address. • `Input DA rejects`—Number of packets that the filter rejected because the destination MAC address of the packet is not on the accept list. It is normal for this value to increment. When it increments very quickly and no traffic is entering the routing device from the far-end system, either there is a bad ARP entry on the far-end system, or multicast routing is not on and the far-end system is sending many multicast packets to the local routing device (which the routing device is rejecting). • `Input SA rejects`—Number of packets that the filter rejected because the source MAC address of the packet is not on the accept list. The value in this field should increment only if source MAC address filtering has been enabled. If filtering is enabled, if the value increments quickly, and if the system is not receiving traffic that it should from the far-end system, it means that the user-configured source MAC addresses for this interface are incorrect. • `Output packet count`—Number of packets that the filter has given to the MAC hardware. • `Output packet pad count`—Number of packets the filter padded to the minimum Ethernet size (60 bytes) before giving the packet to the MAC hardware. Usually, padding is done only on small ARP packets, but some very small IP packets can also require padding. If this value increments rapidly, either the system is trying to find an ARP entry for a far-end system that does not exist or it is misconfigured.	`extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	• `Output packet error count`—Number of packets with an indicated error that the filter was given to transmit. These packets are usually aged packets or are the result of a bandwidth problem on the FPC hardware. On a normal system, the value of this field should not increment. • `CAM destination filters, CAM source filters`—Number of entries in the CAM dedicated to destination and source MAC address filters. There can only be up to 64 source entries. If source filtering is disabled, which is the default, the values for these fields should be 0.	
`PMA PHY`	(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information: • `Seconds`—Number of seconds the defect has been active. • `Count`—Number of times that the defect has gone from inactive to active. • `State`—State of the error. Any state other than `OK` indicates a problem. Subfields are: • `PHY Lock`—Phase-locked loop • `PHY Light`—Loss of optical signal	`extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
WIS section	(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information: • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. Any state other than OK indicates a problem. Subfields are: • BIP-B1—Bit interleaved parity for SONET section overhead • SEF—Severely errored framing • LOL—Loss of light • LOF—Loss of frame • ES-S—Errored seconds (section) • SES-S—Severely errored seconds (section) • SEFS-S—Severely errored framing seconds (section)	extensive

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
WIS line	(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information. • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. State other than OK indicates a problem. Subfields are: • BIP-B2—Bit interleaved parity for SONET line overhead • REI-L—Remote error indication (near-end line) • RDI-L—Remote defect indication (near-end line) • AIS-L—Alarm indication signal (near-end line) • BERR-SF—Bit error rate fault (signal failure) • BERR-SD—Bit error rate defect (signal degradation) • ES-L—Errored seconds (near-end line) • SES-L—Severely errored seconds (near-end line) • UAS-L—Unavailable seconds (near-end line) • ES-LFE—Errored seconds (far-end line) • SES-LFE—Severely errored seconds (far-end line) • UAS-LFE—Unavailable seconds (far-end line)	extensive

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
WIS path	(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information. • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. Any state other than OK indicates a problem. Subfields are: • BIP-B3—Bit interleaved parity for SONET section overhead • REI-P—Remote error indication • LOP-P—Loss of pointer (path) • AIS-P—Path alarm indication signal • RDI-P—Path remote defect indication • UNEQ-P—Path unequipped • PLM-P—Path payload (signal) label mismatch • ES-P—Errored seconds (near-end STS path) • SES-P—Severely errored seconds (near-end STS path) • UAS-P—Unavailable seconds (near-end STS path) • SES-PFE—Severely errored seconds (far-end STS path) • UAS-PFE—Unavailable seconds (far-end STS path)	extensive

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output

Autonegotiation information	Information about link autonegotiation.
	• Negotiation status:
	  • Incomplete—Ethernet interface has the speed or link mode configured.
	  • No autonegotiation—Remote Ethernet interface has the speed or link mode configured, or does not perform autonegotiation.
	  • Complete—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.
	• Link partner status—OK when Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.
	• Link partner:
	  • Link mode—Depending on the capability of the attached Ethernet device, either Full-duplex or Half-duplex.
	  • Flow control—Types of flow control supported by the remote Ethernet device. For Fast Ethernet interfaces, the type is None. For Gigabit Ethernet interfaces, types are Symmetric (link partner supports PAUSE on receive and transmit), Asymmetric (link partner supports PAUSE on transmit), and Symmetric/Asymmetric (link partner supports both PAUSE on receive and transmit or only PAUSE receive).
	  • Remote fault—Remote fault information from the link partner—Failure indicates a receive link error. OK indicates that the link partner is receiving. Negotiation error indicates a negotiation error. Offline indicates that the link partner is going offline.
	• Local resolution—Information from the link partner:
	  • Flow control—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are
		extensive

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	`Symmetric` (link partner supports `PAUSE` on receive and transmit), `Asymmetric` (link partner supports `PAUSE` on transmit), and `Symmetric/Asymmetric` (link partner supports both `PAUSE` on receive and transmit or only `PAUSE` receive). • `Remote fault`—Remote fault information. `Link OK` (no error detected on receive), `Offline` (local interface is offline), and `Link Failure` (link error detected on receive).	
`Received path trace`, `Transmitted path trace`	(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other routing device manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the routing device at the other end of the fiber. The transmitted path trace value is the message that this routing device transmits.	`extensive`
`Packet Forwarding Engine configuration`	Information about the configuration of the Packet Forwarding Engine: • `Destination slot`—FPC slot number.	`extensive`

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
CoS information	Information about the CoS queue for the physical interface. • CoS transmit queue—Queue number and its associated user-configured forwarding class name. • Bandwidth %—Percentage of bandwidth allocated to the queue. • Bandwidth bps—Bandwidth allocated to the queue (in bps). • Buffer %—Percentage of buffer space allocated to the queue. • Buffer usec—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • Priority—Queue priority: low or high. • Limit—Displayed if rate limiting is configured for the queue. Possible values are none and exact. If exact is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If none is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.	extensive
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Index number of the logical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP interface index number for the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Flags	Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under Common Output Fields Description.	All levels

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
VLAN-Tag	Rewrite profile applied to incoming or outgoing frames on the outer (Out) VLAN tag or for both the outer and inner (In) VLAN tags. • push—An outer VLAN tag is pushed in front of the existing VLAN tag. • pop—The outer VLAN tag of the incoming frame is removed. • swap—The outer VLAN tag of the incoming frame is overwritten with the user specified VLAN tag information. • push—An outer VLAN tag is pushed in front of the existing VLAN tag. • push-push—Two VLAN tags are pushed in from the incoming frame. • swap-push—The outer VLAN tag of the incoming frame is replaced by a user-specified VLAN tag value. A user-specified outer VLAN tag is pushed in front. The outer tag becomes an inner tag in the final frame. • swap-swap—Both the inner and the outer VLAN tags of the incoming frame are replaced by the user specified VLAN tag value. • pop-swap—The outer VLAN tag of the incoming frame is removed, and the inner VLAN tag of the incoming frame is replaced by the user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame. • pop-pop—Both the outer and inner VLAN tags of the incoming frame are removed.	brief detail extensive none
Demux:	IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following: • Source Family Inet • Destination Family Inet	detail extensive none
Encapsulation	Encapsulation on the logical interface.	All levels

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Protocol	Protocol family. Possible values are described in the "Protocol Field" section under Common Output Fields Description.	detail extensive none
MTU	Maximum transmission unit size on the logical interface.	detail extensive none
Maximum labels	Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.	detail extensive none
Traffic statistics	Number and rate of bytes and packets received and transmitted on the specified interface set. • Input bytes, Output bytes—Number of bytes received and transmitted on the interface set • Input packets, Output packets—Number of packets received and transmitted on the interface set.	detail extensive
IPv6 transit statistics	Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.	extensive
Local statistics	Number and rate of bytes and packets destined to the routing device.	extensive
Transit statistics	Number and rate of bytes and packets transiting the switch. **NOTE**: For Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces, the logical interface egress statistics might not accurately reflect the traffic on the wire when output shaping is applied. Traffic management output shaping might drop packets after they are tallied by the Output bytes and Output packets interface counters. However, correct values display for both of these egress statistics when per-unit scheduling is enabled for the Gigabit Ethernet IQ2 physical interface, or when a single logical interface is actively using a shared scheduler.	extensive
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Route Table`	Route table in which the logical interface address is located. For example, `0` refers to the routing table inet.0.	`detail extensive` none
`Flags`	Information about protocol family flags. Possible values are described in the “Family Flags” section under Common Output Fields Description.	`detail extensive`
`Donor interface`	(Unnumbered Ethernet) Interface from which an unnumbered Ethernet interface borrows an IPv4 address.	`detail extensive` none
`Preferred source address`	(Unnumbered Ethernet) Secondary IPv4 address of the donor loopback interface that acts as the preferred source address for the unnumbered Ethernet interface.	`detail extensive` none
`Input Filters`	Names of any input filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.	`detail extensive`
`Output Filters`	Names of any output filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.	`detail extensive`
`Mac-Validate Failures`	Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.	`detail extensive` none
`Addresses, Flags`	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	`detail extensive` none
`protocol-family`	Protocol family configured on the logical interface. If the protocol is `inet`, the IP address of the interface is also displayed.	`brief`
`Flags`	Information about address flag (possible values are described in the “Addresses Flags” section under Common Output Fields Description.	`detail extensive` none

Table 24: show interfaces Fast Ethernet Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Destination	IP address of the remote side of the connection.	detail extensive none
Local	IP address of the logical interface.	detail extensive none
Broadcast	Broadcast address of the logical interlace.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive

Sample Output

show interfaces (Fast Ethernet)

```
user@host> show interfaces fe-0/0/0
Physical interface: fe-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 22
  Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  CoS queues     : 4 supported, 4 maximum usable queues
  Current address: 00:00:5e:00:53:38, Hardware address: 00:00:5e:00:53:38
  Last flapped   : 2006-01-20 14:50:58 PST (2w4d 00:44 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None
  Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198)
    Flags: SNMP-Traps Encapsulation: ENET2
    Protocol inet, MTU: 1500
      Flags: None
```

```
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 203.0.113/24, Local: 203.0.113.1, Broadcast: 203.0.113.255
```

show interfaces brief (Fast Ethernet)

```
user@host> show interfaces fe-0/0/0 brief
Physical interface: fe-0/0/0, Enabled, Physical link is Up
  Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Logical interface fe-0/0/0.0
    Flags: SNMP-Traps Encapsulation: ENET2
    inet  203.0.113.1/24
```

show interfaces detail (Fast Ethernet)

```
user@host> show interfaces fe-0/0/0 detail
Physical interface: fe-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 22, Generation: 5391
  Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  CoS queues     : 4 supported, 4 maximum usable queues
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 00:00:5e:00:53:38, Hardware address: 00:00:5e:00:53:3f:38
  Last flapped   : 2006-01-20 14:50:58 PST (2w4d 00:45 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                   0                   0 bps
   Output bytes  :                  42                   0 bps
   Input  packets:                   0                   0 pps
   Output packets:                   1                   0 pps
  Active alarms  : None
  Active defects : None
  Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198) (Generation 67)
    Flags: SNMP-Traps Encapsulation: ENET2
    Protocol inet, MTU: 1500, Generation: 105, Route table: 0
      Flags: Is-Primary, Mac-Validate-Strict
```

```
      Mac-Validate Failures: Packets: 0, Bytes: 0
      Addresses, Flags: Is-Preferred Is-Primary
      Destination: 203.0.113/24, Local: 203.0.113.1, Broadcast: 203.0.113.255,
        Generation: 136
```

show interfaces extensive (Fast Ethernet)

```
user@host> show interfaces fe-0/0/0 extensive
Physical interface: fe-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 22, Generation: 5391
  Link-level type: Ethernet, MTU: 1514, Link-mode: Full-duplex, Speed:
  100mbps, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  CoS queues     : 4 supported, 4 maximum usable queues
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 00:00:5e:00:53:38, Hardware address: 00:00:5e:00:53:38
  Last flapped   : 2006-01-20 14:50:58 PST (2w4d 00:46 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                   0                   0 bps
   Output bytes  :                  42                   0 bps
   Input  packets:                   0                   0 pps
   Output packets:                   1                   0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
    L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
    FIFO errors: 0, Resource errors: 0
  Output errors:
    Carrier transitions: 3, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
    FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
  Active alarms  : None
  Active defects : None
  MAC statistics:                      Receive         Transmit
    Total octets                             0               64
    Total packets                            0                1
    Unicast packets                          0                0
    Broadcast packets                        0                1
    Multicast packets                        0                0
    CRC/Align errors                         0                0
```

```
    FIFO errors                             0               0
    MAC control frames                      0               0
    MAC pause frames                        0               0
    Oversized frames                        0
    Jabber frames                           0
    Fragment frames                         0
    VLAN tagged frames                      0
    Code violations                         0
Filter statistics:
    Input packet count                      0
    Input packet rejects                    0
    Input DA rejects                        0
    Input SA rejects                        0
    Output packet count                             1
    Output packet pad count                         0
    Output packet error count                       0
    CAM destination filters: 1, CAM source filters: 0
  Autonegotiation information:
    Negotiation status: Complete
    Link partner:
        Link partner: Full-duplex, Flow control: None, Remote fault: Ok
    Local resolution:
Packet Forwarding Engine configuration:
    Destination slot: 0
CoS information:
                Bandwidth           Buffer Priority   Limit
                                %          bps   %         usec
    0 best-effort            95    950000000  95            0      low    none
    3 network-control         5     50000000   5            0      low    none
  Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198) (Generation 67)
    Flags: SNMP-Traps Encapsulation: ENET2
    Protocol inet, MTU: 1500, Generation: 105, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 203.0.113/24, Local: 203.0.113.1, Broadcast: 203.0.113.255,
        Generation: 136
```

Release Information

Command introduced before Junos OS Release 7.4.

show interfaces (Loopback)

IN THIS SECTION

Syntax

```
show interfaces lo0
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index snmp-index>
<statistics>
```

Description

Display status information about the local loopback interface.

NOTE: Logical interface `lo0.16385` is the loopback interface for the internal routing instance. Created by the internal routing service process, this interface facilitates internal traffic. It prevents any filter created on loopback `lo0.0` from blocking internal traffic.

Options

lo0	Display standard status information about the local loopback interface.

brief | detail | extensive | terse	(Optional) Display the specified level of output.
descriptions	(Optional) Display interface description strings.
media	(Optional) Display media-specific information.
snmp-index *snmp-index*	(Optional) Display information for the specified SNMP index of the interface.
statistics	(Optional) Display static interface statistics.

Required Privilege Level

view

Output Fields

Table 25 on page 703 lists the output fields for the `show interfaces` (loopback) command. Output fields are listed in the approximate order in which they appear.

Table 25: Loopback show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
`Physical Interface`	Name of the physical interface.	All levels
`Enabled`	State of the interface. Possible values are described in the “Enabled Field” section under Common Output Fields Description.	All levels
`Interface index`	Physical interface index number, which reflects its initialization sequence.	`detail extensive` none
`SNMP ifIndex`	SNMP index number for the physical interface.	`detail extensive` none
`Generation`	Unique number for use by Juniper Networks technical support only.	`detail extensive`

Table 25: Loopback show interfaces Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Type`	Type of interface.	All levels
`Link-level type`	Encapsulation type used on the physical interface.	All levels
`MTU`	Size of the largest packet to be transmitted.	All levels
`Clocking`	Reference clock source of the interface.	All levels
`Speed`	Network speed on the interface.	All levels
`Device flags`	Information about the physical device. Possible values are described in the “Device Flags” section under Common Output Fields Description.	All levels
`Interface flags`	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
`Link type`	Data transmission type.	`detail extensive`
`Link flags`	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	`detail extensive` none
`Physical info`	Information about the physical interface.	`detail extensive`
`Hold-times`	Current interface hold-time up and hold-time down. Value is in milliseconds.	`detail extensive`
`Current address`	Configured MAC address.	`detail extensive`
`Hardware address`	Media access control (MAC) address of the interface.	`detail extensive`

Table 25: Loopback show interfaces Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Alternate link address`	Backup link address.	`detail extensive`
`Last flapped`	Date, time, and how long ago the interface went from down to up. The format is `Last flapped:` *`year-month-day hour`*`:`*`minute`*`:`*`second timezone`* (*`hour`*`:`*`minute`*`:`*`second`* `ago`). For example, `Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)`.	`detail extensive`
`Statistics last cleared`	Time when the statistics for the interface were last set to zero.	`detail extensive`
`Traffic statistics`	Number and rate of bytes and packets received and transmitted on the physical interface. • `Input bytes, Output bytes`—Number of bytes received and transmitted on the interface. • `Input packets, Output packets`—Number of packets received and transmitted on the interface.	`detail extensive`
`Input errors`	• `Errors`—Input errors on the interface. • `Drops`—Number of packets dropped by the output queue of the I/O Manager ASIC. • `Framing errors`—Number of packets received with an invalid frame checksum (FCS). • `Runts`—Frames received smaller than the runt threshold. • `Giants`—Frames received larger than the giant threshold. • `Policed Discards`—Frames that the incoming packet match code discarded because the frames were not recognized or were not of interest. Usually, this field reports protocols that Junos does not support. • `Resource errors`—Sum of transmit drops.	`extensive`

Table 25: Loopback show interfaces Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Output errors	• Carrier transitions—Number of times the interface has gone from down to up. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly, possibly once every 10 seconds, the cable, the remote system, or the interface is malfunctioning. • Errors—Sum of outgoing frame terminations and FCS errors. • Drops—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet dropped by the ASIC RED mechanism. • MTU errors—Number of packets larger than the MTU threshold. • Resource errors—Sum of transmit drops.	extensive
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Logical interface index number, which reflects its initialization sequence.	detail extensive
SNMP ifIndex	Logical interface SNMP interface index number.	detail extensive
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Flags	Information about the logical interface; values are described in the "Logical Interface Flags" section under Common Output Fields Description.	brief detail extensive
Encapsulation	Encapsulation on the logical interface.	brief detail extensive

Table 25: Loopback show interfaces Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Input packets`	Number of packets received on the logical interface.	None specified
`Output packets`	Number of packets transmitted on the logical interface.	None specified
`Traffic statistics`	Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	`detail extensive`
`Local statistics`	Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	`detail extensive`
`Protocol`	Protocol family configured on the logical interface (such as `iso` or `inet6`).	`detail extensive` none
`MTU`	MTU size on the logical interface.	`detail extensive` none
`Generation`	Unique number for use by Juniper Networks technical support only.	`detail extensive`
`Route Table`	Route table in which this address exists; for example, `Route table:0` refers to inet.0.	`detail extensive`
`Flags`	Information about the protocol family flags. Possible values are described in the “Family Flags” section under Common Output Fields Description.	`detail extensive` none
`Addresses, Flags`	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	`detail extensive`

Table 25: Loopback show interfaces Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Destination	IP address of the remote side of the connection.	detail extensive none
Local	IP address of the logical interface.	detail extensive none
Broadcast	Broadcast address on the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive

Sample Output

show interfaces (Loopback)

```
user@host> show interfaces lo0
Physical interface: lo0, Enabled, Physical link is Up
  Interface index: 6, SNMP ifIndex: 6
  Type: Loopback, MTU: Unlimited
  Device flags   : Present Running Loopback
  Interface flags: SNMP-Traps
  Link flags     : None
  Last flapped   : Never
    Input packets : 0
    Output packets: 0

  Logical interface lo0.0 (Index 64) (SNMP ifIndex 16)
    Flags: SNMP-Traps Encapsulation: Unspecified
    Input packets : 0
    Output packets: 0
    Protocol inet, MTU: Unlimited
      Flags: None
      Addresses, Flags: Is-Default Is-Primary
        Local: 203.0.113.1
```

```
      Addresses
        Local: 127.0.0.1
    Protocol iso, MTU: Unlimited
      Flags: None
      Addresses, Flags: Is-Default Is-Primary
        Local: 49.0004.1000.0000.0001

  Logical interface lo0.16385 (Index 65) (SNMP ifIndex 76)
    Flags: SNMP-Traps Encapsulation: Unspecified
    Input packets : 0
    Output packets: 0
    Protocol inet, MTU: Unlimited
      Flags: None
```

show interfaces brief (Loopback)

```
user@host> show interfaces lo0 brief
Physical interface: lo0, Enabled, Physical link is Up
  Type: Loopback, Link-level type: Unspecified, MTU: Unlimited,
  Clocking: Unspecified, Speed: Unspecified
  Device flags   : Present Running Loopback
  Interface flags: SNMP-Traps

  Logical interface lo0.0
    Flags: SNMP-Traps Encapsulation: Unspecified
    inet  203.0.113.1         --> 0/0
          127.0.0.1        --> 0/0
    iso   49.0004.1000.0000.0001

  Logical interface lo0.16385
    Flags: SNMP-Traps Encapsulation: Unspecified
    inet
```

show interfaces detail (Loopback)

```
user@host> show interfaces lo0 detail
Physical interface: lo0, Enabled, Physical link is Up
  Interface index: 6, SNMP ifIndex: 6, Generation: 4
  Type: Loopback, Link-level type: Unspecified, MTU: Unlimited,
  Clocking: Unspecified, Speed: Unspecified
```

```
Device flags   : Present Running Loopback
Interface flags: SNMP-Traps
Link type      : Unspecified
Link flags     : None
Physical info  : Unspecified
Hold-times     : Up 0 ms, Down 0 ms
Current address: Unspecified, Hardware address: Unspecified
Alternate link address: Unspecified
Last flapped   : Never
Statistics last cleared: Never
Traffic statistics:
 Input  bytes  :                   0
 Output bytes  :                   0
 Input  packets:                   0
 Output packets:                   0
Logical interface lo0.0 (Index 64) (SNMP ifIndex 16) (Generation 3)
  Flags: SNMP-Traps Encapsulation: Unspecified
  Traffic statistics:
   Input  bytes  :                   0
   Output bytes  :                   0
   Input  packets:                   0
   Output packets:                   0
  Local statistics:
   Input  bytes  :                   0
   Output bytes  :                   0
   Input  packets:                   0
   Output packets:                   0

  Protocol inet, MTU: Unlimited, Generation: 10, Route table: 0
    Flags: None
    Addresses, Flags: Is-Default Is-Primary
      Destination: Unspecified, Local: 203.0.113.1, Broadcast: Unspecified,
      Generation: 10
    Addresses, Flags: None
      Destination: Unspecified, Local: 127.0.0.1, Broadcast: Unspecified,
      Generation: 12
  Protocol iso, MTU: Unlimited, Generation: 11, Route table: 0
    Flags: None
    Addresses, Flags: Is-Default Is-Primary
      Destination: Unspecified, Local: 49.0004.1000.0000.0001,
      Broadcast: Unspecified, Generation: 14

Logical interface lo0.16385 (Index 65) (SNMP ifIndex 76) (Generation 4)
```

```
    Flags: SNMP-Traps Encapsulation: Unspecified
    Traffic statistics:
     Input  bytes  :                   0
     Output bytes  :                   0
     Input  packets:                   0
     Output packets:                   0
    Local statistics:
     Input  bytes  :                   0
     Output bytes  :                   0
     Input  packets:                   0
     Output packets:                   0
    Protocol inet, MTU: Unlimited, Generation: 12, Route table: 1
      Flags: None
```

show interfaces extensive (Loopback)

```
user@host> show interfaces lo0 extensive
Physical interface: lo0, Enabled, Physical link is Up
  Interface index: 6, SNMP ifIndex: 6, Generation: 4
  Type: Loopback, Link-level type: Unspecified, MTU: Unlimited,
  Clocking: Unspecified, Speed: Unspecified
  Device flags   : Present Running Loopback
  Interface flags: SNMP-Traps
  Link type      : Unspecified
  Link flags     : None
  Physical info  : Unspecified
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: Unspecified, Hardware address: Unspecified
  Alternate link address: Unspecified
  Last flapped   : Never
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                   0
   Output bytes  :                   0
   Input  packets:                   0
   Output packets:                   0
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
    Policed discards: 0, Resource errors: 0
  Output errors:
```

```
    Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
    Resource errors: 0

Logical interface lo0.0 (Index 64) (SNMP ifIndex 16) (Generation 3)
    Flags: SNMP-Traps Encapsulation: Unspecified
    Traffic statistics:
     Input  bytes  :                   0
     Output bytes  :                   0
     Input  packets:                   0
     Output packets:                   0
    Local statistics:
     Input  bytes  :                   0
     Output bytes  :                   0
     Input  packets:                   0
     Output packets:                   0
    Protocol inet, MTU: Unlimited, Generation: 10, Route table: 0
      Flags: None
      Addresses, Flags: Is-Default Is-Primary
        Destination: Unspecified, Local: 203.0.113.1, Broadcast: Unspecified,
        Generation: 10
      Addresses, Flags: None
        Destination: Unspecified, Local: 127.0.0.1, Broadcast: Unspecified,
        Generation: 12
    Protocol iso, MTU: Unlimited, Generation: 11, Route table: 0
      Flags: None
      Addresses, Flags: Is-Default Is-Primary
        Destination: Unspecified, Local: 49.0004.1000.0000.0001,
        Broadcast: Unspecified, Generation: 14

  Logical interface lo0.16385 (Index 65) (SNMP ifIndex 76) (Generation 4)
    Flags: SNMP-Traps Encapsulation: Unspecified
    Traffic statistics:
     Input  bytes  :                   0
     Output bytes  :                   0
     Input  packets:                   0
     Output packets:                   0
    Local statistics:
     Input  bytes  :                   0
     Output bytes  :                   0
     Input  packets:                   0
     Output packets:                   0
    Protocol inet, MTU: Unlimited, Generation: 12, Route table: 1
```

```
      Flags: None
```

Release Information

Command introduced before Junos OS Release 7.4.

show interfaces (PPPoE)

IN THIS SECTION

Syntax

```
show interfaces pp0.logical
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index snmp-index>
<statistics>
```

Description

(M120 routers, M320 routers, and MX Series routers only). Display status information about the PPPoE interface.

Options

pp0.*logical*	Display standard status information about the PPPoE interface.
brief | detail | extensive | terse	(Optional) Display the specified level of output.
descriptions	(Optional) Display interface description strings.
media	(Optional) Display media-specific information about PPPoE interfaces.
snmp-index *snmp-index*	(Optional) Display information for the specified SNMP index of the interface.
statistics	(Optional) Display PPPoE interface statistics.

Required Privilege Level

view

Output Fields

Table 26 on page 714 lists the output fields for the `show interfaces` (PPPoE) command. Output fields are listed in the approximate order in which they appear.

Table 26: show interfaces (PPPoE) Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
`Physical interface`	Name of the physical interface.	All levels
`Enabled`	State of the interface. Possible values are described in the “Enabled Field” section under Common Output Fields Description.	All levels
`Interface index`	Physical interface index number, which reflects its initialization sequence.	`detail extensive` none

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
SNMP ifIndex	SNMP index number for the physical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Type	Physical interface type (PPPoE).	All levels
Link-level type	Encapsulation on the physical interface (PPPoE).	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	Reference clock source. It can be Internal or External.	All levels
Speed	Speed at which the interface is running.	All levels
Device flags	Information about the physical device. Possible values are described in the “Device Flags” section under Common Output Fields Description.	All levels
Interface flags	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
Link type	Physical interface link type: full duplex or half duplex.	All levels
Link flags	Information about the interface. Possible values are described in the “Link Flags” section under Common Output Fields Description.	All levels
Input rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output rate	Output rate in bps and pps.	None specified
Physical Info	Physical interface information.	All levels

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	detail extensive
Current address	Configured MAC address.	detail extensive
Hardware address	MAC address of the hardware.	detail extensive
Alternate link address	Backup address of the link.	detail extensive
Statistics last cleared	Time when the statistics for the interface were last set to zero.	detail extensive
Traffic statistics	Number and rate of bytes and packets received and transmitted on the physical interface. • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface.	detail extensive
IPv6 transit statistics	Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled. **NOTE**: These fields include dropped traffic and exception traffic, as those fields are not separately defined. • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface.	detail extensive

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Input errors`	Input errors on the interface: • `Errors`—Sum of incoming frame terminations and FCS errors. • `Drops`—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • `Framing errors`—Number of packets received with an invalid frame checksum (FCS). • `Runts`—Number of frames received that are smaller than the runt threshold. • `Giants`—Number of frames received that are larger than the giant threshold. • `Policed discards`—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • `Resource errors`—Sum of B chip Tx drops and IXP Tx net transmit drops.	`extensive`

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Output errors`	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • `Carrier transitions` —Number of times the interface has gone from `down` to `up`. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), then the cable, the far-end system, or the PIM is malfunctioning. • `Errors`—Sum of the outgoing frame terminations and FCS errors. • `Drops`—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • `MTU errors`—Number of packets whose size exceeded the MTU of the interface. • `Resource errors`—Sum of B chip Tx drops and IXP Tx net transmit drops.	`extensive`
Logical Interface		
`Logical interface`	Name of the logical interface.	All levels
`Index`	Logical interface index number (which reflects its initialization sequence).	`detail extensive` none
`SNMP ifIndex`	Logical interface SNMP interface index number.	`detail extensive` none
`Generation`	Unique number for use by Juniper Networks technical support only.	`detail extensive`

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Flags`	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under Common Output Fields Description.	All levels
`Encapsulation`	Type of encapsulation configured on the logical interface.	All levels
`PPP parameters`	PPP status: • LCP restart timer—Length of time (in milliseconds) between successive Link Control Protocol (LCP) configuration requests. • NCP restart timer—Length of time (in milliseconds) between successive Network Control Protocol (NCP) configuration requests.	`detail`
`PPPoE`	PPPoE status: • `State`—State of the logical interface (`up` or `down`). • `Session ID`—PPPoE session ID. • `Service name`—Type of service required. Can be used to indicate an Internet service provider (ISP) name or a class or quality of service. • `Configured AC name`—Configured access concentrator name. • `Auto-reconnect timeout`—Time after which to try to reconnect after a PPPoE session is terminated, in seconds. • `Idle Timeout`—Length of time (in seconds) that a connection can be idle before disconnecting. • `Underlying interface`—Interface on which PPPoE is running.	All levels
`Link`	Name of the physical interfaces for member links in an aggregated Ethernet bundle for a PPPoE over aggregated Ethernet configuration. PPPoE traffic goes out on these interfaces.	All levels

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Traffic statistics`	Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter usually takes less than 1 second to stabilize.	`detail extensive`
`IPv6 transit statistics`	Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled. **NOTE**: The packet and byte counts in these fields include traffic that is dropped and does not leave the router. • `Input bytes`—Number of bytes received on the interface. • `Output bytes`—Number of bytes transmitted on the interface. • `Input packets`—Number of packets received on the interface. • `Output packets`—Number of packets transmitted on the interface.	`detail extensive`
`Local statistics`	Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter usually takes less than 1 second to stabilize.	`detail extensive`
`Transit statistics`	Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter usually takes less than 1 second to stabilize. **NOTE**: The packet and byte counts in these fields include traffic that is dropped and does not leave the router.	`detail extensive`

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Keepalive settings	(PPP and HDLC) Configured settings for keepalives. • interval *seconds*—The time in seconds between successive keepalive requests. The range is 10 seconds through 32,767 seconds, with a default of 10 seconds. • down-count *number*—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is 1 through 255, with a default of 3. • up-count *number*—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is 1 through 255, with a default of 1.	detail extensive

Keepalive statistics	(PPP and HDLC) Information about keepalive packets.
	• Input—Number of keepalive packets received by PPP.
	  • (last seen 00:00:00 ago)—Time the last keepalive packet was received, in the format *hh*:*mm*:*ss*.
	• Output—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received.
	  • (last seen 00:00:00 ago)—Time the last keepalive packet was sent, in the format *hh*:*mm*:*ss*.
	(MX Series routers with MPCs/MICs) When an MX Series router with MPCs/MICs is using PPP fast keepalive for a PPP link, the display does not include the number of keepalive packets received or sent, or the amount of time since the router received or sent the last keepalive packet.
		detail extensive

Input packets	Number of packets received on the logical interface.	None specified
Output packets	Number of packets transmitted on the logical interface.	None specified

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`LCP state`	(PPP) Link Control Protocol state. • `Conf-ack-received`—Acknowledgement was received. • `Conf-ack-sent`—Acknowledgement was sent. • `Conf-req-sent`—Request was sent. • `Down`—LCP negotiation is incomplete (not yet completed or has failed). • `Not-configured`—LCP is not configured on the interface. • `Opened`—LCP negotiation is successful.	none `detail` `extensive`
`NCP state`	(PPP) Network Control Protocol state. • `Conf-ack-received`—Acknowledgement was received. • `Conf-ack-sent`—Acknowledgement was sent. • `Conf-req-sent`—Request was sent. • `Down`—NCP negotiation is incomplete (not yet completed or has failed). • `Not-configured`—NCP is not configured on the interface. • `Opened`—NCP negotiation is successful.	`detail extensive` none

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`CHAP state`	(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. • `Chap-Chal-received`—Challenge was received but response not yet sent. • `Chap-Chal-sent`—Challenge was sent. • `Chap-Resp-received`—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.) • `Chap-Resp-sent`—Response was sent for the challenge received. • `Closed`—CHAP authentication is incomplete. • `Failure`—CHAP authentication failed. • `Not-configured`—CHAP is not configured on the interface. • `Success`—CHAP authentication was successful.	none `detail` `extensive`
`Protocol`	Protocol family configured on the logical interface.	`detail` `extensive` none
`protocol-family`	Protocol family configured on the logical interface. If the protocol is `inet`, the IP address of the interface is also displayed.	`brief`
`MTU`	MTU size on the logical interface.	`detail` `extensive` none
`Generation`	Unique number for use by Juniper Networks technical support only.	`detail` `extensive`
`Route table`	Routing table in which the logical interface address is located. For example, `0` refers to the routing table inet.0.	`detail` `extensive` none

Table 26: show interfaces (PPPoE) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Flags	Information about the protocol family flags. Possible values are described in the “Family Flags” section under Common Output Fields Description.	detail extensive none
Addresses, Flags	Information about the addresses configured for the protocol family. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	detail extensive none
Destination	IP address of the remote side of the connection.	detail extensive none
Local	IP address of the logical interface.	detail extensive none
Broadcast	Broadcast address.	detail extensive none

Sample Output

show interfaces (PPPoE)

```
user@host> show interfaces pp0
Physical interface: pp0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 24
  Type: PPPoE, Link-level type: PPPoE, MTU: 1532
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : None
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)

  Logical interface pp0.0 (Index 72) (SNMP ifIndex 72)
    Flags: Hardware-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE
```

```
    PPPoE:
      State: SessionDown, Session ID: None,
      Service name: None, Configured AC name: sapphire,
      Auto-reconnect timeout: 100 seconds, Idle timeout: Never,
      Underlying interface: at-5/0/0.0 (Index 70)
  Input packets : 0
  Output packets: 0
  LCP state: Not-configured
  NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,   mpls: Not-
configured
  CHAP state: Closed
    Protocol inet, MTU: 100
      Flags: User-MTU, Negotiate-Address
```

show interfaces (PPPoE over Aggregated Ethernet)

```
user@host> show interfaces pp0.1073773821
Logical interface pp0.1073773821 (Index 80) (SNMP ifIndex 32584)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE
    PPPoE:
      State: SessionUp, Session ID: 1,
      Session AC name: alcor, Remote MAC address: 00:00:5e:00:53:01,
      Underlying interface: demux0.100 (Index 88)
    Link:
      ge-1/0/0.32767
      ge-1/0/1.32767
    Input packets : 6
    Output packets: 6
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,  mpls: Not-configured
  CHAP state: Closed
  PAP state: Success
    Protocol inet, MTU: 1500
      Flags: Sendbcast-pkt-to-re
      Addresses, Flags: Is-Primary
        Local: 203.0.113.1
```

show interfaces brief (PPPoE)

```
user@host> show interfaces pp0 brief
Physical interface: pp0, Enabled, Physical link is Up
  Type: PPPoE, Link-level type: PPPoE, MTU: 1532, Speed: Unspecified
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps

  Logical interface pp0.0
    Flags: Hardware-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE
    PPPoE:
      State: SessionDown, Session ID: None,
      Service name: None, Configured AC name: sapphire,
      Auto-reconnect timeout: 100 seconds, Idle timeout: Never,
      Underlying interface: at-5/0/0.0 (Index 70)
    inet
```

show interfaces detail (PPPoE)

```
user@host> show interfaces pp0 detail
Physical interface: pp0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 24, Generation: 9
  Type: PPPoE, Link-level type: PPPoE, MTU: 1532, Speed: Unspecified
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : None
  Physical info  : Unspecified
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: Unspecified, Hardware address: Unspecified
  Alternate link address: Unspecified
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                   0                   0 bps
   Output bytes  :                   0                   0 bps
   Input  packets:                   0                   0 pps
   Output packets:                   0                   0 pps
  Logical interface pp0.0 (Index 72) (SNMP ifIndex 72) (Generation 14)
    Flags: Hardware-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE
    PPPoE:
```

```
      State: SessionDown, Session ID: None,
      Service name: None, Configured AC name: sapphire,
      Auto-reconnect timeout: 100 seconds, Idle timeout: Never,
      Underlying interface: at-5/0/0.0 (Index 70)
    Traffic statistics:
     Input  bytes  :                  0
     Output bytes  :                  0
     Input  packets:                  0
     Output packets:                  0
    Local statistics:
     Input  bytes  :                  0
     Output bytes  :                  0
     Input  packets:                  0
     Output packets:                  0
    Transit statistics:
     Input  bytes  :                  0                   0 bps
     Output bytes  :                  0                   0 bps
     Input  packets:                  0                   0 pps
     Output packets:                  0                   0 pps
  LCP state: Not-configured
  NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,   mpls: Not-
configured
  CHAP state: Closed
    Protocol inet, MTU: 100, Generation: 14, Route table: 0
      Flags: User-MTU, Negotiate-Address
```

show interfaces extensive (PPPoE on M120 and M320 Routers)

```
user@host> show interfaces pp0 extensive
Physical interface: pp0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 93, Generation: 129
  Type: PPPoE, Link-level type: PPPoE, MTU: 1532, Speed: Unspecified
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : None
  Physical info  : Unspecified
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: Unspecified, Hardware address: Unspecified
  Alternate link address: Unspecified
  Statistics last cleared: Never
```

```
Traffic statistics:
 Input  bytes  :              972192                  0 bps
 Output bytes  :              975010                  0 bps
 Input  packets:                1338                  0 pps
 Output packets:                1473                  0 pps
 IPv6 transit statistics:
  Input  bytes  :                   0
  Output bytes  :                   0
  Input  packets:                   0
  Output packets:                   0
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards: 0,
  Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors: 0

Logical interface pp0.0 (Index 69) (SNMP ifIndex 96) (Generation 194)
  Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPPoE
  PPPoE:
    State: SessionUp, Session ID: 26,
    Session AC name: None, AC MAC address: 00:00:5e:00:53:12,
    Service name: None, Configured AC name: None,
    Auto-reconnect timeout: Never, Idle timeout: Never,
    Underlying interface: ge-3/0/1.0 (Index 67)
  Traffic statistics:
   Input  bytes  :                 252
   Output bytes  :                 296
   Input  packets:                   7
   Output packets:                   8
   IPv6 transit statistics:
    Input  bytes  :                   0
    Output bytes  :                   0
    Input  packets:                   0
    Output packets:                   0
  Local statistics:
   Input  bytes  :                 252
   Output bytes  :                 296
   Input  packets:                   7
   Output packets:                   8
  Transit statistics:
   Input  bytes  :                   0                  0 bps
   Output bytes  :                   0                  0 bps
   Input  packets:                   0                  0 pps
```

```
    Output packets:                  0                    0 pps
    IPv6 transit statistics:
     Input  bytes  :                 0
     Output bytes  :                 0
     Input  packets:                 0
     Output packets:                 0
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 1 (last seen 00:00:00 ago)
    Output: 1 (last sent 00:00:03 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls: Not-configured
  CHAP state: Closed
  PAP state: Closed
    Protocol inet, MTU: 1492, Generation: 171, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 203.0.113.2, Local: 203.0.113.1, Broadcast: Unspecified, Generation: 206
```

Release Information

Command introduced before Junos OS Release 7.4.

show interfaces demux0 (Demux Interfaces)

IN THIS SECTION

Syntax

```
show interfaces demux0.logical-interface-number
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index snmp-index>
<statistics>
```

Description

(MX Series and M Series routers only) Display status information about the specified demux interface.

Options

none	Display standard information about the specified demux interface.
brief | detail | extensive | terse	(Optional) Display the specified level of output.
descriptions	(Optional) Display interface description strings.
media	(Optional) Display media-specific information about network interfaces.
snmp-index *snmp-index*	(Optional) Display information for the specified SNMP index of the interface.
statistics	(Optional) Display static interface statistics.

Required Privilege Level

view

Output Fields

Table 27 on page 731 lists the output fields for the `show interfaces` demux0 (Demux Interfaces) command. Output fields are listed in the approximate order in which they appear.

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	brief detail extensive none
Interface index	Index number of the physical interface, which reflects its initialization sequence.	brief detail extensive none
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under Common Output Fields Description.	brief detail extensive none
Physical link	Status of the physical link (Up or Down).	detail extensive none
Admin	Administrative state of the interface (Up or Down).	terse
Interface index	Index number of the physical interface, which reflects its initialization sequence.	detail extensive none
Link	Status of the physical link (Up or Down).	terse
Targeting summary	Status of aggregated Ethernet links that are configured with targeted distribution (primary or backup)	extensive
Bandwidth	Bandwidth allocated to the aggregated Ethernet links that are configured with targeted distribution.	extensive
Proto	Protocol family configured on the interface.	terse
SNMP ifIndex	SNMP index number for the physical interface.	detail extensive none

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Type	Type of interface. Software-Pseudo indicates a standard software interface with no associated hardware device.	brief detail extensive none
Link-level type	Encapsulation being used on the physical interface.	brief detail extensive
MTU	Maximum transmission unit size on the physical interface.	brief detail extensive
Clocking	Reference clock source: Internal (1) or External (2).	brief detail extensive
Speed	Speed at which the interface is running.	brief detail extensive
Device flags	Information about the physical device. Possible values are described in the “Device Flags” section under Common Output Fields Description.	brief detail extensive none
Interface flags	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	brief detail extensive none
Link type	Data transmission type.	detail extensive none
Link flags	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	detail extensive none
Physical info	Information about the physical interface.	detail extensive
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	detail extensive

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Current address`	Configured MAC address.	`detail extensive`
`Hardware address`	Hardware MAC address.	`detail extensive`
`Alternate link address`	Backup address of the link.	`detail extensive`
`Last flapped`	Date, time, and how long ago the interface went from down to up. The format is `Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)`. For example, `Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)`.	`detail extensive` none
`Statistics last cleared`	Time when the statistics for the interface were last set to zero.	`detail extensive`

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Traffic statistics`	Number and rate of bytes and packets received and transmitted on the physical interface. • `Input bytes`—Number of bytes received on the interface. • `Output bytes`—Number of bytes transmitted on the interface. • `Input packets`—Number of packets received on the interface. • `Output packets`—Number of packets transmitted on the interface. • `IPv6 transit statistics`—Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled. **NOTE**: These fields include dropped traffic and exception traffic, as those fields are not separately defined. • `Input bytes`—Number of bytes received on the interface • `Output bytes`—Number of bytes transmitted on the interface. • `Input packets`—Number of packets received on the interface. • `Output packets`—Number of packets transmitted on the interface.	`detail extensive`

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Input errors`	Input errors on the interface whose definitions are as follows: • `Errors`—Sum of the incoming frame terminations and FCS errors. • `Drops`—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • `Framing errors`—Number of packets received with an invalid frame checksum (FCS). • `Runts`—Number of frames received that are smaller than the runt threshold. • `Giants`—Number of frames received that are larger than the giant packet threshold. • `Policed discards`—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • `Resource errors`—Sum of transmit drops.	`extensive`
`Input Rate`	Input rate in bits per second (bps) and packets per second (pps).	none

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Output errors`	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • `Carrier transitions`—Number of times the interface has gone from `down` to `up`. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning. • `Errors`—Sum of the outgoing frame terminations and FCS errors. • `Drops`—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • `MTU errors`—Number of packets whose size exceeded the MTU of the interface. • `Resource errors`—Sum of transmit drops.	`extensive`
`Output Rate`	Output rate in bps and pps.	none
Logical Interface		
`Logical interface`	Name of the logical interface.	`brief detail extensive` none
`Index`	Index number of the logical interface, which reflects its initialization sequence.	`detail extensive` none
`SNMP ifIndex`	SNMP interface index number for the logical interface.	`detail extensive` none
`Generation`	Unique number for use by Juniper Networks technical support only.	`detail`

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Flags`	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under Common Output Fields Description.	`brief detail extensive` none
`Encapsulation`	Encapsulation on the logical interface.	`brief extensive` none
`ACI VLAN: Dynamic Profile`	Name of the dynamic profile that defines the agent circuit identifier (ACI) interface set. If configured, the ACI interface set enables the underlying demux interface to create dynamic VLAN subscriber interfaces based on ACI information.	`brief detail extensive` none
`Demux`	Specific IP demultiplexing (demux) values: • `Underlying interface`—The underlying interface that the demux interface uses. • `Index`—Index number of the logical interface. • `Family`—Protocol family configured on the logical interface. • `Source prefixes, total`—Total number of source prefixes for the underlying interface. • `Destination prefixes, total`—Total number of destination prefixes for the underlying interface. • `Prefix`—`inet` family prefix.	`detail extensive` none
`protocol-family`	Protocol family configured on the logical interface.	`brief`

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Traffic statistics`	Number and rate of bytes and packets received and transmitted on the specified interface set. • `Input bytes, Output bytes`—Number of bytes received and transmitted on the interface set. • `Input packets, Output packets`—Number of packets received and transmitted on the interface set. • `IPv6 transit statistics`—Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled. **NOTE**: The packet and byte counts in these fields include traffic that is dropped and does not leave the router. • `Input bytes`—Number of bytes received on the interface. • `Output bytes`—Number of bytes transmitted on the interface. • `Input packets`—Number of packets received on the interface. • `Output packets`—Number of packets transmitted on the interface.	`detail extensive`
`Local statistics`	Number of transit bytes and packets received and transmitted on the local interface. • `Input bytes`—Number of bytes received on the interface. • `Output bytes`—Number of bytes transmitted on the interface. • `Input packets`—Number of packets received on the interface. • `Output packets`—Number of packets transmitted on the interface.	`detail extensive`

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Transit statistics`	Number and rate of bytes and packets transiting the switch. **NOTE**: The packet and byte counts in these fields include traffic that is dropped and does not leave the router. • `Input bytes`—Number of bytes received on the interface. • `Output bytes`—Number of bytes transmitted on the interface. • `Input packets`—Number of packets received on the interface. • `Output packets`—Number of packets transmitted on the interface.	`detail extensive`
`IPv6 Transit statistics`	Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled. **NOTE**: The packet and byte counts in these fields include traffic that is dropped and does not leave the router. • `Input bytes`—Number of bytes received on the interface. • `Output bytes`—Number of bytes transmitted on the interface. • `Input packets`—Number of packets received on the interface. • `Output packets`—Number of packets transmitted on the interface.	`detail extensive`
`Input packets`	Number of packets received on the interface.	none
`Output packets`	Number of packets transmitted on the interface.	none
`Protocol`	Protocol family. Possible values are described in the “Protocol Field” section under Common Output Fields Description.	`detail extensive` none
`MTU`	Maximum transmission unit size on the logical interface.	`detail extensive` none

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Maximum labels	Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Route table	Route table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.	detail extensive
Flags	Information about protocol family flags. Possible values are described in the "Family Flags" section under Common Output Fields Description.	detail extensive none
Mac-Validate Failures	Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.	detail extensive none
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under Common Output Fields Description.	detail extensive none
Destination	IP address of the remote side of the connection.	detail extensive statistics none
Local	IP address of the logical interface.	detail extensive terse none
Remote	IP address of the remote interface.	terse
Broadcast	Broadcast address of the logical interlace.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive

Table 27: show interfaces demux0 (Demux Interfaces) Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Link	Name of the physical interfaces for member links in an aggregated Ethernet bundle for a PPPoE over aggregated Ethernet configuration. PPPoE traffic goes out on these interfaces.	detail extensive none
Dynamic-profile	Name of the PPPoE dynamic profile assigned to the underlying interface.	detail extensive none
Service Name Table	Name of the PPPoE service name table assigned to the PPPoE underlying interface.	detail extensive none
Max Sessions	Maximum number of dynamic PPPoE logical interfaces that the router can activate on the underlying interface.	detail extensive none
Duplicate Protection	State of duplicate protection: On or Off. Duplicate protection prevents the activation of another dynamic PPPoE logical interface on the same underlying interface when a dynamic PPPoE logical interface for a client with the same MAC address is already active on that interface.	detail extensive none
Direct Connect	State of the configuration to ignore DSL Forum VSAs: On or Off. When configured, the router ignores any of these VSAs received from a directly connected CPE device on the interface.	detail extensive none
AC Name	Name of the access concentrator.	detail extensive none

Sample Output

show interfaces demux0 (Demux)

```
user@host> show interfaces demux0
Physical interface: demux0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 79, Generation: 129
  Type: Software-Pseudo, Link-level type: Unspecified, MTU: 9192, Clocking: 1,
  Speed: Unspecified
```

```
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : None
  Physical info  : Unspecified
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: Unspecified, Hardware address: Unspecified
  Alternate link address: Unspecified
  Last flapped   : Never
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                   0                   0 bps
   Output bytes  :                   0                   0 bps
   Input  packets:                   0                   0 pps
   Output packets:                   0                   0 pps
   IPv6 transit statistics:
    Input  bytes  :                  0
    Output bytes  :                  0
    Input  packets:                  0
    Output packets:                  0
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
    Policed discards: 0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
    Resource errors: 0

Logical interface demux0.0 (Index 87) (SNMP ifIndex 84) (Generation 312)
    Flags: SNMP-Traps 0x4000 Encapsulation: ENET2
    Demux:
     Underlying interface: ge-2/0/1.0 (Index 74)
      Family Inet Source prefixes, total 1
      Prefix: 203.0.113/24
    Traffic statistics:
     Input  bytes  :                   0
     Output bytes  :                1554
     Input  packets:                   0
     Output packets:                  37
     IPv6 transit statistics:
      Input  bytes  :                  0
      Output bytes  :                  0
      Input  packets:                  0
      Output packets:                  0
```

```
    Local statistics:
     Input  bytes  :                    0
     Output bytes  :                 1554
     Input  packets:                    0
     Output packets:                   37
    Transit statistics:
     Input  bytes  :                    0                    0 bps
     Output bytes  :                    0                    0 bps
     Input  packets:                    0                    0 pps
     Output packets:                    0                    0 pps
     IPv6 transit statistics:
      Input  bytes  :                   0
      Output bytes  :                   0
      Input  packets:                   0
      Output packets:                   0
    Protocol inet, MTU: 1500, Generation: 395, Route table: 0
      Flags: Is-Primary, Mac-Validate-Strict
      Mac-Validate Failures: Packets: 0, Bytes: 0
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 203.0.113/24, Local: 203.0.113.13, Broadcast: 203.0.113.255,
        Generation: 434
```

show interfaces demux0 (PPPoE over Aggregated Ethernet)

```
user@host> show interfaces demux0.100
Logical interface demux0.100 (Index 76) (SNMP ifIndex 61160)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.100 ]
    Encapsulation: ENET2
    Demux:
      Underlying interface: ae0 (Index 199)
    Link:
      ge-1/0/0
      ge-1/1/0
    Input packets : 0
    Output packets: 0
    Protocol pppoe
      Dynamic Profile: pppoe-profile,
      Service Name Table: service-table1,
      Max Sessions: 100, Duplicate Protection: On,
```

```
      Direct Connect: Off,
      AC Name: pppoe-server-1
```

show interfaces demux0 extensive (Targeted Distribution for Aggregated Ethernet Links)

```
user@host> show interfaces demux0.1073741824 extensive

  Logical interface demux0.1073741824 (Index 75) (SNMP ifIndex 558) (Generation 346)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.1 ]  Encapsulation: ENET2
    Demux:
      Underlying interface: ae0 (Index 201)
    Link:
      ge-1/0/0
      ge-1/1/0
      ge-2/0/7
      ge-2/0/8
    Targeting summary:
      ge-1/1/0, primary, Physical link is Up
      ge-2/0/8, backup, Physical link is Up
    Bandwidth: 1000mbps
```

show interfaces demux0 (ACI Interface Set Configured)

```
user@host> show interfaces demux0.1073741827
  Logical interface demux0.1073741827 (Index 346) (SNMP ifIndex 527)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.1802 0x8100.302 ]  Encapsulation: ENET2
    Demux: Source Family Inet
    ACI VLAN:
      Dynamic Profile: aci-vlan-set-profile
    Demux:
      Underlying interface: ge-1/0/0 (Index 138)
    Input packets : 18
    Output packets: 16
    Protocol inet, MTU: 1500
      Flags: Sendbcast-pkt-to-re, Unnumbered
      Donor interface: lo0.0 (Index 322)
      Preferred source address: 203.0.113.202
      Addresses, Flags: Primary Is-Default Is-Primary
        Local: 203.0.113.119
    Protocol pppoe
```

```
    Dynamic Profile: aci-vlan-pppoe-profile,
    Service Name Table: None,
    Max Sessions: 32000, Max Sessions VSA Ignore: Off,
    Duplicate Protection: On, Short Cycle Protection: Off,
    Direct Connect: Off,
    AC Name: nbc
```

Release Information

Command introduced in Junos OS Release 9.0.

RELATED DOCUMENTATION

Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration

show interfaces filters

IN THIS SECTION

Syntax

```
show interfaces filters
<interface-name>
```

Description

Display all firewall filters that are installed on each interface in a system.

Options

none	Display filter information about all interfaces.
interface-name	(Optional) Display filter information about a particular interface.

Additional Information

For information about how to configure firewall filters, see the Routing Policies, Firewall Filters, and Traffic Policers User Guide. For related operational mode commands, see the CLI Explorer.

Required Privilege Level

view

Output Fields

Table 28 on page 746 lists the output fields for the `show interfaces filters` command. Output fields are listed in the approximate order in which they appear.

Table 28: show interfaces filters Output Fields

Field Name	Field Description
`Interface`	Name of the interface.
`Admin`	Interface state: `up` or `down`.
`Link`	Link state: `up` or `down`.
`Proto`	Protocol configured on the interface.

Table 28: show interfaces filters Output Fields *(Continued)*

Field Name	Field Description
`Input Filter`	Names of any firewall filters to be evaluated when packets are received on the interface, including any filters attached through activation of dynamic service.
`Output Filter`	Names of any firewall filters to be evaluated when packets are transmitted on the interface, including any filters attached through activation of dynamic service.

Sample Output

show interfaces filters

```
user@host> show interfaces filters
Interface       Admin Link Proto Input Filter         Output Filter
ge-0/0/0        up    up
ge-0/0/0.0      up    up   inet
                           iso
ge-5/0/0        up    up
ge-5/0/0.0      up    up   any                        f-any
                           inet                       f-inet
                           multiservice
gr-0/3/0        up    up
ip-0/3/0        up    up
mt-0/3/0        up    up
pd-0/3/0        up    up
pe-0/3/0        up    up
vt-0/3/0        up    up
at-1/0/0        up    up
at-1/0/0.0      up    up   inet
                           iso
at-1/1/0        up    down
at-1/1/0.0      up    down inet
                           iso
....
```

show interfaces filters (Interface-Name)

```
user@host> show interfaces filters so-2/1/0
Interface       Admin Link Proto Input Filter         Output Filter
so-2/1/0        up    down
so-2/1/0.0      up    down inet  goop                 outfilter
                           iso
                           inet6 v6in                 v6out
```

```
user@host > show interfaces filters ge-3/0/1
Interface       Admin Link Proto Input Filter         Output Filter
ge-3/0/1        up    up
ge-3/0/1.0      up    up   inet  F1-ge-3/0/1.0-in     F2-ge-3/0/1.0-out
                           inet  F3-ge-3/0/1.0-in
```

show interfaces filters (PTX Series Packet Transport Routers)

```
user@host > show interfaces filters em0
Interface       Admin Link Proto Input Filter         Output Filter
            em0             up    up
            em0.0           up    up   inet
```

Release Information

Command introduced before Junos OS Release 7.4.

Command introduced on PTX Series Packet Transport Routers for Junos OS Release 12.1.

show interfaces l2-routing-instance

IN THIS SECTION

Syntax

```
show interfaces l2-routing-instance routing-instance-name
```

Description

Display information about core-facing physical interfaces in the specified routing instance. The routing instance must be configured for Layer 2 wholesale operations or the command displays no output.

Options

routing-instance-name	Name of the routing instance.

Required Privilege Level

view

Output Fields

Table 29 on page 750 lists the output fields for the `show interfaces l2-routing-instance` command. Output fields are listed in the approximate order in which they appear.

Table 29: show interfaces l2-routing-instance Output Fields

Field Name	Field Description
`Interface`	Name of .the core-facing physical interface.
`VLAN Id`	Trunk VLAN ID assigned to the core-facing physical interface within its input VLAN map.
`Inner VLAN Id total`	Aggregate number of VLAN IDs assigned to this physical interface based on the inner VLAN ID-swap-ranges configured for the interface.
`Inner VLAN range`	Inner VLAN ID swap range; numbers that can be used for swapping inner VLAN IDs.
`Inner VLAN range total`	Size of the inner VLAN ID swap range.
`Inner VLAN id use count`	Number of inner VLAN ID tags in use.
`Inner VLAN id free count`	Number of inner VLAN ID tags not in use.

Sample Output

show interfaces l2-routing-instance

```
user@host> show interfaces l2-routing-instance NSP1
Interface: ge-1/1/1.0
VLAN Id: 100
  Inner VLAN Id total: 6
  Inner VLAN range: 15-20
    Inner VLAN range total   : 6
    Inner VLAN id use count  : 1
    Inner VLAN id free count : 5
```

Release Information

Command introduced in Junos OS Release 16.1R4.

RELATED DOCUMENTATION

Layer 2 Wholesale with ANCP-Triggered VLANs Overview | 126

show interfaces routing

IN THIS SECTION

Syntax

```
show interfaces routing
<brief | summary | detail>
<interface-name>
<logical-system (all | logical-system-name)>
```

Description

Display the state of the router's interfaces. Use this command for performing router diagnostics only, when you are determining whether the routing protocols and the Junos OS differ about the state of an interface.

Options

none	Display standard information about the state of all router interfaces on all logical systems.
brief | summary | detail	(Optional) Display the specified level of output.
interface-name	(Optional) Name of a specific interface.
logical-system (all | *logical-system-name*)	(Optional) Perform this operation on all logical systems or on a particular logical system.

Additional Information

For information about related operational mode commands for routing instances and protocols, see the CLI Explorer.

Required Privilege Level

view

Output Fields

Table 30 on page 752 lists the output fields for the `show interfaces routing` command. Output fields are listed in the approximate order in which they appear.

Table 30: show interfaces routing Output Fields

Field Name	Field Description	Level of Output
`Interface`	Name of the physical interface.	none `brief`
`State`	State of the physical interface: `Up` or `Down`.	none `brief`
`Addresses`	Protocols and addresses configured on the interface.	none `brief`
`Index`	Interface index number, which reflects its initialization sequence.	`detail`

Table 30: show interfaces routing Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Refcount	Number of references to the interface in the routing software.	detail
State	State (Up or Down) and type of interface.	detail
Change	Reflects one or more of the following recent changes to the interface: • Add—The interface was just added. • Address—The interface's link-layer address has changed. • Delete—The interface is being deleted. • Encapsulation—The type of encapsulation on the interface has changed. • Metric—The interface's metric value has changed. • MTU—The interface's maximim transmission unit size has changed. • UpDown—The interface has made an up or down transition.	detail
Up/down transitions	Number of times the interface has gone from Down to Up.	detail
Link layer	Describes the link layer of the interface.	detail
Encapsulation	Encapsulation on the interface.	detail
Bandwidth	Speed at which the interface is running.	detail

Table 30: show interfaces routing Output Fields *(Continued)*

Field Name	Field Description	Level of Output

Protocol address	Information about the configuration of protocols on the interface:
	• Address—Address configured on the interface for the protocol type.
	• State—State (Up or down) and type of interface.
	• Change—Reflects one or more of the following recent changes to the interface:
	  • Add—The interface was just added.
	  • Address—The interface's address has changed.
	  • Broadcast—The interface's broadcast address has changed.
	  • Delete—The interface is being deleted.
	  • Netmask—The interface's netmask has changed.
	  • UpDown—The interface has made an up or down transition.
	• Preference—Preference value for the route for this address.
	• Metric—Metric value on the interface for the protocol type.
	• MTU—Maximim transmission unit value of the interface.
	• Local address—On a point-to-point link, the address of the local side of the link. Not used for multicast links.
	• Destination—For a point-to-point link, the address of the remote side of the link. For multicast links, the network address.
		detail

Sample Output

show interfaces routing brief

```
user@host> show interfaces routing brief
Interface        State Addresses
so-5/0/3.0       Down  ISO   enabled
so-5/0/2.0       Up    MPLS  enabled
```

```
                      ISO   enabled
                      INET  192.168.2.120
                      INET  enabled
so-5/0/1.0       Up   MPLS  enabled
                      ISO   enabled
                      INET  192.168.2.130
                      INET  enabled
at-1/0/0.3       Up   CCC   enabled
at-1/0/0.2       Up   CCC   enabled
at-1/0/0.0       Up   ISO   enabled
                      INET  192.168.90.10
                      INET  enabled
lo0.0            Up   ISO   47.0005.80ff.f800.0000.0108.0001.1921.6800.5061.00
                      ISO   enabled
                      INET  127.0.0.1
fxp1.0           Up
fxp0.0           Up   INET  192.168.6.90
```

show interfaces routing brief (TX Matrix Plus Router)

```
user@host> show interfaces routing brief
Interface        State Addresses
...
ge-23/0/4.0      Up    INET  203.0.113.91
                       ISO   enabled
                       MPLS  enabled
ge-23/0/3.0      Up    INET  203.0.113.81
                       ISO   enabled
                       MPLS  enabled
ge-23/0/2.0      Up    INET  203.0.113.71
                       ISO   enabled
                       MPLS  enabled
ge-23/0/1.0      Up    INET  203.0.113.61
                       ISO   enabled
                       MPLS  enabled
ge-23/0/0.0      Up    INET  203.0.113.51
                       ISO   enabled
                       MPLS  enabled
ge-31/0/7.599    Up    INET  192.0.2.93
ge-31/0/7.598    Up    INET  192.0.2.89
ge-31/0/7.597    Up    INET  192.0.2.85
```

```
ge-31/0/7.596    Up    INET  192.0.2.81
ge-31/0/7.595    Up    INET  192.0.2.77
ge-31/0/7.594    Up    INET  192.0.2.73
...
ixgbe1.0         Up    INET  203.0.113.34
                       INET  198.51.100.4
                       INET6 fe80::200:1ff:fe22:4
                       INET6 fec0::a:22:0:4
ixgbe0.0         Up    INET  203.0.113.34
                       INET  198.51.100
                       INET6 fe80::200:ff:fe22:4
                       INET6 fec0::a:22:0:4
em0.0            Up    INET  192.168.178.11
```

show interfaces routing detail

```
user@host> show interfaces routing detail
so-5/0/3.0
  Index: 15, Refcount: 2, State: Up <Broadcast PointToPoint Multicast> Change:<>
  Metric: 0, Up/down transitions: 0, Full-duplex
  Link layer: HDLC serial line Encapsulation: PPP Bandwidth: 155Mbps
  ISO address (null)
    State: <Broadcast PointToPoint Multicast> Change: <>
    Preference: 0 (120 down), Metric: 0, MTU: 4470 bytes
so-5/0/2.0
  Index: 14, Refcount: 7, State: <Up Broadcast PointToPoint Multicast> Change:<>
  Metric: 0, Up/down transitions: 0, Full-duplex
  Link layer: HDLC serial line Encapsulation: PPP Bandwidth: 155Mbps
  MPLS address (null)
    State: <Up Broadcast PointToPoint Multicast> Change: <>
    Preference: 0 (120 down), Metric: 0, MTU: 4458 bytes
  ISO address (null)
    State: <Up Broadcast PointToPoint Multicast> Change: <>
    Preference: 0 (120 down), Metric: 0, MTU: 4470 bytes
  INET address 192.168.2.120
    State: <Up Broadcast PointToPoint Multicast Localup> Change: <>
    Preference: 0 (120 down), Metric: 0, MTU: 4470 bytes
    Local address: 192.168.2.120
    Destination: 192.168.2.110/32
  INET address (null)
    State: <Up Broadcast PointToPoint Multicast> Change: <>
```

```
    Preference: 0 (120 down), Metric: 0, MTU: 4470 bytes
...
```

show interfaces routing detail (TX Matrix Plus Router)

```
user@host> show interfaces routing detail
ge-23/0/4.0
  Index: 77, Refcount: 5, State: <Up Broadcast Multicast> Change: <>
  0 metric, 0 up/down transitions, reth state 0, full-duplex
  Link layer: Ethernet Encapsulation: Ethernet Bandwidth: 1000Mbps
  Link address #0 0.1d.b5.14.da.2d
  INET address 203.0.113.91
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <RT-Change>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 203.0.113.93
    Destination: 203.0.113.0/30
    System flags: <Is-Preferred Is-Primary>
  ISO address (null)
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1497 bytes
    System flags: <>
  MPLS address (null)
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1488 bytes
    System flags: <>
ge-23/0/3.0
  Index: 76, Refcount: 5, State: <Up Broadcast Multicast> Change: <>
  0 metric, 0 up/down transitions, reth state 0, full-duplex
  Link layer: Ethernet Encapsulation: Ethernet Bandwidth: 1000Mbps
  Link address #0 0.1d.b5.14.da.2c
  INET address 203.0.113.81
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <RT-Change>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 10.8.1.3
    Destination: 203.0.113.80/30
    System flags: <Is-Preferred Is-Primary>
  ISO address (null)
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1497 bytes
    System flags: <>
  MPLS address (null)
```

```
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1488 bytes
    System flags: <>
ge-23/0/2.0
  Index: 75, Refcount: 5, State: <Up Broadcast Multicast> Change: <>
  0 metric, 0 up/down transitions, reth state 0, full-duplex
  Link layer: Ethernet Encapsulation: Ethernet Bandwidth: 1000Mbps
  Link address #0 0.1d.b5.14.da.2b
  INET address 203.0.113.71
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <RT-Change>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 203.0.113.73
    Destination: 203.0.113.70/30
    System flags: <Is-Preferred Is-Primary>
  ISO address (null)
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1497 bytes
    System flags: <>
  MPLS address (null)
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1488 bytes
    System flags: <>
ge-23/0/1.0
  Index: 74, Refcount: 5, State: <Up Broadcast Multicast> Change: <>
  0 metric, 0 up/down transitions, reth state 0, full-duplex
  Link layer: Ethernet Encapsulation: Ethernet Bandwidth: 1000Mbps
  Link address #0 0.1d.b5.14.da.2a
  INET address 203.0.113.61
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <RT-Change>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 203.0.113.63
...
ixgbe1.0
  Index: 5, Refcount: 5, State: <Up Broadcast Multicast> Change: <>
  0 metric, 0 up/down transitions, reth state 0, full-duplex
  Link layer: Ethernet Encapsulation: Ethernet Bandwidth: 1000Mbps
  Link address #0 2.0.1.22.0.4
  INET address 203.0.113.34
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 203.0.113.255
    Destination: 203.0.113.0/8
    System flags: <Is-Preferred>
```

```
  INET address 198.51.100.4
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 191.255.255.255
    Destination: 192.0.2.0/2
    System flags: <Primary Is-Preferred Is-Primary>
  INET6 address fe80::200:1ff:fe22:4
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Destination: fe80::/64
    System flags: <Is-Preferred>
  INET6 address fec0::a:22:0:4
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Destination: fec0::/64
    System flags: <Is-Preferred Is-Primary>
ixgbe0.0
  Index: 4, Refcount: 5, State: <Up Broadcast Multicast> Change: <>
  0 metric, 0 up/down transitions, reth state 0, full-duplex
  Link layer: Ethernet Encapsulation: Ethernet Bandwidth: 1000Mbps
  Link address #0 2.0.0.22.0.4
  INET address 203.0.113.34
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 203.0.113.255
    Destination: 203.0.113.0/8
    System flags: <Is-Preferred>
  INET address 198.51.100.4
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 191.255.255.255
    Destination: 192.0.2.0/2
    System flags: <Primary Is-Default Is-Preferred Is-Primary>
  INET6 address fe80::200:ff:fe22:4
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Destination: fe80::/64
    System flags: <Is-Preferred>
  INET6 address fec0::a:22:0:4
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Destination: fec0::/64
    System flags: <Is-Default Is-Preferred Is-Primary>
```

```
em0.0
  Index: 3, Refcount: 2, State: <Up Broadcast Multicast> Change: <>
  0 metric, 0 up/down transitions, reth state 0, full-duplex
  Link layer: Ethernet Encapsulation: Ethernet Bandwidth: 100Mbps
  Link address #0 0.80.f9.26.0.c0
  INET address 192.168.178.11
    State: <Up Broadcast Multicast Localup> Change: <> Flags: <>
    Preference 0, metric 0, MTU 1500 bytes
    Broadcast address 192.168.178.127
    Destination: 192.168.178.0/25
    System flags: <Is-Preferred Is-Primary>
```

Release Information

Command introduced before Junos OS Release 7.4.

show interfaces routing-instance

IN THIS SECTION

Syntax

```
show interfaces routing-instance (instance-name | all)
<brief | detail | extensive | terse>
```

Description

Display information about the interfaces configured for either a specific routing instance or for all of the routing instances.

Options

all	Display information about all of the interfaces configured for all of the routing instances on the router.
instance-name	Display information about the interfaces configured for the specified routing instance.
brief | detail | extensive | terse	(Optional) Display the specified level of output.

Required Privilege Level

view

Output Fields

The output fields from the `show interfaces routing-instance` command are identical to those produced by the `show interfaces` *interface-name* command. For a description of output fields, see the other chapters in this manual.

Sample Output

show interfaces routing-instance terse

```
user@host> show interfaces routing-instance sample terse
Interface      Admin   Link      Proto    Local               Remote
ge-0/0/0.0     up      up        inet     192.168.4.28/24
```

Sample Output

show interfaces routing-instance all

```
user@host> show interfaces terse routing-instance all
Interface   Admin   Link   Proto    Local             Remote Instance
at-0/0/1       up      up     inet        203.0.113.1/24
ge-0/0/0.0  up      up     inet      192.168.4.28/24          sample-a
at-0/1/0.0  up      up     inet6     fe80::a:0:0:4/64         sample-b
so-0/0/0.0     up      up     inet        203.0.113.1/32
```

show interfaces routing-instance extensive

```
user@hostshow interfaces fe-0/1/3 routing-instance instance2 extensive
Logical interface fe-0/1/3.0 (Index 70) (SNMP ifIndex 53) (Generation 211)
    Flags: SNMP-Traps Encapsulation: ENET2
    Traffic statistics:
     Input  bytes :                   0
     Output bytes :                  42
     Input packets:                   0
     Output packets:                  1
     IPv6 transit statistics:
      Input bytes :                   0
      Output bytes  :                 0
      Input packets:                  0
      Output packets:                 0
    Local statistics:
     Input bytes :                   0
     Output bytes :                 42
     Input packets:                  0
     Output packets:                 1
    Transit statistics:
     Input bytes :                   0                  0 bps
     Output bytes :                  0                  0 bps
     Input packets:                  0                  0 pps
     Output packets:                 0                  0 pps
     IPv6 transit statistics:
      Input bytes :                  0
      Output bytes :                 0
      Input packets:                 0
```

```
      Output packets:                0
    Protocol inet, MTU: 1500, Generation: 252, Route table: 4
      Flags: Is-Primary
      Addresses, Flags: Is-Default Is-Preferred Is-Primary
      Destination: 192.0.2/24, Local: 192.0.2.51, Broadcast: 192.0.2.255, Generation: 263
```

Release Information

Command introduced in Junos OS Release 9.1.

show network-access aaa statistics

IN THIS SECTION

Syntax

```
show network-access aaa statistics
<accounting (detail)>
<address-assignment (client | pool pool-name)>
<dynamic-requests>
<radius>
<session-limit-per-username>
```

Description

Display AAA accounting, address-assignment, dynamic request statistics, RADIUS settings and statistics, and subscriber session limit statistics.

Options

accounting (detail)	(Optional) Display AAA accounting statistics. The `detail` keyword displays additional accounting information
address-assignment (client | pool *pool-name*)	(Optional) Display AAA address-assignment client and pool statistics.
dynamic-requests	(Optional) Display AAA dynamic requests.
radius	(Optional) Display RADIUS settings and statistics.
session-limit-per-username	Maximum number of sessions allowed for a username per access profile. Use the `brief` option to display only active users with blocked requests. Use the `detail` option to display all active users.

Required Privilege Level

view

Output Fields

Table 31 on page 764 lists the output fields for the `show network-access aaa statistics` command. Output fields are listed in the approximate order in which they appear.

Table 31: show network-access aaa statistics Output Fields

Field Name	Field Description	Level of Output
`Requests received`	• Number of accounting requests generated by the AAA framework. • Number of dynamic requests received from the external server. Does not include requests sent from backup accounting.	All levels

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Accounting request failures`	Number of accounting requests that failed to be sent or queued from a client to a RADIUS accounting server. Does not include requests sent from backup accounting.	`detail`
`Accounting request success`	Number of accounting requests successfully sent or queued from a client to a RADIUS accounting server. Does not include requests sent from backup accounting.	`detail`
`Account on requests`	Number of accounting on requests sent from a client to a RADIUS accounting server.	`detail`
`Accounting start requests`	Number of accounting start requests sent from a client to a RADIUS accounting server.	`detail`
`Accounting interim requests`	Number of accounting interim requests sent from a client to a RADIUS accounting server.	`detail`
`Accounting stop requests`	Number of accounting stop requests sent from a client to a RADIUS accounting server. Does not include requests sent from backup accounting.	`detail`

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Accounting request timeouts`	Number of accounting requests to the accounting server that timed out. This field was named `Timed out requests` in releases before Junos OS Release 16.1. Does not include requests sent from backup accounting.	All levels
`Accounting Response failures`	Number of accounting requests not acknowledged (NAK) by the accounting server. Does not include requests sent from backup accounting.	All levels
`Accounting response success`	Number of accounting requests acknowledged by the accounting server. Does not include requests sent from backup accounting.	All levels
`Account on responses`	Number of accounting on requests acknowledged by the RADIUS accounting server.	`detail`
`Accounting start responses`	Number of accounting start requests acknowledged by the RADIUS accounting server.	`detail`
`Accounting interim responses`	Number of accounting interim requests acknowledged by the RADIUS accounting server.	`detail`

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Accounting stop responses`	Number of accounting stop requests acknowledged by the RADIUS accounting server. Does not include requests sent from backup accounting.	`detail`
`Accounting rollover requests`	Number of accounting requests coming to a RADIUS accounting server after a previous server timing out.	`detail`
`Accounting unknown requests`	Number of unknown accounting requests sent from a client to a RADIUS accounting server (for example, when the header has invalid or unsupported information).	`detail`
`Accounting radius pending requests`	Number of accounting requests sent from a client to a RADIUS accounting server that are waiting for a response from the server.	`detail`
`Accounting malformed responses`	Number of accounting responses from a RADIUS accounting server that have invalid or unexpected attributes.	`detail`
`Accounting retransmissions`	Number of accounting requests made by a client to the RADIUS sever that were retransmitted. Does not include requests sent from backup accounting.	`detail`
`Accounting bad authenticators`	Number of accounting responses from a RADIUS accounting server that have an incorrect authenticator (for example, the client and server RADIUS secret do not match).	`detail`

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Accounting packets dropped	Number of accounting responses from a RADIUS accounting server that are dropped by a client.	detail
Accounting backup record creation requests	Number of accounting stop requests from a client to a RADIUS accounting server that were forwarded to be backed up.	detail
Accounting backup replay request success	Number of backup accounting stop requests successfully created by clients after each timeout for replay to a RADIUS accounting server.	detail
Accounting backup request failures	Number of backup accounting requests that failed to be sent or queued from a client to a RADIUS accounting server.	detail
Accounting backup request success	Number of backup accounting requests successfully sent or queued from a client to a RADIUS accounting server.	detail
Accounting backup timeouts	Number of backup accounting requests that timed out after being sent to a RADIUS accounting server.	detail

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Accounting backup in-flight requests`	Number of backup accounting requests that were successfully sent or queued to a RADIUS accounting server for which no response or error has been received yet. Backup requests are replayed only in the following circumstances: • When the request being replayed receives a positive response, the next request can be replayed. • When the request being replayed receives a timeout response, it can be replayed again. Consequently this intermediate timer displays 1 or 0. The value eventually drops to 0 as requests are responded to positively or fail due to error.	`detail`
`Accounting backup responses success`	Number of backup records that were successfully acknowledged with a positive response from a RADIUS accounting server.	`detail`
`Accounting backup radius requests`	Number of backup requests sent to UDP level. This is a RADIUS-level counter and increments rapidly based on the configured retries and timeouts and the RADIUS-level retransmissions. An observation that the value is increasing is more significant than the exact value of the counter.	`detail`

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Accounting backup radius responses`	Number of responses received at the UDP level for backup requests. This is a RADIUS-level counter and increments rapidly based on the configured retries and timeouts and the RADIUS-level retransmissions. Observation that the value is increasing is more significant than the exact value of the counter.	`detail`
`Accounting backup radius timeouts`	Number of backup requests that timed out after being sent to UDP. This is a RADIUS-level counter and increments rapidly based on the configured retries and timeouts and the RADIUS-level retransmissions. Observation that the value is increasing is more significant than the exact value of the counter.	`detail`
`Accounting backup radius pending requests`	Number of backup requests sent to a RADIUS accounting server that are waiting for a response from the server. This is an intermediate state counter that eventually drops to zero as requests are responded to or failed due to error.	`detail`
`Accounting backup radius retransmissions`	Sum of backup request retransmissions for each RADIUS accounting server. This is a RADIUS-level counter and increments rapidly based on the configured retries and timeouts and the RADIUS-level retransmissions. Observation that the value is increasing is more significant than the exact value of the counter.	`detail`

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Accounting backup malformed responses	Sum of malformed responses received for backup requests sent to each RADIUS accounting server at the UDP level.	detail
Accounting backup bad authenticators	Sum of responses received for backup accounting requests for each RADIUS accounting server where authenticators were mismatched.	detail
Accounting backup responses dropped	Sum of responses for backup accounting requests for each RADIUS accounting server that were dropped due to various sanity checks.	detail
Accounting backup rollover requests	Sum of backup accounting requests rolled over for each RADIUS accounting server.	detail
Accounting backup unknown responses	Sum of unknown responses for backup accounting requests for each RADIUS accounting server.	detail
Client	Client type; for example, DHCP, Mobile IP, PPP.	none specified
Out of Memory	Number of times an address was not given to the client due to memory issues.	none specified
No Matches	Number of times there were no network matches for the pool.	none specified

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Pool Name`	Name of the address-assignment pool for this client.	none specified
`Out of Addresses`	Number of times there were no available addresses in the pool.	none specified
`Address total`	Number of addresses in the pool.	none specified
`Addresses in use`	Number of addresses in use.	none specified
`Addresses excluded`	Number of addresses excluded from being allocated from the pool with the `excluded-address` or `excluded-range` statements.	none specified
`Address Usage (percent)`	Percentage of total addresses in use. This value does not take excluded addresses into account.	none specified
`Pool drain configured`	Configuration state of active drain for the specified local address pool, `yes` or `no`.	none specified
`Pool Usage`	Percentage of allocated addresses in the specified address pool.	none specified
`processed successfully`	Number of dynamic requests processed successfully by the AAA framework.	All levels
`errors during processing`	Number of dynamic requests that resulted in processing errors by the AAA framework.	All levels

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Link Name`	Name of the secondary address-assignment pool to which the primary pool is linked.	
`silently dropped`	Number of dynamic requests dropped by the AAA framework due to multiple back-to-back or duplicate requests.	All levels
`RADIUS Server`	IPv4 or IPv6 address of the RADIUS server to which the router is sending requests.	All levels
`Profile`	Name of the RADIUS profile associated with the RADIUS server. A RADIUS server can be associated with more than one RADIUS profile.	All levels
`Configured`	Configured maximum number of outstanding requests from the router to the RADIUS server for a specific profile. An outstanding request is a request to which the RADIUS server has not yet responded. The range of values is 0 through 2000 outstanding requests. The default value is 1000.	All levels
`Current`	Current number of outstanding requests from the router to the RADIUS server for a specific profile. An outstanding request is a request to which the RADIUS server has not yet responded.	All levels

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Peak	Highest number of outstanding requests from the router to the RADIUS server for a specific profile at any point in time since the router was started or since the counter was last cleared. **NOTE**: If the value of this field is equal to the value of the Configured field, you may want to increase the value of the Configured field.	All levels
Exceeded	Number of times that the router attempted to send requests to the RADIUS server in excess of the configured maximum value for a specific profile. **NOTE**: If the value of this field is nonzero, you may want to increase the value of the Configured field.	All levels
Username	Username for a subscriber with one or more active sessions for an access profile.	briefdetail
Access-profile	Name of the access profile where the username is active.	briefdetail
Blocked requests	Number of session requests that have been blocked for the username for an access profile. A request is blocked when it exceeds the configured session limit.	briefdetail
Session count	Number of active sessions for the username for an access profile.	briefdetail
Total usernames	Number of active usernames for all access profiles.	none summary

Table 31: show network-access aaa statistics Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Total usernames exceeding session limit	Number of usernames that have attempted sessions greater than the limit configured for the username.	none summary
Total blocked requests	Number of session requests that have been blocked because the session limit is exceeded.	none summary

Sample Output

show network-access aaa statistics accounting

```
user@host> show network-access aaa statistics accounting
Accounting module statistics
Accounting module statistics
  Requests received: 5000
  Accounting request timeouts: 2000
  Accounting response failures: 0
  Accounting response success: 3000
```

show network-access aaa statistics accounting detail

```
user@host> show network-access aaa statistics accounting detail
Accounting module statistics
Accounting module statistics
  Requests received: 5000
  Accounting request failures: 0
  Accounting request success: 5000
    Account on requests: 0
    Accounting start requests: 3000
    Accounting interim requests: 0
    Accounting stop requests: 2000
```

```
  Accounting request timeouts: 2000
  Accounting response failures: 0
  Accounting response success: 3000
    Account on responses: 0
    Accounting start responses: 3000
    Accounting interim responses: 0
    Accounting stop responses: 0
  Accounting rollover requests: 0
  Accounting unknown responses: 0
  Accounting radius pending requests: 0
  Accounting malformed responses: 0
  Accounting retransmissions: 6000
  Accounting bad authenticators: 0
  Accounting packets dropped: 0

  Accounting backup record creation requests: 3000
  Accounting backup request replay success: 9808
  Accounting backup request failures: 0
  Accounting backup request success: 3006
  Accounting backup timeouts: 6
  Accounting backup in-flight requests: 0
  Accounting backup responses success: 3000
  Accounting backup radius requests: 3006
  Accounting backup radius responses: 3000
  Accounting backup radius timeouts: 99
  Accounting backup radius pending requests: 0
  Accounting backup radius retransmissions: 99
  Accounting backup malformed responses: 0
  Accounting backup bad authenticators: 0
  Accounting backup responses dropped: 0
  Accounting backup rollover requests: 0
  Accounting backup unknown responses: 0
```

show network-access aaa statistics address-assignment client

```
user@host> show network-access aaa statistics address-assignment client
Address-assignment statistics
 Client: jdhcpd
 Out of Memory: 0
 No Matches: 2
```

show network-access aaa statistics address-assignment pool

```
user@host> show network-access aaa statistics address-assignment pool isp_1
Address-assignment statistics
 Pool Name: isp_1
 Pool Name: (all pools in chain)
 Out of Memory: 0
 Out of Addresses: 9
 Address total: 47
 Addresses in use: 47
 Address Usage (percent): 100
 Pool drain configured: yes
```

show network-access aaa statistics address-assignment pool (Excluded Addresses)

```
user@host> show network-access aaa statistics address-assignment pool isp_1
Address-assignment statistics
 Pool Name: isp_1
 Pool Name: (all pools in chain)
 Out of Memory: 0
 Out of Addresses: 0
 Address total: 24000
 Addresses in use: 12000
 Addresses excluded: 1000
 Address Usage (percent): 50
 Pool drain configured: yes
```

show network-access aaa statistics dynamic-requests

```
user@host> show network-access aaa statistics dynamic-requests
requests received: 0
processed successfully: 0
errors during processing: 0
silently dropped: 0
```

show network-access aaa statistics radius

```
user@host> show network-access aaa statistics radius
Outstanding Requests
RADIUS Server            Profile        Configured   Current   Peak   Exceeded
198.51.100.239           prof1          1000         0         1000   14
                         prof2          500          17        432    0
198.51.100.211           myprof         200          0         200    27
203.0.113.254            pppoe-auth     111          0         1      0
2001:db8:0:f101::2       xyz-profile11  1000         10        135    0
```

show network-access aaa statistics session-limit-per-username (Users with Blocked Requests)

```
user@host> show network-access aaa statistics session-limit-per-username brief
Username           Access-profile     Blocked requests     Session count
xyz@example.net    BNG1               3                    5
abc@example.net    BNG2               2                    5
```

show network-access aaa statistics session-limit-per-username (All Active Users)

```
user@host> show network-access aaa statistics session-limit-per-username detail
Username           Access-profile     Blocked requests     Session count
rkv@example.net    BNG1               0                    4
xyz@example.net    BNG1               3                    5
abc@example.net    BNG2               2                    5
pqr@example.net    BNG2               0                    1
```

show network-access aaa statistics session-limit-per-username

```
user@host> show network-access aaa statistics on-limit-per-username
Total usernames:  15
Total usernames exceeding session limit: 2
Total blocked requests:  5
```

Release Information

Command introduced in Junos OS Release 9.1.

`address-assignment` option introduced in Junos OS Release 10.0.

`radius` option introduced in Junos OS Release 11.4.

`detail` option introduced in Junos OS Release 13.3.

`session-limit-per-username` option introduced in Junos OS Release 18.4R1 on MX Series routers.

RELATED DOCUMENTATION

Verifying and Managing Subscriber AAA Information

Session Options for Subscriber Access

clear network-access aaa statistics

show network-access aaa statistics authentication

IN THIS SECTION

Syntax

```
show network-access aaa statistics authentication
<detail>
```

Description

Display AAA authentication statistics.

Options

detail (Optional) Displays detailed information about authentication.

Required Privilege Level

view

Output Fields

Table 32 on page 780 lists the output fields for the `show network-access aaa statistics authentication` command. Output fields are listed in the approximate order in which they appear.

Table 32: show network-access aaa statistics authentication Output Fields

Field Name	Field Description	Level of Output
`Requests received`	Number of authentication requests received from clients.	All levels
`Accepts`	Number of authentication requests accepted by the authentication server.	All levels
`Rejects`	Number of authentication requests rejected by the authentication server.	All levels
`Challenges`	Number of authentication requests challenged by the authentication server.	All levels
`Timed out requests`	Number of authentication requests that timed out.	All levels
`RADIUS authentication failures`	Number of RADIUS authentication requests that have failed.	Detail

Table 32: show network-access aaa statistics authentication Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Queue request deleted`	Number of queue requests that have been deleted.	Detail
`Malformed reply`	Number of malformed replies received from the RADIUS authentication server.	Detail
`No server configured`	Number of authentication requests that failed because no authentication server is configured.	Detail
`Access Profile configuration not found`	Number of authentication requests that failed because no access profile is configured.	Detail
`Unable to create client record`	Number of times that the router is unable to create the client record for the authentication request.	Detail
`Unable to create client request`	Number of times that the router is unable to create the client request for the authentication request.	Detail
`Unable to build authentication request`	Number of times that the router is unable to build the authentication request.	Detail
`No server found`	Number of requests to the authentication server that have timed out; the server is then considered to be down.	Detail
`Unable to create handle`	Number of authentication requests that have failed because of an internal allocation failure.	Detail
`Unable to queue request`	Number of times the router was unable to queue the request to the authentication server.	Detail
`Invalid credentials`	Number of times the router did not have proper authorization to access the authentication server.	Detail

Table 32: show network-access aaa statistics authentication Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Malformed request	Number of times the router request to the authentication server is malformed.	Detail
License unavailable	Number of times the router did not have a license to access the authentication server.	Detail
Redirect requested	Number of authentication requests that have been redirected based on routing instance.	Detail
Internal failure	Number of internal failures.	Detail
Local authentication failures	Number of times local authentication failed.	Detail
LDAP lookup failures	Number of times the LDAP lookup operation failed.	Detail

Sample Output

show network-access aaa statistics authentication

```
user@host> show network-access aaa statistics authentication
Authentication module statistics
  Requests received: 2118
    Accepts: 261
  Rejects: 975
  Challenges: 0
  Timed out requests: 882
```

show network-access aaa statistics authentication detail

```
user@host> show network-access aaa statistics authentication detail
Authentication module statistics
  Requests received: 2118
```

```
    Accepts: 261
  Rejects: 975
    RADIUS authentication failures: 975
      Queue request deleted: 0
      Malformed reply: 0
      No server configured: 0
      Access Profile configuration not found: 0
      Unable to create client record: 0
      Unable to create client request: 0
      Unable to build authentication request: 0
      No server found: 975
      Unable to create handle: 0
      Unable to queue request: 0
      Invalid credentials: 0
      Malformed request: 0
      License unavailable: 0
      Redirect requested: 0
      Internal failure: 0
    Local authentication failures: 0
    LDAP lookup failures: 0
  Challenges: 0
  Timed out requests: 882
```

Release Information

Command introduced in Junos OS Release 9.1.

Option `detail` introduced in Junos OS Release 12.1.

RELATED DOCUMENTATION

Verifying and Managing Subscriber AAA Information

show network-access aaa subscribers

IN THIS SECTION

Syntax

```
show network-access aaa subscribers
<logical-system logical-system-name>
<routing-instance routing-instance-name>
<statistics>
<username>
<session-id session-id-number detail>
```

Description

Display subscriber-specific AAA statistics.

Options

logical-system *logical-system-name*	(Optional) List subscribers in the specific logical system.
routing-instance *routing-instance-name*	(Optional) List subscribers for the specific routing instance. If you do not specify a routing instance name, the default routing instance is assumed.
statistics	(Optional) Display statistics for the subscriber events.
username	(Optional) Display information for the specified subscriber.

session-id *session-id-number* **detail**	(Optional) Display information for the specified session ID.

Required Privilege Level

view

Output Fields

Table 33 on page 785 lists the output fields for the `show network-access aaa subscribers` command. Output fields are listed in the approximate order in which they appear.

Table 33: show network-access aaa subscribers Output Fields

Field Name	Field Description
`Challenge requests`	Number of authentication requests challenged by the authentication server for this subscriber.
`Challenge responses`	Number of challenge responses sent by the subscriber to the authentication server.
`START sent successfully`	Number of accounting start requests generated by the AAA framework for this subscriber.
`START send failures`	Number of accounting start requests that failed to make it to the accounting server for this subscriber.
`START ack received`	Number of accounting start requests acknowledged by the accounting server for this subscriber.
`INTERIM sent successfully`	Number of accounting interim requests generated by the AAA framework for this subscriber.
`INTERIM send failures`	Number of accounting interim requests that failed to make it to the accounting server for this subscriber.
`INTERIM ack received`	Number of accounting interim requests acknowledged by the accounting server for this subscriber.

Table 33: show network-access aaa subscribers Output Fields *(Continued)*

Field Name	Field Description
Requests received	Number of reauthentication requests received by the authentication server.
Successful responses	Number of successful reauthentication requests granted by the authentication server.
Aborts handled	Number of reauthentication requests terminated by the authentication server.
Service name	Name of the subscriber service.
Creation requests	Number of requests to create the service.
Deletion requests	Number of requests to delete the service.
Request timeouts	Number of times the service request was timed out.
Client type	Type of client; for example, DHCP, Mobile IP, PPP.
Session-ID	ID of the subscriber session.
Session uptime	How long the session has been up, in *HH:MM:SS.*
Accounting	Status of accounting, and type of accounting if accounting is on.
Stripped username	Username of the subscriber session.
AAA Logical system/ Routing instance	AAA framework for the subscriber of logical system or routing instance.
Target Logical system/Routing instance	Target framework for the subscriber of logical system or routing instance.

Table 33: show network-access aaa subscribers Output Fields *(Continued)*

Field Name	Field Description
Access-profile	Profile of the subscriber.
Accounting Session ID	ID of the subscriber session for accounting.
Multi Accounting Session ID	ID of the subscriber session for multiple accouting.
IP Address	IPv4 address of the subscriber.
IPv6 Address	IPv6 address of the subscriber.
IPv6 Prefix	IPv6 prefix of the subscriber.
Authentication State	State of subscriber session authentication.
Accounting State	State of subscriber session accounting.
Provisioning Type	Type of subscriber provisioning.

Sample Output

show network-access aaa subscribers logical-system

```
user@host> show network-access aaa subscribers logical-system
Username            Client type    Logical system/Routing instance
user61@example.net    ppp            default
00010e020304.1231   dhcp           isp-bos-metro-12:isp-cmbrg-12
user54@example.com     dhcp           default:isp-gtown-r3-00
0020df980102.2334   dhcp           isp-bos-metro-16:isp-cmbrg-12
```

show network-access aaa subscribers logical-system routing-instance

```
user@host> show network-access aaa subscribers logical-system isp-bos-metro-16 routing-instance
isp-cmbrg-12-32
Username            Client type   Logical system/Routing instance
00010e020304.1231   dhcp          isp-bos-metro-12:isp-cmbrg-12
user54@example.com     dhcp          default:isp-gtown-r3-00
0020df980102.2334   dhcp          isp-bos-metro-16:isp-cmbrg-12
```

show network-access aaa subscribers statistics username

```
user@host> show network-access aaa subscribers statistics username 00010e020304.1231
Authentication statistics
   Challenge requests: 0
   Challenge responses: 0
 Accounting statistics
   START sent successfully: 1
   START send failures: 0
   START ack received: 1
   INTERIM sent successfully: 0
   INTERIM send failures: 0
   INTERIM ack received: 0
 Re-authentication statistics
   Requests received: 0
   Sucessfull responses: 0
   Aborts handled: 0
 Service statistics
   Service name: filter-serv
   Creation requests: 1
   Deletion requests: 0
   Request timeouts: 0
   Service name: filter-serv2
   Creation requests: 144
   Deletion requests: 0
   Request timeouts: 144
```

show network-access aaa subscribers username

```
user@host> show network-access aaa subscribers username user80@example.net
Logical system/Routing instance   Client type  Session-ID  Session uptime  Accounting
isp-bos-metro-16:isp-cmbrg-12     dhcp         7           01:12:56        on/volume
Service name       Service type      Quota          Accounting
I-Cast             volume            1200 Mbps      on/volume+time
Voip                                                on/volume
GamingBurst        time              6000 secs      on/volume
```

show network-access aaa subscribers session-id 26 detail

The following command output is seen when only an IPv4 client is associated with the session:

```
user@host> show network-access aaa subscribers session-id 26 detail
Type: dhcp
Stripped username: my-customer
AAA Logical system/Routing instance: default:default
Target Logical system/Routing instance: default:default
Access-profile: AccessProfile
Session ID: 26
Accounting Session ID: 26
Multi Accounting Session ID: 0
IP Address: 10.0.0.2
Authentication State: AuthStateActive
Accounting State: Acc-Interim-Sent
Provisioning Type: None
```

The following command output is seen when IPv6 client logs in (after IPv4 association) and is associated with the same session ID:

```
user@host> show network-access aaa subscribers session-id 26 detail
Type: dhcp
Stripped username: my-customer
AAA Logical system/Routing instance: default:default
Target Logical system/Routing instance: default:default
Access-profile: AccessProfile
Session ID: 26
Accounting Session ID: 26
Multi Accounting Session ID: 0
```

```
IP Address: 10.0.0.2
IPv6 Address: 2001:db8:0:8003::2
IPv6 Prefix: 2001:db8:ffff:0:4::/64
Authentication State: AuthStateActive
Accounting State: Acc-Interim-Sent
Provisioning Type: None
```

show network-access aaa subscribers (Tenant systems)

```
user@host:TSYS1> show network-access aaa subscribers
Username                Logical system/Routing instance   Client type    Session-ID
userX                   default:TSYS1-ri                    xauth          1
```

show network-access aaa subscribers (Tenant systems)

```
user@host> show network-access aaa subscribers session-id 1 detail
Type: xauth
Username: userX
Stripped username: userX
AAA Logical system/Routing instance: default:TSYS1-ri
Target Logical system/Routing instance: default:TSYS1-ri
Access-profile: ap1
+    Tenant: TSYS1
Session ID: 1
Multi Accounting Session ID: 0
IP Address: 192.0.2.0
Authentication State: AuthStateActive
Accounting State: Acc-Init
Converted to time accounting: no
Provisioning Type: None

user@host> show network-access aaa subscribers session-id 2 detail
Type: xauth
Username: userY
Stripped username: userY
AAA Logical system/Routing instance: default:TSYS2-ri
Target Logical system/Routing instance: default:TSYS2-ri
Access-profile: ap1
+    Tenant: TSYS2
Session ID: 2
```

```
Multi Accounting Session ID: 0
IP Address: 192.0.2.1
Authentication State: AuthStateActive
Accounting State: Acc-Init
Converted to time accounting: no
Provisioning Type: None
```

Release Information

Command introduced in Junos OS Release 9.1.

Command updated with `session-id` *`session-id-number`* `detail` in Junos OS Release 17.3.

RELATED DOCUMENTATION

Verifying and Managing Subscriber AAA Information

show network-access address-assignment pool

IN THIS SECTION

Syntax

```
show network-access address-assignment pool pool-name
<logical-system logical-system-name>
<routing-instance routing-instance-name>
```

Description

Display state information for each address-assignment pool.

Options

none	Display information about clients that have obtained addresses from the address-assignment pool.
pool *pool-name*	Display information about the specified address-assignment pool.
logical-system *logical-system-name*	(Optional) Perform this operation on the specified logical system.
routing-instance *routing-instance-name*	(Optional) Perform this operation on the specified routing instance.

Required Privilege Level

view and system

Output Fields

Table 34 on page 792 lists the output fields for the `show network-access address-assignment pool` command. Output fields are listed in the approximate order in which they appear.

Table 34: show network-access address-assignment pool Output Fields

Field Name	Field Description
`IP address/prefix`	IP address of the client.

Table 34: show network-access address-assignment pool Output Fields *(Continued)*

Field Name	Field Description
Hardware address	MAC address of the client. Displays NA for addresses excluded from being allocated from the pool with the excluded-address or excluded-range statements.
Host/User	Hostname or username of the client. Displays EXCLUDED for addresses excluded from being allocated from the pool with the excluded-address or excluded-range statements.
Type	Type of client. Displays unknown for addresses excluded from being allocated from the pool with the excluded-address or excluded-range statements.

Sample Output

show network-access address-assignment pool

```
user@host> show network-access address-assignment pool sunnywest logical-system ls1 routing-
instance routinst2
IP address/prefix       Hardware address      Host/User       Type
192.168.2.1             00:00:5e:00:53:01      user1          DHCP
192.168.2.2             00:00:5e:00:53:02      user2          DHCP
192.168.2.3             00:00:5e:00:53:03      user3          DHCP
192.168.2.4             NA                     EXCLUDED       unknown
```

Release Information

Command introduced in Junos OS Release 9.0.

show ppp interface

IN THIS SECTION

Syntax

```
show ppp interface interface-name
<extensive | terse>
```

Description

Display information about PPP interfaces.

Options

interface-name	Name of a logical interface. Starting in Junos OS Release 17.3, the * (asterisk) wildcard character is supported for the interface name for debugging purpose. With this support, you can match any string of characters in that position in the interface name. For example, so* matches all SONET/SDH interfaces.
extensive | terse	(Optional) Display the specified level of output.

Required Privilege Level

view

Output Fields

Table 35 on page 795 lists the output fields for the `show ppp interface` command. Output fields are listed in the approximate order in which they appear.

Table 35: show ppp interface Output Fields

Field Name	Field Description	Level of Output
`Session`	Name of the logical interface on which the session is running.	All levels
`Type`	Session type: PPP.	All levels
`Phase`	PPP process phase: `Authenticate`, `Pending`, `Establish`, `LCP`, `Network`, `Disabled`, and `Tunneled`.	All levels
`Session flags`	Special conditions present in the session: `Bundled`, `TCC`, `No-keepalives`, `Looped`, `Monitored`, and `NCP-only`.	All levels
`protocol` `State`	Protocol state information. See specific protocol state fields for information.	None specified
`AUTHENTICATION`	Challenge-Handshake Authentication Protocol (CHAP) authentication state information or Password Authentication Protocol (PAP) state information. See the `Authentication` field description for further information.	None specified

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Keepalive settings`	Keepalive settings for the PPP sessions on the L2TP network server (LNS). LNS-based PPP sessions are supported only on service interfaces (si). • `Interval`—Time in seconds between successive keepalive requests. Keepalive aging timeout is calculated as a product of the `interval` and `Down-count` values. If the keepalive aging timeout is greater than 180 seconds, the keepalive packets are handled by the Routing Engine. If the aging timeout is less than or equal to 180 seconds, the packets are handled by the Packet Forwarding Engine. • `Up-count`—The number of keepalive packets a destination must receive to change a link's status from down to up. • `Down-count`—The number of keepalive packets a destination must fail to receive before the network takes down a link.	`extensive`
`Magic-Number validation`	Indicates whether the local peer is configured to ignore mismatches between peer magic numbers when the numbers are validated during PPP keepalive (Echo-Request/Echo-Reply) exchanges. • Enable–Mismatch detection sends failed Echo-Reply packets to the Routing Engine. If a valid magic number is not received within the configurable keepalive interval, PPP treats this as a keepalive failure and tears down the PPP sessions. • Disable–The Packet Forwarding Engine does not perform a validation check for magic numbers received from remote peers. A mismatch cannot be detected, so receipt of its own magic number or an unexpected value does not trigger notification to the Routing Engine.	`extensive`

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
RE Keepalive statistics	Keepalive statistics for the packets handled by the Routing Engine. • LCP echo req Tx—LCP echo requests sent from the Routing Engine. • LCP echo req Rx—LCP echo requests received at the Routing Engine. • LCP echo rep Tx—LCP echo responses sent from the Routing Engine. • LCP echo rep Rx—LCP echo responses received at the Routing Engine. • LCP echo req timeout—Number of keepalive packets where the keepalive aging timer has expired. • LCP Rx echo req Magic Num Failures—LCP echo requests where the magic numbers shared between the PPP peers during LCP negotiation did not match. • LCP Rx echo rep Magic Num Failures—LCP echo responses where the magic numbers shared between the PPP peers during LCP negotiation did not match.	extensive

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output

LCP	LCP information:
	• State—LCP protocol state (all platforms except M120 and M320 routers):
	  • Ack-rcvd—A Configure-Request has been sent and a Configure-Ack has been received.
	  • Ack-sent—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • Closed—Link is not available for traffic.
	  • Opened—Link is administratively available for traffic.
	  • Req-sent—An attempt has been made to configure the connection.
	• State—LCP protocol state (M120 and M320 routers):
	  • Ack-rcvd—A Configure-Request has been sent and a Configure-Ack has been received.
	  • Ack-sent—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • Closed—Link is available (up), but no Open has occurred.
	  • Closing—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	  • Opened—Link is administratively available for traffic. A Configure-Ack has been both sent and received.
	  • Req-sent—An attempt has been made to configure the connection. A Configure-Request has been sent but a Configure-Ack has not yet been received.
	  • Starting—An administrative Open has been initiated, but the lower layer is still unavailable (Down).
	  • Stopped—The system is waiting for a Down event after the This-Layer-Finished action, or after sending a Terminate-Ack.
		extensive

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	• `Stopping`—A Terminate-Request has been sent but a Terminate-Ack has not yet been received. • `Last started`—LCP state start time. • `Last completed`—LCP state completion time. • `Last updated`—Reports the timestamp of the last successful connection update exchange. 1. When LCP negotiation completes, this field has the same value as the `Last completed` field. 2. The field then reports the timestamp of any subsequent successful exchange of Connection-Update-Request and Connection-Update-Ack messages with the peer (such as a home gateway). This field is displayed only when the Connection-Status-Message option is successfully negotiated.	

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output

	• `Negotiated options`:
	  • `ACFC`—Address and-Control Field Compression. A configuration option that provides a method to negotiate the compression of the Data Link Layer Address and Control fields.
	  • `Asynchronous map`—Asynchronous control character map. A configuration option used on asynchronous links such as telephone lines to identify control characters that must be replaced by a two-character sequence to prevent them from being interpreted by equipment used to establish the link.
	  • `Authentication protocol`—Protocol used for authentication. This option provides a method to negotiate the use of a specific protocol for authentication. It requires a peer to authenticate itself before allowing network-layer protocol packets to be exchanged. By default, authentication is not required.
	  • `Authentication algorithm`—Type of authentication algorithm. The Message Digest algorithm (MD5) is the only algorithm supported.
	  • `Connection Update Requests`—Number of connection update requests sent by PPP to the remote peer (such as a home gateway). This value does not include retries.
	  This field is displayed even when negotiation fails for the Connection-Status-Message option. This enables you to confirm that an update request was sent. The absence of the Juniper Connection Status Message field indicates the peer does not support the updates.
	  • `Endpoint discriminator class`—For multilink PPP (MLPPP), a configuration option that identifies the system transmitting the packet. This option advises a system that the peer on this link could be the same as the peer on another existing link.
	  • `Juniper Connection Status Message`—The content of the Connection-Status-Message VSA (26-4874–218) most recently received from RADIUS.	

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	This field is displayed only when the Connection-Status-Message option is successfully negotiated. • `Magic number`—A configuration option that provides a method to detect looped-back links and other data-link layer anomalies. By default, the magic number is not negotiated. • `MRU`—Maximum receive unit. A configuration option that may be sent to inform the peer that the implementation can receive larger packets, or to request that the peer send smaller packets. The default value is 1500 octets. • `MRRU`—For multilink PPP, the maximum receive reconstructed unit. A configuration option that specifies the maximum number of octets in the Information fields of reassembled packets. • `Multilink header suspendable classes`—For MLPPP, an LCP option that advises the peer that the implementation wishes to receive fragments with a format given by the code number, with the maximum number of suspendable classes given. • `Multilink header format classes`—For MLPPP, an LCP option that advises the peer that the implementation wishes to receive fragments with a format given by the code number. • `PFC`—Protocol-Field-Compression. A configuration option that provides a method to negotiate the compression of the PPP Protocol field. • `short sequence`—For MLPPP, an option that advises the peer that the implementation wishes to receive fragments with short, 12-bit sequence numbers.	

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
`Authentication`	CHAP or PAP authentication state information. For CHAP authentication: • `Chap-ans-rcvd`—Packet was sent from the peer, indicating that the peer received the `Chap-resp-sent` packet. • `Chap-ans-sent`—Packet was sent from the authenticator, indicating that the authenticator received the peer's `Chap-resp-rcvd` packet. • `Chap-chal-rcvd`—Challenge packet has been received by the peer. • `Chap-chal-sent`—Challenge packet has been sent by the authenticator to begin the CHAP protocol or has been transmitted at any time during the Network-Layer Protocol (NCP) phase to ensure that the connection has not been altered. • `Chap-resp-rcvd`—CHAP response packet has been received by the authenticator. • `Chap-resp-sent`—CHAP response packet has been sent to the authenticator. • `Closed`—Link is not available for authentication. • `Failure`—Authenticator compares the response value in the response packet from the peer with its own response value, but the value does not match. Authentication fails. • `Success`—Authenticator compares the response value in the response packet from the peer with its own response value, and the value matches. Authentication is successful. For PAP authentication: • `Pap-resp-sent`—PAP response sent to peer (ACK/NACK)t. • `Pap-req-rcvd`—PAP request packet received from peer. • `Pap-resp-rcvd`—PAP response received from the peer (ACK/NACK). • `Pap-req-sent`—PAP request packet sent to the peer. • `Closed`—Link is not available for authentication.	None specified

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	• `Failure`—Authenticator compares the response value in the response packet from the peer with its own response value, but the value does not match. Authentication fails. • `Success`—Authenticator compares the response value in the response packet from the peer with its own response value, and the value matches. Authentication is successful.	

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output

IPCP	Internet Protocol Control Protocol (IPCP) information.
	• State—(All platforms except M120 and M320 routers) One of the following values:
	  • Ack-rcvd—A Configure-Request has been sent and a Configure-Ack has been received.
	  • Ack-sent—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • Closed—Link is not available for traffic.
	  • Opened—Link is administratively available for traffic.
	  • Req-sent—An attempt has been made to configure the connection.
	• State—(M120 and M320 routers) One of the following values:
	  • Ack-rcvd—A Configure-Request has been sent and a Configure-Ack has been received.
	  • Ack-sent—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • Closed—Link is available (up), but no Open has occurred.
	  • Closing—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	  • Opened—Link is administratively available for traffic. A Configure-Ack has been both sent and received.
	  • Req-sent—An attempt has been made to configure the connection. A Configure-Request has been sent but a Configure-Ack has not yet been received.
	  • Starting—An administrative Open has been initiated, but the lower layer is still unavailable (Down).
		extensive

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	• Stopped—The system is waiting for a Down event after the This-Layer-Finished action, or after sending a Terminate-Ack. • Stopping—A Terminate-Request has been sent but a Terminate-Ack has not yet been received. • Last started—IPCP state start time. • Last completed—IPCP state authentication completion time. • Negotiated options: • compression protocol—Negotiate the use of a specific compression protocol. By default, compression is not enabled. • local address—Desired local address of the sender of a Configure-Request. If all four octets are set to zero, the peer provides the IP address. • primary DNS server—Negotiate with the remote peer to select the address of the primary DNS server to be used on the local end of the link. • primary WINS server—Negotiate with the remote peer to select the address of the primary WINS server to be used on the local end of the link. • remote address—IP address of the remote end of the link in dotted quad notation. • secondary DNS server—Negotiate with the remote peer to select the address of the secondary DNS server to be used on the local end of the link. • secondary WINS server—Negotiate with the remote peer to select the address of the secondary WINS server to be used on the local end of the link. • Negotiation mode—PPP Network Control Protocol (NCP) negotiation mode configured for IPCP: Active or Passive	

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output

IPV6CP	Internet Protocol version 6 Control Protocol (IPv6CP) information.
	• State—(All platforms except M120 and M320 routers) One of the following values:
	  • Ack-rcvd—A Configure-Request has been sent and a Configure-Ack has been received.
	  • Ack-sent—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • Closed—Link is not available for traffic.
	  • Opened—Link is administratively available for traffic.
	  • Req-sent—An attempt has been made to configure the connection.
	• State—(M120 and M320 routers) One of the following values:
	  • Ack-rcvd—A Configure-Request has been sent and a Configure-Ack has been received.
	  • Ack-sent—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • Closed—Link is available (up), but no Open has occurred.
	  • Closing—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	  • Opened—Link is administratively available for traffic. A Configure-Ack has been both sent and received.
	  • Req-sent—An attempt has been made to configure the connection. A Configure-Request has been sent but a Configure-Ack has not yet been received.
	  • Starting—An administrative Open has been initiated, but the lower layer is still unavailable (Down).
		extensive

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	• Stopped—The system is waiting for a Down event after the This-Layer-Finished action, or after sending a Terminate-Ack. • Stopping—A Terminate-Request has been sent but a Terminate-Ack has not yet been received. • Last started—IPV6CP state start time. • Last completed—IPV6CP state authentication completion time. • Negotiated options: • local interface identifier—Desired local address of the sender of a Configure-Request. If all four octets are set to zero, the peer provides the IP address. • remote interface identifier—IP address of the remote end of the link in dotted quad notation. • Negotiation mode—PPP Network Control Protocol (NCP) negotiation mode configured for IPv6CP: Active or Passive	
OSINLCP State	OSI Network Layer Control Protocol (OSINLCP) protocol state information (all platforms except M120 and M320 routers): • State: • Ack-rcvd—Configure-Request has been sent and Configure-Ack has been received. • Ack-sent—Configure-Request and Configure-Ack have both been sent, but Configure-Ack has not yet been received. • Closed—Link is not available for traffic. • Opened—Link is administratively available for traffic. • Req-sent—Attempt has been made to configure the connection. • Last started—OSINLCP state start time. • Last completed—OSINCLP state completion time.	extensive

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output

TAGCP	TAGCP information.
	• State—(All platforms except M120 and M320 routers) One of the following values:
	  • Ack-rcvd—A Configure-Request has been sent and a Configure-Ack has been received.
	  • Ack-sent—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • Closed—Link is not available for traffic.
	  • Opened—Link is administratively available for traffic.
	  • Req-sent—An attempt has been made to configure the connection.
	• State—(M120 and M320 routers) One of the following values:
	  • Ack-rcvd—A Configure-Request has been sent and a Configure-Ack has been received.
	  • Ack-sent—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • Closed—Link is available (up), but no Open has occurred.
	  • Closing—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	  • Opened—Link is administratively available for traffic. A Configure-Ack has been both sent and received.
	  • Req-sent—An attempt has been made to configure the connection. A Configure-Request has been sent but a Configure-Ack has not yet been received.
	  • Starting—An administrative Open has been initiated, but the lower layer is still unavailable (Down).
		extensive
		none

Table 35: show ppp interface Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	• Stopped—The system is waiting for a Down event after the This-Layer-Finished action, or after sending a Terminate-Ack. • Stopping—A Terminate-Request has been sent but a Terminate-Ack has not yet been received. • Last started—TAGCP state start time. • Last completed—TAGCP state authentication completion time.	

Sample Output

show ppp interface

```
user@host> show ppp interface si-1/3/0.0
Session si-1/3/0.0, Type: PPP, Phase: Authenticate
  Session flags: Monitored
    LCP State: Opened
    AUTHENTICATION: CHAP State: Chap-resp-sent, Chap-ans-sent
    IPCP State: Closed, OSINLCP State: Closed
```

show ppp interface extensive (LCP Connection Update Negotiation Successful)

```
user@host> show ppp interface extensive pp0.3221225489
  Session pp0.3221225489, Type: PPP, Phase: Network
   Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
               Magic-Number validation: enable
    LCP
      State: Opened
      Last started: 2020-02-11 15:06:00 PDT
      Last completed: 2020-02-11 15:06:00 PDT
      Last updated: 2020-02-11 15:06:10 PDT
      Negotiated options:
        Magic number: 906403799, Initial Advertised MRU: 1492, Local MRU: 1492, Peer MRU: 149
        Juniper Connection Status Message: 10m:xxxx
```

```
        Connection-Update-Requests: 1
     Authentication: Off
    IPCP
      State: Opened
      Last started: 2020-02-11 15:06:00 PDT
      Last completed: 2020-02-11 15:06:00 PDT
      Negotiated options:
        Local address: 198.51.100.30, Remote address: 203.0.113.9
      Negotiation mode: Passive
    IPV6CP
      State: Opened
      Last started: 2020-02-11 15:06:00 PDT
      Last completed: 2020-02-11 15:06:00 PDT
      Negotiated options:
        Local interface identifier: 2001:db8::fc73:cba, Remote interface identifier: 2001:db8::3a
      Negotiation mode: Passive
```

show ppp interface extensive (LCP Connection Update Negotiation Failed)

```
user@host> show ppp interface extensive pp0.3221225489
  Session pp0.3221225489, Type: PPP, Phase: Network
   Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
               Magic-Number validation: enable
    LCP
      State: Opened
      Last started: 2020-02-11 15:06:00 PDT
      Last completed: 2020-02-11 15:06:00 PDT
      Negotiated options:
        Magic number: 906403799, Initial Advertised MRU: 1492, Local MRU: 1492, Peer MRU: 149
        Connection-Update-Requests: 1
     Authentication: Off
    IPCP
      State: Opened
      Last started: 2020-02-11 15:06:00 PDT
      Last completed: 2020-02-11 15:06:00 PDT
      Negotiated options:
        Local address: 198.51.100.30, Remote address: 203.0.113.9
      Negotiation mode: Passive
    IPV6CP
      State: Opened
      Last started: 2020-02-11 15:06:00 PDT
```

```
      Last completed: 2020-02-11 15:06:00 PDT
      Negotiated options:
        Local interface identifier: 2001:db8::fc73:cba, Remote interface identifier: 2001:db8::3a
      Negotiation mode: Passive
```

show ppp interface extensive (Inline Service Interface)

```
user@host> show ppp interface si-0/0/3.0 extensive
Session si-0/0/3.0, Type: PPP, Phase: Network
Keepalive settings: Interval 30 seconds, Up-count 1, Down-count 3
                    Magic-Number validation: disable
RE Keepalive statistics:
        LCP echo req Tx        :  657 (last sent 00:50:10 ago)
        LCP echo req Rx        :    0 (last seen: never)
        LCP echo rep Tx        :    0
        LCP echo rep Rx        :  657
        LCP echo req timout    :    0
        LCP Rx echo req Magic Num Failures :    0
        LCP Rx echo rep Magic Num Failures :    0
LCP
  State: Opened
  Last started: 2007-01-29 10:43:50 PST
  Last completed: 2007-01-29 10:43:50 PST
  Negotiated options:
    Authentication protocol: PAP, Magic number: 2341124815, MRU: 4470
Authentication: PAP
  State: Success
  Last started: 2007-01-29 10:43:50 PST
  Last completed: 2007-01-29 10:43:50 PST
IPCP
  State: Opened
  Last started: 2007-01-29 10:43:50 PST
  Last completed: 2007-01-29 10:43:50 PST
  Negotiated options:
    Local address: 203.0.113.21, Remote address: 203.0.113.22
  Negotiation mode: Active
IPV6CP
  State: Opened
  Last started: 2007-01-29 10:43:50 PST
  Last completed: 2007-01-29 10:43:50 PST
  Negotiated options:
```

```
    Local interface identifier: 2a0:a522:64:d319, Remote interface identifier: 0:0:0:c
  Negotiation mode: Passive
```

show ppp interface terse

```
user@host> show ppp interface si-1/3/0 terse
Session name    Session type   Session phase      Session flags
si-1/3/0.0      PPP            Authenticate       Monitored
```

Release Information

Command introduced in Junos OS Release 7.5.

show subscribers

IN THIS SECTION

Syntax

```
show subscribers
<detail | extensive | terse>
<aci-interface-set-name aci-interface-set-name>
<address address>
```

```
<agent-circuit-identifier agent-circuit-identifier>
<agent-remote-identifier agent-remote-identifier>
<aggregation-interface-set-name interface-set-name>
<client-type client-type>
<count>
<id session-id <accounting-statistics>>
<interface interface <accounting-statistics>>
<logical-system logical-system>
<mac-address mac-address>
<physical-interface physical-interface-name>
<profile-name profile-name>
<routing-instance routing-instance>
<stacked-vlan-id stacked-vlan-id>
<sub-system (agf | bng)>
<subscriber-state subscriber-state>
<user-name user-name>
<vci vci-identifier>
<vpi vpi-identifier>
<vlan-id vlan-id>
```

Description

Display information for active subscribers on both the broadband network gateway (BNG) and Access Gateway Function (AGF) subsystems. When you have subscribers logged in to both the BNG and the AGF, you can use the `sub-system` option to view the outputs specific to either subsytem.

See "Sample Output for AGF" on page 864 for subscriber session information about the AGF subsystem.

Options

detail | extensive | terse	(Optional) Display the specified level of output.
aci-interface-set-name	(Optional) Display all the dynamic subscriber sessions that use the specified agent circuit identifier (ACI) interface set. You must use the ACI interface set name generated by the router, such as aci-1003-ge-1/0/0.4001, and not the actual ACI value found in the Dynamic Host Configuration Protocol (DHCP) or Point-to-Point Protocol over Ethernet (PPPoE) control packets.
address	(Optional) Display subscribers whose IP address matches the specified address. You must specify the IPv4 or IPv6 address prefix without a netmask (for example,

192.0.2.0). If you specify the IP address as a prefix with a netmask (for example, 192.0.2.0/32), the router displays a message that the IP address is invalid and rejects the command.

agent-circuit-identifier

(Optional) Display all the dynamic subscriber sessions whose ACI value matches the specified string. You can specify either the complete ACI string or a substring. To specify a substring, you must enter characters that form the beginning of the string, followed by an asterisk (*) as a wildcard to substitute for the remainder of the string. The wildcard can be used only at the end of the specified substring; for example:

```
user@host1> show subscribers agent-circuit-identifier substring*
```

The table below lists supported string values for different Junos OS releases.

Table 36: Supported Substring

Junos OS Release	Substring Support
Junos OS Release 13.3R1	You can specify a substring without a wildcard.
Starting in Junos OS Release 14.1R1	You must specify the complete ACI string; you cannot specify a wildcard.
Starting in Junos OS Releases 15.1R7, 16.1R7, 16.2R3, 17.1R3, 17.2R3, 17.3R3, 17.4R2, 18.1R2, 18.2R1	You can specify a substring, but you must include the wildcard character at the end of the substring.

agent-remote-identifier

(Optional) Display all the dynamic subscriber sessions whose agent remote identifier (ARI) value matches the specified string. You must specify the complete ACI string; you cannot specify a wildcard.

aggregation-interface-set-name *interface-set-name*

(Optional) Display summary information for the specified aggregation node interface set, including interface, VLAN ID, username, and logical system and routing instance (LS:RI).

client-type

(Optional) Display subscribers whose client type matches one of the following client types:

- dhcp—Dynamic Host Configuration Protocol (DHCP) clients only.

- `dotlx`—802.1X clients only.
- `essm`—Extensible Subscribers Services Manager (ESSM) clients only.
- `fixed-wireless-access`—Fixed wireless access clients only.
- `fwauth`—FwAuth (authenticated across a firewall) clients only.
- `l2tp`—Layer 2 Tunneling Protocol (L2TP) clients only.
- `mlppp`—Multilink Point-to-Point Protocol (MLPPP) clients only.
- `ppp`—Point-to-Point Protocol (PPP) clients only.
- `pppoe`—Point-to-Point Protocol over Ethernet (PPPoE) clients only.
- `static`—Static clients only.
- `vlan`—VLAN clients only.
- `vlan-oob`—VLAN out-of-band (triggered by by Access Node Control Protocol or ANCP) clients only.
- `vpls-pw`—Virtual private LAN service (VPLS) pseudowire clients only.
- `xauth`—Extended Authentication (XAuth) clients only.

count (Optional) Display the count of the total subscribers and active subscribers for any specified option. You can use the `count` option alone or in combination with one or more of the following options:

- `address`
- `client-type`
- `interface`
- `logical-system`
- `mac-address`
- `profile-name`
- `routing-instance`
- `stacked-vlan-id`
- `subscriber-state`

- `vlan-id`

id *session-id* (Optional) Display a specific subscriber session whose session ID matches the specified subscriber ID. You can display the subscriber IDs by using the `show subscribers extensive` command or the `show subscribers interface extensive` command.

id *session-id* accounting-statistics (Optional) Display accurate subscriber accounting statistics for a subscriber session based on the session ID you specify. You must configure the `actual-transmit-statistics` statement in the dynamic profile for the dynamic logical interface. If you do not configure statement, the CLI displays a value of 0 for the accounting statistics.

interface (Optional) Display subscribers whose interface matches the specified interface.

***interface* accounting-statistics** (Optional) Display subscriber accounting statistics for the specified interface. If you do not configure statement, the CLI displays a value of 0 for the accounting statistics.

logical-system (Optional) Display subscribers whose logical system matches the specified logical system.

mac-address (Optional) Display subscribers whose MAC address matches the specified MAC address.

physical-interface-name (M120, M320, and MX Series routers only) (Optional) Display subscribers whose physical interface matches the specified physical interface.

profile-name (Optional) Display subscribers whose dynamic profile matches the specified profile name.

routing-instance (Optional) Display subscribers whose routing instance matches the specified routing instance.

stacked-vlan-id (Optional) Display subscribers whose stacked VLAN ID matches the specified stacked VLAN ID.

subsystem (agf | bng) (Optional) Display information for subscribers on the AGF or BNG subsystem.

> **NOTE**: The subsystem option is only available when both the AGF and BNG subscribers are logged into the router at the same time.

subscriber-state (Optional) Display subscribers whose subscriber state matches the specified subscriber state (ACTIVE, CONFIGURED, INIT, TERMINATED, or TERMINATING).

user-name (M120, M320, and MX Series routers only) (Optional) Display subscriber whose username matches the specified subscriber name.

vci-identifier (MX Series routers with MPCs and ATM MICs with SFP only) (Optional) Display active Asynchronous Transfer Mode (ATM) subscribers whose ATM virtual circuit identifier (VCI) matches the specified VCI identifier. The range of values is 0 through 255.

vpi-identifier (MX Series routers with MPCs and ATM MICs with SFP only) (Optional) Display active ATM subscribers whose ATM virtual path identifier (VPI) matches the specified VPI identifier. The range of values is 0 through 65,535.

vlan-id (Optional) Display subscribers whose VLAN ID matches the specified VLAN ID, regardless of whether the subscriber uses a single-tagged or double-tagged VLAN. Among the subscribers using a double-tagged VLAN, this option displays subscribers where the inner VLAN tag matches the specified VLAN ID. To see the subscribers (among subscribers using a double-tagged VLAN) whose outer VLAN tag matches the specified value, you can use the `stacked-vlan-id` *`stacked-vlan-id`* option to match the outer VLAN tag.

NOTE: Because of display limitation, the logical system and routing instance output values are truncated when necessary.

Required Privilege Level

view

Output Fields

Table 37 on page 818 lists the output fields for the `show subscribers` command. Output fields are listed in the approximate order in which they appear.

Table 37: show subscribers Output Fields

Field Name	Field Description
`Interface`	Interface associated with the subscriber. The router or the switch displays the subscribers whose interface matches or begins with the specified interface. The asterisk (*) indicates a continuation of addresses for the same session.
`IP Address/VLAN ID`	Subscriber IP address or VLAN ID associated with the subscriber in the form *tpid.vlan-id* No IP address or VLAN ID is assigned to an L2TP tunnel-switched session. For these subscriber sessions, the value is `Tunnel-switched`.
`User Name`	Name of subscriber.
`LS:RI`	Logical system and routing instance associated with the subscriber.
`Type`	Subscriber client type (DHCP, FWA, GRE, L2TP, PPP, PPPoE, STATIC-INTERFACE, VLAN).
`IP Address`	Subscriber IPv4 address.
`IP Netmask`	Subscriber IP netmask. (MX Series) This field displays 255.255.255.255 by default. For tunneled or terminated PPP subscribers only, this field displays the actual value of Framed-IP-Netmask when the SDB_FRAMED_PROTOCOL attribute in the session database is equal to AUTHD_FRAMED_PROTOCOL_PPP. This occurs in the use case where the L2TP network server (LNS) generates access-internal routes when it receives Framed-IP-Netmask from RADIUS during authorization. When it receives Framed-Pool from RADIUS, the pool mask is ignored and the default /32 mask is used.
`Primary DNS Address`	IP address of the primary Domain Name System (DNS) server. This field is displayed with the `extensive` option only when the address is provided by RADIUS.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
`Secondary DNS Address`	IP address of the secondary DNS server. This field is displayed with the `extensive` option only when the address is provided by RADIUS.
`IPv6 Primary DNS Address`	IPv6 address of the primary DNS server. This field is displayed with the `extensive` option only when the address is provided by RADIUS.
`IPv6 Secondary DNS Address`	IPv6 address of the secondary DNS server. This field is displayed with the `extensive` option only when the address is provided by RADIUS.
`Domain name server inet`	IP addresses for the DNS server, displayed in order of configuration. This field is displayed with the `extensive` option only when the addresses are derived from the access profile or the global access configuration.
`Domain name server inet6`	IPv6 addresses for the DNS server, displayed in order of configuration. This field is displayed with the `extensive` option only when the addresses are derived from the access profile or the global access configuration.
`Primary WINS Address`	IP address of the primary Windows Internet Name Service (WINS) server.
`Secondary WINS Address`	IP address of the secondary WINS server.
`IPv6 Address`	Subscriber IPv6 address, or multiple addresses.
`IPv6 Prefix`	Subscriber IPv6 prefix. If you are using DHCPv6 prefix delegation, this is the delegated prefix.
`IPv6 User Prefix`	IPv6 prefix obtained through Neighbor Discovery Router Advertisement (NDRA).

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
`IPv6 Address Pool`	Subscriber IPv6 address pool. The IPv6 address pool is used to allocate IPv6 prefixes to the DHCPv6 clients.
`IPv6 Network Prefix Length`	Length of the network portion of the IPv6 address.
`IPv6 Prefix Length`	Length of the subscriber IPv6 prefix.
`Logical System`	Logical system associated with the subscriber.
`Routing Instance`	Routing instance associated with the subscriber.
`Interface`	(Enhanced subscriber management for the MX Series routers) Name of the enhanced subscriber management logical interface, in the form `demux0.`*nnnn* (for example, `demux0.3221225472`), to which access-internal and framed subscriber routes are mapped.
`Interface Type`	Subscriber interface (`Static` or `Dynamic`)

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
`Interface Set`	Internally generated name of the dynamic agent circuit identifier (ACI) or ATM line interface (ALI) interface set used by the subscriber session. The prefix of the name indicates the string received in DHCP or PPPoE control packets on which the interface set is based. For ALI interface sets, the prefix indicates that the value is configured as a trusted option to identify the subscriber line. The name of the interface set uses one of the following prefixes: • `aci`—ACI; for example, aci-1033-demux0.3221225524. This is the only prefix allowed for ACI interface sets. • `ari`—ARI or agent remote identifier; for example, ari-1033-demux0.3221225524. • `aci+ari`—Both the ACI and the ARI; for example, aci+ari-1033-demux0.3221225524. • `noids`—Neither the ACI nor the ARI were received; for example, noids-1033-demux0.3221225524. **NOTE**: ACI interface sets are configured with the `agent-circuit-identifier` autoconfiguration stanza. ALI interface sets are configured with the `line-identity` autoconfiguration stanza. Besides dynamic ACI and ALI interface sets, this field can be an interface set based on a substring of the ARI string. This occurs when the dynamic profile includes the predefined variable *$junos-pon-id-interface-set-name*, and the profile is applied for a passive optical network (PON). The ARI string is inserted by the optical line terminal (OLT). The final substring in the string, unique for the PON, identifies individual subscriber circuits, and is used as the name of the interface set.
`Interface Set Type`	Interface type of the ACI interface set: `Dynamic`. This is the only ACI interface set type currently supported.
`Interface Set Session ID`	Identifier of the dynamic ACI interface set entry in the session database.
`Underlying Interface`	Name of the underlying interface for the subscriber session.
`Dynamic Profile Name`	Dynamic profile used for the subscriber.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
`Dynamic Profile Version`	Version number of the dynamic profile used for the subscriber.
`MAC Address`	MAC address associated with the subscriber.
`State`	Current state of the subscriber session (`Init`, `Configured`, `Active`, `Terminating`, or `Tunneled`).
`L2TP State`	Current state of the L2TP session (`Tunneled` or `Tunnel-switched`). When the value is `Tunnel-switched`, two entries are displayed for the subscriber; the first entry is at the L2TP network server (LNS) interface on the L2TP tunnel switch (LTS) and the second entry is at the L2TP access concentrator (LAC) interface on the LTS.
`Tunnel switch Profile Name`	Name of the L2TP tunnel switch profile that initiates tunnel switching.
`Local IP Address`	IP address of the local gateway (LAC).
`Remote IP Address`	IP address of the remote peer (LNS).
`PFE Flow ID`	Forwarding flow identifier.
`VLAN Id`	VLAN ID associated with the subscriber in the form *tpid.vlan-id*.
`Stacked VLAN Id`	Stacked VLAN ID associated with the subscriber in the form *tpid.vlan-id*.
`RADIUS Accounting ID`	RADIUS accounting ID associated with the subscriber.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
Agent Circuit ID	For the dhcp client type, option 82 agent circuit ID associated with the subscriber. The ID is displayed as an ASCII string unless the value has nonprintable characters, in which case it is displayed in the hexadecimal format. For the vlan-oob client type, the agent circuit ID or access-loop circuit identifier that identifies the subscriber line based on the subscriber-facing DSL access multiplexer (DSLAM) interface on which the subscriber request originates.
Agent Remote ID	For the dhcp client type, option 82 agent remote ID associated with the subscriber. The ID is displayed as an ASCII string unless the value has nonprintable characters, in which case it is displayed in hexadecimal format. For the vlan-oob client type, the agent remote ID or access-loop remote identifier that identifies the subscriber line based on the network access server (NAS)-facing DSLAM interface on which the subscriber request originates.
Aggregation Interface-set Name	Value of the $junos-aggregation-interface-set-name predefined variable. The value is determined based on the following factors:; • When the hierarchical-access-network-detection option is configured for the access lines and the value of the Access-Aggregation-Circuit-ID-ASCII attribute (TLV 0x0003) received either in the Access Node Control Protocol (ANCP) Port Up message or PPPoE Active Discover Request (PADR) IA tags begins with a # character, then the variable takes the value of the remainder of the string after the # character. • When the hierarchical-access-network-detection option is not configured, or if the sting does not begin with the # character, then the variable takes the value specified with the predefined-variable-defaults statement.
Accounting Statistics	Actual transmitted subscriber accounting statistics by the session ID or the interface. Service accounting statistics are not included. These statistics do not include overhead bytes or dropped packets; they are the accurate statistics used by RADIUS. The statistics are counted when the actual-transmit-statistics statement is included in the dynamic profile.
DHCP Relay IP Address	IP address used by the DHCP relay agent.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
ATM VPI	(MX Series routers with MPCs and ATM MICs with SFP only) ATM virtual path identifier (VPI) on the subscriber's physical interface.
ATM VCI	(MX Series routers with MPCs and ATM MICs with SFP only) ATM virtual circuit identifier (VCI) for each VPI configured on the subscriber interface.
Login Time	Date and time at which the subscriber logged in.
DHCPV6 Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for the DHCPv6 options.
Server DHCP Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for the DHCP options.
Server DHCPV6 Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for the DHCPv6 options.
DHCPV6 Header	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for the DHCPv6 options.
Effective shaping-rate	Actual downstream traffic shaping rate for the subscriber in kilobits per second.
IPv4 Input Service Set	Input service set in access dynamic profile.
IPv4 Output Service Set	Output service set in access dynamic profile.
PCEF Profile	Policy and charging enforcement function (PCEF) profile in access dynamic profile.
PCEF Rule/Rulebase	PCC rule or rulebase used in dynamic profile.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
Dynamic configuration	Values for variables that are passed into the dynamic profile from RADIUS.
Service activation time	Time at which the first family in this service became active.
IPv4 rpf-check Fail Filter Name	Name of the filter applied by the dynamic profile to the IPv4 packets that fail the reverse-path-forwarding (RPF) check.
IPv6 rpf-check Fail Filter Name	Name of the filter applied by the dynamic profile to the IPv6 packets that fail the RPF check.
DHCP Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for the DHCP options, as defined in RFC 2132.
Session ID	ID number for a subscriber session.
Underlying Session ID	Session ID of the underlying PPPoE interface for the DHCPv6 subscribers on a PPPoE network.
Service Sessions	Number of service sessions (that is, a service activated using RADIUS Change of Authorization or CoA) associated with the subscribers.
Service Session ID	ID number for a subscriber service session.
Service Session Name	Service session profile name.
Session Timeout (seconds)	Number of seconds of access provided to the subscriber before the session is automatically terminated.
Idle Timeout (seconds)	Number of seconds for which the subscriber can be idle before the session is automatically terminated.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
IPv6 Delegated Address Pool	Name of the pool used for DHCPv6 prefix delegation.
IPv6 Delegated Network Prefix Length	Length of the prefix configured for the IPv6 delegated address pool.
IPv6 Interface Address	Address assigned by the Framed-Ipv6-Prefix AAA attribute. This field is displayed only when the predefined variable $junos-ipv6-address is used in the dynamic profile.
IPv6 Framed Interface Id	Interface ID assigned by the Framed-Interface-Id AAA attribute.
ADF IPv4 Input Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv4 input filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv4 Output Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv4 output filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv6 Input Filter Name	Name assigned to the ADF interface IPv6 input filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv6 Output Filter Name	Name assigned to the ADF interface IPv6 output filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
IPv4 Input Filter Name	Name assigned to the IPv4 input filter (client or service session).
IPv4 Output Filter Name	Name assigned to the IPv4 output filter (client or service session).

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
IPv6 Input Filter Name	Name assigned to the IPv6 input filter (client or service session).
IPv6 Output Filter Name	Name assigned to the IPv6 output filter (client or service session).
IFL Input Filter Name	Name assigned to the logical interface input filter (client or service session).
IFL Output Filter Name	Name assigned to the logical interface output filter (client or service session).
DSL type	PPPoE subscriber's access line type reported by the PPPoE intermediate agent in a PPPoE Active Discovery Initiation (PADI) or PPPoE Active Discovery Offer(PADO) packet in the Vendor-Specific-Tags TLV in subattribute DSL-Type (0x0091). The DSL can be one of the following types: ADSL, ADSL2, ADSL2+, OTHER, SDSL, VDSL, or VDSL2.
Frame/Cell Mode	Mode type of the PPPoE subscriber's access line determined by the PPPoE daemon based on the received subattribute DSL-Type (0x0091): • Cell—When the DSL line type is one of the following: asymmetric digital subscriber line (ADSL), asymmetric digital subscriber line 2 (ADSL2), or asymmetric digital subscriber line 2 plus (ADSL2+). • Frame—When the DSL line type is one of the following: OTHER, SDSL, VDSL, or VDSL2. The value is stored in the subscriber session database.
Overhead accounting bytes	Number of bytes added to or subtracted from the actual downstream cell or frame overhead to account for the technology overhead of the DSL line type. The value is determined by the PPPoE daemon based on the received subattribute DSL-Type (0x0091). The value is stored in the subscriber session database.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
`Actual upstream data rate`	Unadjusted upstream data rate for the PPPoE subscriber's access line reported by the PPPoE intermediate agent in a PADI or PADO packet in the Vendor-Specific-Tags TLV in subattribute Actual-Net-Data-Rate-Upstream (0x0081).
`Actual downstream data rate`	Unadjusted downstream data rate for the PPPoE subscriber's access line reported by the PPPoE intermediate agent in a PADI or PADO packet in the Vendor-Specific-Tags TLV in subattribute Actual-Net-Data-Rate-Downstream (0x0082).
`Adjusted downstream data rate`	Adjusted downstream data rate for the PPPoE subscriber's access line, calculated by the PPPoE daemon and stored in the subscriber session database.
`Adjusted upstream data rate`	Adjusted upstream data rate for the PPPoE subscriber's access line, calculated by the PPPoE daemon and stored in the subscriber session database. **NOTE**: This output field is only available on Junos Release 19.1R1 or earlier versions.
`AGF Mode`	Type of access. Adaptive mode indicates an FN-RG.
`Local TEID-U`	Tunnel endpoint identifier (TEID) on the BNG for the GPRS Tunnelling Protocol User Plane (GTP-U) tunnel to the evolved node B (eNodeB). The identifier is allocated by the BNG. A fully qualified local TEID-C consists of this identifier and the `GTPU Tunnel Local IP address` value.
`Local TEID-C`	Tunnel endpoint identifier on the BNG for the GTP-C control plane tunnel to the Mobility management Entity (MME). The identifier is allocated by the BNG. A fully qualified local TEID-C consists of this identifier and the `GTPC Local IP address` value.
`Remote TEID-U`	Tunnel endpoint identifier on the eNodeB for the GTP-U user plane tunnel to the BNG. The identifier is allocated by the eNodeB. A fully qualified remote TEID-U consists of this identifier and the `GTPU Tunnel Remote IP address` value.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
`Remote TEID-C`	Tunnel endpoint identifier on the MME for the GPRS tunneling protocol, control (GTP-C) plane tunnel to the BNG. The identifier is allocated by the MME. A fully qualified remote TEID-C consists of this identifier and the `GTPC Remote IP address` value.
`GTPU Tunnel Remote IP address`	IP address of the S1-U interface on the eNodeB for the GPRS tunneling protocol, user plane (GTP-U) tunnel endpoint. A fully qualified remote TEID-U consists of this address and the `Remote TEID-U` value.
`GTPU Tunnel Local IP address`	IP address of the S1-U interface on the BNG for the GTP-U tunnel endpoint. A fully qualified local TEID-U consists of this address and the `Local TEID-U` value
`GTPC Remote IP address`	IP address of the S11 interface on the MME for the GTP-C tunnel endpoint. A fully qualified remote TEID-C consists of this address and the `Remote TEID-C` value.
`GTPC Local IP address`	IP address of the S11 interface on the BNG for the GTP-C tunnel endpoint. A fully qualified local TEID-C consists of this address and the `Local TEID-C` value.
`Access Point Name`	Access point name (APN) for the user equipment. The APN corresponds to the connection and service parameters that the subscriber's mobile device can use for connecting to the carrier's gateway to the Internet.
`Tenant`	Name of the tenant system. You can create multiple tenant system administrators for a tenant system and assign the administrators different permission levels based on your requirements.
`Routing instance`	Name of the routing instance. When a custom routing instance is created for a tenant system, all the interfaces defined in that tenant system are added to that routing instance.

Table 37: show subscribers Output Fields *(Continued)*

Field Name	Field Description
Dynamic Profile Version Alias	Configured name for a specific variation of a base dynamic profile. The presence of this name presence indicates that the profile configuration is different from that of the base profile. The value is conveyed to the RADIUS server during authentication in the Client-Profile-Name VSA (26–4874–174).

Sample Output

show subscribers (IPv4)

```
user@host> show subscribers
Interface               IP Address/VLAN ID   User Name         LS:RI
ge-1/3/0.1073741824     10                                     default:default
demux0.1073741824       203.0.113.10        WHOLESALER-CLIENT default:default
demux0.1073741825       203.0.113.3         RETAILER1-CLIENT  test1:retailer1
demux0.1073741826       203.0.113.3         RETAILER2-CLIENT  test1:retailer2
```

show subscribers (IPv6)

```
user@host> show subscribers
Interface          IP Address/VLAN ID   User Name           LS:RI
ge-1/0/0.0         2001:db8:c0:0:0:0/74    WHOLESALER-CLIENT   default:default
     *             2001:db8:1/128          subscriber-25       default:default
```

show subscribers (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers
Interface           IP Address/VLAN ID         User Name                      LS:RI
demux0.1073741834   0x8100.1002 0x8100.1                                  default:default
demux0.1073741835   0x8100.1001 0x8100.1                                  default:default
pp0.1073741836      203.0.113.13            dualstackuser1@example1.com     default:ASP-1
*                   2001:db8:1::/48
*                   2001:db8:1:1::/64
pp0.1073741837      203.0.113.33            dualstackuser2@example1.com     default:ASP-1
```

```
*                   2001:db8:1:2:5::/64
```

show subscribers (Single Session DHCP Dual Stack)

```
user@host> show subscribers

Interface           IP Address/VLAN ID        User Name               LS:RI
demux0.1073741364   192.168.10.10             dual-stack-retail35     default:default
                    2001:db8::100:0:0:0/74                            default:default
                    2001:db8:3ffe:0:4::/64
```

show subscribers (Single Session DHCP Dual Stack detail)

```
user@host> show subscribers id 27 detail
Type: DHCP
User Name: dual-stack-retail33
IP Address: 10.10.0.53
IPv6 Address: 2001:db8:3000:0:0:8003::2
IPv6 Prefix: 2001:db8:3ffe:0:4::/64
Logical System: default
Routing Instance: default
Interface: ae0.3221225472
Interface type: Static
Underlying Interface: ae0.3221225472
Dynamic Profile Name: dhcp-retail-18
MAC Address: 00:00:5E:00:53:02
State: Active
DHCP Relay IP Address: 10.10.0.1
Radius Accounting ID: 27
Session ID: 27
PFE Flow ID: 2
Stacked VLAN Id: 2000
VLAN Id: 1
Login Time: 2014-05-15 10:12:10 PDT
DHCP Options: len 60
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 00 64 01 01 02
00 06 00 04 00 03 00 19 00 03 00 0c 00 00 00 00 00 00 00 00
00 00 00 00 00 19 00 0c 00 00 00 00 00 00 00 00 00 00 00 00
```

show subscribers (LNS on MX Series Routers)

```
user@host> show subscribers
Interface          IP Address/VLAN ID   User Name         LS:RI
si-4/0/0.1         192.0.2.0          user@example.com   default:default
```

show subscribers (L2TP Switched Tunnels)

```
user@host> show subscribers
Interface           IP Address/VLAN ID    User Name              LS:RI
si-2/1/0.1073741842 Tunnel-switched       user@example.com        default:default
si-2/1/0.1073741843 Tunnel-switched       user@example.com        default:default
```

show subscribers aggregation-interface-set-name

```
user@host> show subscribers aggregation-interface-set-name FRA*

Interface              IP Address/VLAN ID              User Name                 LS:RI
ge-1/0/0.3221225472    50                                ancp                      default:isp1-
subscriber
```

show subscribers client-type dhcp detail

```
user@host> show subscribers client-type dhcp detail
Type: DHCP
IP Address: 203.0.113.29
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux
MAC Address: 00:00:5e:00:53:98
State: Active
Radius Accounting ID: user :2304
Login Time: 2009-08-25 14:43:52 PDT
```

```
Type: DHCP
IP Address: 203.0.113.27
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744383
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:f3
State: Active
Radius Accounting ID: 1234 :2560
Login Time: 2009-08-25 14:43:56 PDT
```

show subscribers client-type dhcp detail (DHCPv6)

```
user@host> show subscribers client-type dhcp detail
Type: DHCP
User Name: DEFAULTUSER
IPv6 Address: 2001:db8::2
IPv6 Prefix: 2001:db8:1::/64
Logical System: default
Routing Instance: default
Interface: demux0.3221225602
Interface type: Static
Underlying Interface: demux0.3221225602
Dynamic Profile Name: client-profile
MAC Address: 00:00:5E:00:53:01
State: Active
Radius Accounting ID: 142
Session ID: 142
PFE Flow ID: 148
Stacked VLAN Id: 1
VLAN Id: 1
Login Time: 2018-03-29 12:27:38 EDT
DHCP Options: len 56
00 08 00 02 00 00 00 01 00 0e 00 01 00 01 22 4f d0 33 00 11
01 00 00 01 00 03 00 0c 00 00 00 0a 00 04 9d 40 00 07 62 00
00 19 00 0c 00 00 00 0b 00 04 9d 40 00 07 62 00
Server DHCPV6 Options: len 94
00 0a 00 06 11 22 33 44 55 66 00 11 00 09 00 00 0c 4c 00 02
```

```
00 01 aa 00 11 00 20 00 00 0a 4c 00 02 00 02 32 33 00 03 00
03 34 35 36 00 05 00 06 31 32 33 34 35 36 00 06 00 01 31 00
11 00 09 00 00 0b 4c 00 02 00 01 bb 00 11 00 12 00 00 0d e9
00 01 00 03 aa bb cc 00 02 00 03 dd ee cc
DHCPV6 Header: len 4
01 fc e4 96
```

show subscribers client-type dhcp extensive

```
user@host> show subscribers client-type dhcp extensive
Type: DHCP
User Name: user
IP Address: 192.0.2.4
IP Netmask: 255.0.0.0
IPv6 Address: 2001:db8:3::103
IPv6 Prefix: 2001:db8::/68
Domain name server inet6: 2001:db8:1 abcd::2
Logical System: default
Routing Instance: default
Interface: ge-0/0/0.0
Interface type: Static
Underlying Interface: ge-0/0/0.0
MAC Address: 00:00:5e:00:53:01
State: Configured
Radius Accounting ID: 10
Session ID: 10
PFE Flow ID: 2
VLAN Id: 100
Agent Circuit ID: ge-0/0/0:100
Agent Remote ID: ge-0/0/0:100
Login Time: 2017-05-23 12:52:22 IST
DHCPV6 Options: len 69
00 01 00 0e 00 01 00 01 59 23 e3 31 00 10 94 00 00 01 00 08
00 02 00 00 00 19 00 29 00 00 00 00 00 04 9d 40 00 07 62 00
00 1a 00 19 00 09 3a 80 00 27 8d 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
Server DHCP Options: len 13
3a 04 00 00 00 ff 00 3b 04 00 00 0f 00
Server DHCPV6 Options: len 8
00 0a 00 04 ab cd ef ab
DHCPV6 Header: len 4
```

```
01 00 00 04
IP Address Pool: al_pool30
IPv6 Address Pool: ia_na_pool
IPv6 Delegated Address Pool: prefix_delegate_pool
```

show subscribers client-type fixed-wireless-access

```
user@host> show subscribers client-type fixed-wireless-access

Interface             IP Address/VLAN ID            User Name                LS:RI
ps1.3221225472        192.0.2.10                    505024101215074          default:default
ps1.3221225473        192.0.2.11                    505024101215075          default:default
```

show subscribers client-type fixed-wireless-access detail (Detail)

```
user@host> show subscribers client-type fixed-wireless-access detail
Type: FWA
User Name: 505024101215074
IP Address: 192.0.2.10
IP Netmask: 255.255.0.0
Interface: ps1.3221225472
Interface type: Dynamic
Dynamic Profile Name: fwa-profile
State: Active
Radius Accounting ID: 1
Session ID: 1
PFE Flow ID: 11
Login Time: 2019-04-10 14:10:12 PDT
Local TEID-U: 1
Local TEID-C: 1
Remote TEID-U: 2000000
Remote TEID-C: 1000000
GTPU Tunnel Remote IP Address: 203.0.113.1.3
GTPU Tunnel Local IP Address: 203.0.113.2.5
GTPC Remote IP Address: 203.0.113.1.2
GTPC Local IP Address: 203.0.113.1.1
Access Point Name: user21
```

show subscribers client-type vlan-oob detail

```
user@host> show subscribers client-type vlan-oob detail
Type: VLAN-OOB
User Name: L2WS.line-aci-1.line-ari-1
Logical System: default
Routing Instance: ISP1
Interface: demux0.1073744127
Interface type: Dynamic
Underlying Interface: ge-1/0/0
Dynamic Profile Name: Prof_L2WS
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 1234
Session ID: 77
VLAN Id: 126
Core-Facing Interface: ge-2/1/1
VLAN Map Id: 6
Inner VLAN Map Id: 2001
Agent Circuit ID: line-aci-1
Agent Remote ID: line-ari-1
Login Time: 2013-10-29 14:43:52 EDT
```

show subscribers count

```
user@host> show subscribers count
Total Subscribers: 188, Active Subscribers: 188
```

show subscribers address detail (IPv6)

```
user@host> show subscribers address 203.0.113.137 detail
Type: PPPoE
User Name: pppoeTerV6User1Svc
IP Address: 203.0.113.137
IP Netmask: 255.0.0.0
IPv6 User Prefix: 2001:db8:0:c88::/32
Logical System: default
Routing Instance: default
Interface: pp0.1073745151
```

```
Interface type: Dynamic
Underlying Interface: demux0.8201
Dynamic Profile Name: pppoe-client-profile
MAC Address: 00:00:5e:00:53:53
Session Timeout (seconds): 31622400
Idle Timeout (seconds): 86400
State: Active
Radius Accounting ID: example demux0.8201:6544
Session ID: 6544
Agent Circuit ID: ifl3720
Agent Remote ID: ifl3720
Login Time: 2012-05-21 13:37:27 PDT
Service Sessions: 1
```

show subscribers detail (IPv4)

```
user@host> show subscribers detail
Type: DHCP
IP Address: 203.0.113.29
IP Netmask: 255.255.0.0
Primary DNS Address: 192.0.2.0
Secondary DNS Address: 192.0.2.1
Primary WINS Address: 192.0.2.3
Secondary WINS Address: 192.0.2.4
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:98
State: Active
Radius Accounting ID: example :2304
Idle Timeout (seconds): 600
Login Time: 2009-08-25 14:43:52 PDT
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 08 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 36 2f
33 2d 37 2d 30 37 05 01 06 0f 21 2c
Service Sessions: 2
```

show subscribers detail (IPv6)

```
user@host> show subscribers detail
Type: DHCP
User Name: pd-user1
IPv6 Prefix: 2001:db8:ffff:1::/32
Logical System: default
Routing Instance: default
Interface: ge-3/1/3.2
Interface type: Static
MAC Address: 00:00:5e:00:53:03
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-08-25 12:12:26 PDT
DHCP Options: len 42
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 51 ff ff 00 03
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00
```

show subscribers detail (pseudowire Interface for GRE Tunnel)

```
user@host> show subscribers detail
Interface           IP Address/VLAN ID        User Name           LS:RI
ps0.3221225484      192.0.2.2
ps0.3221225485      192.0.2.3
demux0.3221225486    1                                          default:default
demux0.3221225487    1                                          default:default
demux0.3221225488   198.51.0.1                                  default:default
demux0.3221225489   198.51.0.2                                  default:default
```

show subscribers detail (IPv6 Static Demux Interface)

```
user@host> show subscribers detail
Type: STATIC-INTERFACE
User Name: user@example.com
IPv6 Prefix: 2001:db8:3:4:5:6:7:aa/32
Logical System: default
Routing Instance: default
```

```
Interface: demux0.1
Interface type: Static
Dynamic Profile Name: junos-default-profile
State: Active
Radius Accounting ID: 185
Login Time: 2010-05-18 14:33:56 EDT
```

show subscribers detail (L2TP LNS Subscribers on MX Series Routers)

```
user@host> show subscribers detail
Type: L2TP
User Name: user@example.com
IP Address: 203.0.113.58
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: si-5/2/0.1073749824
Interface type: Dynamic
Dynamic Profile Name: dyn-lns-profile2
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 8001
Session ID: 8001
Login Time: 2011-04-25 20:27:50 IST
```

show subscribers detail (L2TP Switched Tunnels)

```
user@host> show subscribers detail
Type: L2TP
User Name: user@example.com
Logical System: default
Routing Instance: default
Interface: si-2/1/0.1073741842
Interface type: Dynamic
Dynamic Profile Name: dyn-lts-profile
State: Active
L2TP State: Tunnel-switched
Tunnel switch Profile Name: ce-lts-profile
Local IP Address: 203.0.113.51
Remote IP Address: 192.0.2.0
```

```
Radius Accounting ID: 21
Session ID: 21
Login Time: 2013-01-18 03:01:11 PST

Type: L2TP
User Name: user@example.com
Logical System: default
Routing Instance: default
Interface: si-2/1/0.1073741843
Interface type: Dynamic
Dynamic Profile Name: dyn-lts-profile
State: Active
L2TP State: Tunnel-switched
Tunnel switch Profile Name: ce-lts-profile
Local IP Address: 203.0.113.31
Remote IP Address: 192.0.2.1
Session ID: 22
Login Time: 2013-01-18 03:01:14 PST
```

show subscribers detail (Tunneled Subscriber)

```
user@host> show subscribers detail
Type: PPPoE
User Name: user1@example.com
Logical System: default
Routing Instance: default
Interface: pp0.1
State: Active, Tunneled
Radius Accounting ID: 512
```

show subscribers detail (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlanProfile
State: Active
```

```
Session ID: 1
Stacked VLAN Id: 0x8100.1001
VLAN Id: 0x8100.1
Login Time: 2011-11-30 00:18:04 PST

Type: PPPoE
User Name: dualstackuser1@example1.com
IP Address: 203.0.113.13
IPv6 Prefix: 2001:db8:1::/32
IPv6 User Prefix: 2001:db8:1:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Dynamic
Dynamic Profile Name: dualStack-Profile1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
Login Time: 2011-11-30 00:18:05 PST

Type: DHCP
IPv6 Prefix: 2001:db8:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: test :3
Session ID: 3
Underlying Session ID: 2
Login Time: 2011-11-30 00:18:35 PST
DHCP Options: len 42
00 08 00 02 0b b8 00 01 00 0a 00 03 00 01 00 00 64 03 01 02
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00
```

show subscribers detail (ACI Interface Set Session)

```
user@host> show subscribers detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0
Interface Set: aci-1001-ge-1/0/0.2800
Interface Set Session ID: 0
Underlying Interface: ge-1/0/0.2800
Dynamic Profile Name: aci-vlan-set-profile-2
Dynamic Profile Version: 1
State: Active
Session ID: 1
Agent Circuit ID: aci-ppp-dhcp-20
Login Time: 2012-05-26 01:54:08 PDT
```

show subscribers detail (PPPoE Subscriber Session with ACI Interface Set)

```
user@host> show subscribers detail
Type: PPPoE
User Name: ppphint2
IP Address: 203.0.113.15
Logical System: default
Routing Instance: default
Interface: pp0.1073741825
Interface type: Dynamic
Interface Set: aci-1001-demux0.1073741824
Interface Set Type: Dynamic
Interface Set Session ID: 2
Underlying Interface: demux0.1073741824
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 3
Session ID: 3
Agent Circuit ID: aci-ppp-dhcp-dvlan-50
Login Time: 2012-03-07 13:46:53 PST
```

show subscribers detail (Dynamic Profile Version Alias)

```
user@host> show subscribers detail

Type: PPPoE
User Name: DEFAULTUSER
IP Address: 192.0.2.21
IP Netmask: 255.255.255.255
IPv6 Address: 2001:db8::17
Logical System: default
Routing Instance: default
Interface: pp0.3221225720
Interface type: Dynamic
Underlying Interface: demux0.3221225719
Dynamic Profile Name: pppoe-client-profile
Dynamic Profile Version Alias: profile-version1a
MAC Address: 00:00:5E:00:53:38
State: Active
Radius Accounting ID: 288
Session ID: 288
PFE Flow ID: 344
VLAN Id: 1
Login Time: 2019-09-23 10:40:56 IST
```

show subscribers extensive

```
user@host> show subscribers extensive
Type: DHCP
User Name: uer@host
IP Address: 192.0.2.136
IP Netmask: 255.0.0.0
Logical System: default
Routing Instance: default
Interface: ge-0/0/0.0
Interface type: Static
Underlying Interface: ge-0/0/0.0
MAC Address: 00:10:94:00:00:01
State: Active
Radius Accounting ID: 15
Session ID: 15
```

```
PFE Flow ID: 2
VLAN Id: 100
Login Time: 2021-05-24 11:30:07 IST
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 01 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 31 2f
31 2d 30 2d 30 37 05 01 06 0f 21 2c
DHCP Header: len 44
01 01 06 00 00 00 00 1d 00 00 80 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 10 94 00 00 01 00 00 00 00 00 00
00 00 00 00
IP Address Pool: al_pool30
Access Line Attributes:
  Actual upstream data rate: 19998
  Actual downstream data rate: 79999
  Access loop encapsulation: 01 02 00
```

show subscribers extensive (Aggregation Node Interface Set and DSL Forum Attributes)

```
user@host> show subscribers extensive
Type: VLAN-OOB
User Name: ancp
Logical System: default
Routing Instance: isp1-subscriber
Interface: ge-1/0/0.3221225472
Interface type: Dynamic
Interface Set: FRA-DPU-C-100
Underlying Interface: ge-1/0/0
Core IFL Name: ge-1/0/4.0
Dynamic Profile Name: Prof_L2BSA
State: Active
Radius Accounting ID: 1
Session ID: 1
PFE Flow ID: 13
VLAN Id: 50
VLAN Map Id: 20
Inner VLAN Map Id: 1
Inner VLAN Tag Protocol Id: 0x88a8
Agent Circuit ID: circuit 201
Agent Remote ID: remote-id
Aggregation Interface-set Name: FRA-DPU-C-100
```

```
Login Time: 2018-05-29 08:43:42 EDT
Accounting interval: 72000
Dynamic configuration:
  junos-cos-scheduler-map: 100m
  junos-inner-vlan-tag-protocol-id: 0x88a8
  junos-vlan-map-id: 20

Type: PPPoE
IP Address: 192.85.128.1
IP Netmask: 255.255.255.255
Logical System: default
Routing Instance: default
Interface: pp0.3221225474
Interface type: Dynamic
Interface Set: ge-1/0/0
Underlying Interface: demux0.3221225473
Dynamic Profile Name: pppoe-client-profile-with-cos
MAC Address: 00:10:94:00:00:03
State: Active
Radius Accounting ID: 3
Session ID: 3
PFE Flow ID: 16
Stacked VLAN Id: 50
VLAN Id: 7
Agent Circuit ID: circuit 201
Agent Remote ID: remote-id
Aggregation Interface-set Name: FRA-DPU-C-100
Login Time: 2018-05-29 08:43:45 EDT
IP Address Pool: pool-1
Accounting interval: 72000
DSL type: G.fast
Frame/cell mode: Frame
Overhead accounting bytes: 10
Actual upstream data rate: 100000 kbps
Actual downstream data rate: 200000 kbps
Calculated downstream data rate: 180000 kbps
Calculated upstream data rate: 90000 kbps

Adjusted downstream data rate: 160000 kbps
DSL Line Attributes
  Agent Circuit ID: circuit 201
  Agent Remote ID: remote-id
  Actual upstream data rate: 100000
```

```
  Actual downstream data rate: 200000
  DSL type: G.fast
  Access Aggregation Circuit ID: #FRA-DPU-C-100
  Attribute type: 0xAA, Attribute length: 4
    198 51 100 78
```

show subscribers extensive (Passive Optical Network Circuit Interface Set)

```
user@host> show subscribers client-type dhcp extensive
Type: DHCP
IP Address: 192.0.2.136
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073741842
Interface type: Dynamic
Interface Set: otl01.xyz101-202
Underlying Interface: demux0.1073741841
Dynamic Profile Name: dhcp-profile
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: user :19
Session ID: 19
VLAN Id: 1100
Agent Remote ID: ABCD01234|100M|AAAA01234|otl01.xyz101-202

Login Time: 2017-03-29 10:30:46 PDT
DHCP Options: len 97
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 02 33 04 00 00
17 70 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 32 2f
32 2d 31 2d 31 37 05 01 06 0f 21 2c 52 2b 02 29 41 42 43 44
30 31 32 33 34 7c 31 30 30 4d 7c 41 41 41 41 30 31 32 33 34
7c 6f 74 6c 30 31 2e 78 79 7a 31 30 31 2d 32 30 32
IP Address Pool: POOL-V4
```

show subscribers extensive (DNS Addresses from Access Profile or Global Configuration)

```
user@host> show subscribers extensive
Type: DHCP
User Name: test-user@example-com
```

```
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Domain name server inet: 198.51.100.1 198.51.100.2
IPv6 Address: 2001:db8::1:11
Domain name server inet6: 2001:db8:5001::12 2001:db8:3001::12
Logical System: default
Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
IP Address Pool: v4-pool
```

show subscribers extensive (DNS Addresses from RADIUS)

```
user@host> show subscribers extensive
Type: DHCP
User Name: test-user@example-com
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Primary DNS Address: 198.51.100.1
Secondary DNS Address: 198.51.100.2
IPv6 Address: 2001:db8::1:11
IPv6 Primary DNS Address: 2001:db8:5001::12
IPv6 Secondary DNS Address: 2001:db8:3001::12
Logical System: default
Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
```

```
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
IP Address Pool: v4-pool
```

show subscribers extensive (IPv4 DNS Addresses from RADIUS, IPv6 from Access Profile or Global Configuration)

```
user@host> show subscribers extensive
Type: DHCP
User Name: test-user@example-com
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Primary DNS Address: 198.51.100.1
Secondary DNS Address: 198.51.100.2
IPv6 Address: 2001:db8::1:11
Domain name server inet6: 2001:db8:5001::12 2001:db8:3001::12
Logical System: default
Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
IP Address Pool: v4-pool
```

show subscribers extensive (RPF Check Fail Filter)

```
user@host> show subscribers extensive
...
Type: VLAN
  Logical System: default
  Routing Instance: default
  Interface: ae0.1073741824
  Interface type: Dynamic
  Dynamic Profile Name: vlan-prof
  State: Active
  Session ID: 9
  VLAN Id: 100
  Login Time: 2011-08-26 08:17:00 PDT
  IPv4 rpf-check Fail Filter Name: rpf-allow-dhcp
  IPv6 rpf-check Fail Filter Name: rpf-allow-dhcpv6
...
```

show subscribers extensive (L2TP LNS Subscribers on MX Series Routers)

```
user@host> show subscribers extensive
Type: L2TP
User Name: user@example.com
IP Address: 203.0.113.58
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: si-5/2/0.1073749824
Interface type: Dynamic
Dynamic Profile Name: dyn-lns-profile2
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 8001
Session ID: 8001
Login Time: 2011-04-25 20:27:50 IST
IPv4 Input Filter Name: classify-si-5/2/0.1073749824-in
IPv4 Output Filter Name: classify-si-5/2/0.1073749824-out
```

show subscribers extensive (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers extensive
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlanProfile
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.1001
VLAN Id: 0x8100.1
Login Time: 2011-11-30 00:18:04 PST

Type: PPPoE
User Name: dualstackuser1@example1.com
IP Address: 203.0.113.13
IPv6 Prefix: 2001:db8:1::/32
IPv6 User Prefix: 2001:db8:1:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Dynamic
Dynamic Profile Name: dualStack-Profile1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
Login Time: 2011-11-30 00:18:05 PST
IPv6 Delegated Network Prefix Length: 48
IPv6 Interface Address: 2001:db8:2016:1:1::1/64
IPv6 Framed Interface Id: 1:1:2:2
IPv4 Input Filter Name: FILTER-IN-pp0.1073741825-in
IPv4 Output Filter Name: FILTER-OUT-pp0.1073741825-out
IPv6 Input Filter Name: FILTER-IN6-pp0.1073741825-in
IPv6 Output Filter Name: FILTER-OUT6-pp0.1073741825-out

Type: DHCP
IPv6 Prefix: 2001:db8:1::/32
Logical System: default
Routing Instance: ASP-1
```

```
Interface: pp0.1073741825
Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: test :3
Session ID: 3
Underlying Session ID: 2
Login Time: 2011-11-30 00:18:35 PST
DHCP Options: len 42
00 08 00 02 0b b8 00 01 00 0a 00 03 00 01 00 00 64 03 01 02
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00
IPv6 Delegated Network Prefix Length: 48
```

show subscribers extensive (ADF Rules)

```
user@host> show subscribers extensive
...
   Service Session ID: 12
   Service Session Name: SERVICE-PROFILE
   State: Active
   Family: inet
     ADF IPv4 Input Filter Name: __junos_adf_12-demux0.3221225474-inet-in
                       Rule 0: 010101000b0101020b020200201811
                               from {
                                   source-address 203.0.113.232;
                                   destination-address 198.51.100.0/24;
                                   protocol 17;
                               }
                               then {
                                   accept;
                               }
```

show subscribers extensive (Effective Shaping-Rate)

```
user@host> show subscribers extensive
Type: VLAN
Logical System: default
Routing Instance: default
```

```
Interface: demux0.1073741837
Interface type: Dynamic
Interface Set: ifset-1
Underlying Interface: ae1
Dynamic Profile Name: svlan-dhcp-test
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.201
VLAN Id: 0x8100.201
Login Time: 2011-11-30 00:18:04 PST
Effective shaping-rate: 31000000k
...
```

show subscribers extensive (PPPoE Subscriber Access Line Rates)

```
user@host> show subscribers extensive
Type: PPPoE
 IP Address: 198.51.100.1
 IP Netmask: 255.255.255.255
 Logical System: default
 Routing Instance: default
 Interface: pp0.3221225475
 Interface type: Dynamic
 Underlying Interface: demux0.3221225474
 Dynamic Profile Name: pppoe-client-profile-with-cos
 MAC Address: 00:00:5e:00:53:02
 State: Active
 Radius Accounting ID: 4
 Session ID: 4
 PFE Flow ID: 14
 Stacked VLAN Id: 40
 VLAN Id: 1
 Agent Circuit ID: circuit0
 Agent Remote ID: remote0
 Login Time: 2017-04-06 15:52:32 PDT

 User Name: DAVE-L2BSA-SERVICE
 Logical System: default
 Routing Instance: isp-1-subscriber
 Interface: ge-1/2/4.3221225472
 Interface type: Dynamic
```

```
  Interface Set: ge-1/2/4
  Underlying Interface: ge-1/2/4
  Core IFL Name: ge-1/3/4.0
  Dynamic Profile Name: L2BSA-88a8-400LL1300VO
  State: Active
Radius Accounting ID: 1
  Session ID: 1
  PFE Flow ID: 14
  VLAN Id: 13
  VLAN Map Id: 102
  Inner VLAN Map Id: 1
  Agent Circuit ID: circuit-aci-3
  Agent Remote ID: remote49-3
  Login Time: 2017-04-05 16:59:29 EDT
  Service Sessions: 4
  IFL Input Filter Name: L2BSA-CP-400LL1300VO-ge-1/2/4.3221225472-in
  IFL Output Filter Name: L2BSA-CP-400LL1300VO-ge-1/2/4.3221225472-out
  Accounting interval: 900
  DSL type: VDSL
  Frame/Cell Mode: Frame
  Overhead accounting bytes: -10
  Actual upstream data rate: 1024 kbps
  Actual downstream data rate: 4096 kbps
  Adjusted downstream data rate: 3686 kbps
   Dynamic configuration:
    junos-vlan-map-id: 102
    Service Session ID: 5
    Service Session Name: SRL-L1
    State: Active
    Family: inet, inet6
    IFL Input Filter Name: L2BSA-FWF-in-10048-ge-1/2/4.3221225472-in
    IFL Output Filter Name: L2BSA-FWF-out-25088-ge-1/2/4.3221225472-out
    Service Activation time: 2017-04-05 16:59:30 EDT
    Dynamic configuration:
      l2bsa-fwf-in: L2BSA-FWF-in-10048
      l2bsa-fwf-out: L2BSA-FWF-out-25088
      rldown: 25088
      rlup: 10048
```

show subscribers extensive (Subscriber Session Using PCEF Profile)

```
user@host> show subscribers extensive
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.3221225517
Interface type: Dynamic
Underlying Interface: ge-1/0/3
Dynamic Profile Name: svlan-dhcp
State: Active
Session ID: 59
PFE Flow ID: 71
Stacked VLAN Id: 0x8100.1
VLAN Id: 0x8100.2
Login Time: 2017-03-28 08:23:08 PDT

Type: DHCP
User Name: pcefuser
IP Address: 192.0.2.26
IP Netmask: 255.0.0.0
Logical System: default
Routing Instance: default
Interface: demux0.3221225518
Interface type: Dynamic
Underlying Interface: demux0.3221225517
Dynamic Profile Name: dhcp-client-prof
MAC Address: 00:00:5e:00:53:01
State: Active
Radius Accounting ID: 60
Session ID: 60
PFE Flow ID: 73
Stacked VLAN Id: 1
VLAN Id: 2
Login Time: 2017-03-28 08:23:08 PDT
Service Sessions: 1
DHCP Options: len 9
35 01 01 37 04 01 03 3a 3b
IP Address Pool: pool-ipv4
IPv4 Input Service Set: tdf-service-set
IPv4 Output Service Set: tdf-service-set
PCEF Profile: pcef-prof-1
```

```
PCEF Rule/Rulebase: default
Dynamic configuration:
  junos-input-service-filter: svc-filt-1
  junos-input-service-set: tdf-service-set
  junos-output-service-filter: svc-filt-1
  junos-output-service-set: tdf-service-set
  junos-pcef-profile: pcef-prof-1
  junos-pcef-rule: default

   Service Session ID: 61
   Service Session Name: pcef-serv-prof
   State: Active
   Family: inet
   IPv4 Input Service Set: tdf-service-set
   IPv4 Output Service Set: tdf-service-set
   PCEF Profile: pcef-prof-1
   PCEF Rule/Rulebase: limit-fb
   Service Activation time: 2017-03-28 08:31:19 PDT
   Dynamic configuration:
     pcef-prof: pcef-prof-1
     pcef-rule1: limit-fb
     svc-filt: svc-filt-1
     svc-set: tdf-service-set
```

show subscribers aci-interface-set-name detail (Subscriber Sessions Using Specified ACI Interface Set)

```
user@host> show subscribers aci-interface-set-name aci-1003-ge-1/0/0.4001 detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-set-profile
Dynamic Profile Version: 1
State: Active
Session ID: 13
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:56 PDT

Type: PPPoE
```

```
User Name: ppphint2
IP Address: 203.0.113.17
Logical System: default
Routing Instance: default
Interface: pp0.1073741834
Interface type: Dynamic
Interface Set: aci-1003-ge-1/0/0.4001
Interface Set Type: Dynamic
Interface Set Session ID: 13
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address:
State: Active
Radius Accounting ID: 14
Session ID: 14
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:57 PDT
```

show subscribers agent-circuit-identifier detail (Subscriber Sessions Using Specified ACI Substring)

```
user@host> show subscribers agent-circuit-identifier aci-ppp-vlan detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-set-profile
Dynamic Profile Version: 1
State: Active
Session ID: 13
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:56 PDT

Type: PPPoE
User Name: ppphint2
IP Address: 203.0.113.17
Logical System: default
Routing Instance: default
Interface: pp0.1073741834
```

```
Interface type: Dynamic
Interface Set: aci-1003-ge-1/0/0.4001
Interface Set Type: Dynamic
Interface Set Session ID: 13
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:5e:00:53:52
State: Active
Radius Accounting ID: 14
Session ID: 14
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:57 PDT
```

show subscribers id accounting-statistics

```
user@host> show subscribers id 601 accounting-statistics
Session ID: 601
Accounting Statistics:
Input bytes : 199994
Output bytes : 121034
Input packets: 5263
Output packets: 5263
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
```

show subscribers interface accounting-statistics

```
user@host> show subscribers interface pp0.3221226949 accounting-statistics
Session ID: 501
Accounting Statistics:
Input bytes : 199994
Output bytes : 121034
Input packets: 5263
Output packets: 5263
IPv6:
Input bytes : 0
```

```
Output bytes : 0
Input packets: 0
Output packets: 0

Session ID: 502
Accounting Statistics:
Input bytes : 87654
Output bytes : 72108
Input packets: 3322
Output packets: 3322
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

Session ID: 503
Accounting Statistics:
Input bytes : 156528
Output bytes : 123865
Input packets: 7448
Output packets: 7448
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
```

show subscribers interface extensive

```
user@host> show subscribers interface demux0.1073741826 extensive
Type: VLAN
User Name: user@test.example.com
Logical System: default
Routing Instance: testnet
Interface: demux0.1073741826
Interface type: Dynamic
Dynamic Profile Name: profile-vdemux-relay-23qos
MAC Address: 00:00:5e:00:53:04
State: Active
Radius Accounting ID: 12
```

```
Session ID: 12
Stacked VLAN Id: 0x8100.1500
VLAN Id: 0x8100.2902
Login Time: 2011-10-20 16:21:59 EST

Type: DHCP
User Name: user@test.example.com
IP Address: 192.0.2.0
IP Netmask: 255.255.255.0
Logical System: default
Routing Instance: testnet
Interface: demux0.1073741826
Interface type: Static
MAC Address: 00:00:5e:00:53:04
State: Active
Radius Accounting ID: 21
Session ID: 21
Login Time: 2011-10-20 16:24:33 EST
Service Sessions: 2

Service Session ID: 25
Service Session Name: SUB-QOS
State: Active

Service Session ID: 26
Service Session Name: service-cb-content
State: Active
IPv4 Input Filter Name: content-cb-in-demux0.1073741826-in
IPv4 Output Filter Name: content-cb-out-demux0.1073741826-out
```

show subscribers logical-system terse

```
user@host> show subscribers logical-system test1 terse
Interface                       IP Address/VLAN ID   User Name         LS:RI
demux0.1073741825           203.0.113.3         RETAILER1-CLIENT  test1:retailer1
demux0.1073741826           203.0.113.4         RETAILER2-CLIENT  test1:retailer2
```

show subscribers physical-interface count

```
user@host> show subscribers physical-interface ge-1/0/0 count
Total subscribers: 3998, Active Subscribers: 3998
```

show subscribers routing-instance inst1 count

```
user@host> show subscribers routing-instance inst1 count
Total Subscribers: 188, Active Subscribers: 183
```

show subscribers stacked-vlan-id detail

```
user@host> show subscribers stacked-vlan-id 101 detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers stacked-vlan-id vlan-id detail (Combined Output)

```
user@host> show subscribers stacked-vlan-id 101 vlan-id 100 detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers stacked-vlan-id vlan-id interface detail (Combined Output for a Specific Interface)

```
user@host> show subscribers stacked-vlan-id 101 vlan-id 100 interface ge-1/2/0.* detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers user-name detail

```
user@host> show subscribers user-name larry1 detail
Type: DHCP
User Name: larry1
IP Address: 203.0.113.37
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.1
Interface type: Static
Dynamic Profile Name: foo
MAC Address: 00:00:5e:00:53:01
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-11-07 08:25:59 PST
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 01 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 32 2f
37 2d 30 2d 30 37 05 01 06 0f 21 2c
```

show subscribers vlan-id

```
user@host> show subscribers vlan-id 100
Interface           IP Address                              User Name
```

```
ge-1/0/0.1073741824
ge-1/2/0.1073741825
```

show subscribers vlan-id detail

```
user@host> show subscribers vlan-id 100 detail
Type: VLAN
Interface: ge-1/0/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT

Type: VLAN
Interface: ge-1/2/0.1073741825
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT
```

show subscribers vpi vci extensive (PPPoE-over-ATM Subscriber Session)

```
user@host> show subscribers vpi 40 vci 50 extensive
Type: PPPoE
User Name: testuser
IP Address: 203.0.113.2
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: pp0.0
Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
ATM VPI: 40
ATM VCI: 50
Login Time: 2012-12-03 07:49:26 PST
```

```
IP Address Pool: pool_1
IPv6 Framed Interface Id: 200:65ff:fe23:102
```

show subscribers address detail (Enhanced Subscriber Management)

```
user@host> show subscribers address 203.0.113.111 detail
Type: DHCP
User Name: simple_filters_service
IP Address: 203.0.113.111
IP Netmask: 255.0.0.0
Logical System: default
Routing Instance: default
Interface: demux0.3221225482
Interface type: Dynamic
Underlying Interface: demux0.3221225472
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:0f
State: Active
Radius Accounting ID: 11
Session ID: 11
PFE Flow ID: 15
Stacked VLAN Id: 210
VLAN Id: 209
Login Time: 2014-03-24 12:53:48 PDT
Service Sessions: 1
DHCP Options: len 3
35 01 01
```

show subscribers extensive (Tenant Systems)

```
user@host:TSYS1> show subscribers extensive
Type: XAUTH
User Name: userX
+    Tenant: TSYS1
    Routing Instance: TSYS1-ri
IP Address: 192.0.2.0
IP Netmask: 203.0.113.0
Primary DNS Address: 198.51.100.0
Secondary DNS Address: 198.51.100.1
Dynamic Profile Name: radius
```

```
State: Active
Session ID: 1
Login Time: 2018-09-18 13:49:00 PDT
```

Sample Output for AGF

The following sample output shows subscribers connected to the AGF:

show subscribers extensive (DHCP on an FN-RG)

```
user@host> show subscribers extensive
Type: DHCP
User Name: USER2
IP Address: 172.16.0.227
Logical System: default
Routing Instance: default
Interface: demux0.3221230587
Interface type: Dynamic
Underlying Interface: demux0.3221230586
Dynamic Profile Name: dhcp-profile
MAC Address: 00:44:46:44:44:44
State: Active
DHCP Relay IP Address: 10.1.0.1
Radius Accounting ID: 5128
Session ID: 5128
PFE Flow ID: 5185
Stacked VLAN Id: 1
VLAN Id: 1
Agent Circuit ID: aci1
Agent Remote ID: ari1
Login Time: 2022-04-26 09:24:56 PDT
Service Sessions: 1
DHCP Options: len 9
35 01 01 37 04 01 03 3a 3b
DHCP Header: len 44
01 01 06 00 10 bd b4 93 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 44 46 44 44 44 00 00 00 00 00 00
00 00 00 00
AGF Mode: Adaptive
Local TEID-U: 10183810
Remote TEID-U: 6354992
```

```
GTPU Tunnel Remote IP Address: 10.0.0.1
GTPU Tunnel Local IP Address: 10.0.0.1
5G-QFI: 1
IPv6 Framed Interface Id: 0:7fff:ffff:eaa0
IPv4 Input Filter Name: RG-LWAC-V4-INPUT-FILTER-01-demux0.3221230587-in
IPv4 Output Filter Name: RG-LWAC-V4-OUTPUT-FILTER-01-demux0.3221230587-out
Access Line Attributes:
  Agent Circuit ID: aci1
  Agent Remote ID: ari1
Dynamic configuration:
  junos-cos-guaranteed-rate: 1000000
  junos-cos-guaranteed-rate-burst: 250000
      junos-cos-scheduler: GOLD
          junos-cos-scheduler-shaping-rate: 200000000
          junos-cos-scheduler-tx: 200000000
  junos-cos-scheduler-map: DATA_VOICE_VIDEO_SMAP_UID1468
  junos-cos-shaping-rate: 200000000
  junos-cos-shaping-rate-burst: 50000
  junos-cos-traffic-control-profile: TRAFFIC_CONTROL_PROFILE
  junos-input-filter: RG-LWAC-V4-INPUT-FILTER-01
  junos-input-ipv6-filter: RG-LWAC-V6-INPUT-FILTER-01
  junos-output-filter: RG-LWAC-V4-OUTPUT-FILTER-01
  junos-output-ipv6-filter: RG-LWAC-V6-OUTPUT-FILTER-01

   Service Session ID: 5129
   Service Session Name: SERVICE-PROFILE-BASIC-POLICER
   State: Active
   Family: inet
   Service session type: Service-Profile
   IPv4 Input Filter Name: CAP-POLICER-demux0.3221230587-in
   IPv4 Output Filter Name: CAP-POLICER-demux0.3221230587-out
   Service Activation time: 2022-04-26 09:24:57 PDT
   Dynamic configuration:
     bandwidth-limit: 200k
     burst-size-limit: 75k
```

Release Information

Command introduced in Junos OS Release 9.3.

`client-type`, `mac-address`, `subscriber-state`, and `extensive` options introduced in Junos OS Release 10.2.

`count` option usage with other options introduced in Junos OS Release 10.2.

Options `aci-interface-set-name` and `agent-circuit-identifier` introduced in Junos OS Release 12.2.

The `physical-interface` and `user-name` options introduced in Junos OS Release 12.3.

Options `vci` and `vpi` introduced in Junos OS Release 12.3R3 and supported in later 12.3R*x* releases.

Options `vci` and `vpi` supported in Junos OS Release 13.2 and later releases. (Not supported in Junos OS Release 13.1.)

Enhanced subscriber management supported in Junos OS Release 15.1R3 on MX Series routers.

`accounting-statistics` option added in Junos OS Release 15.1R3 and 17.4R1 on MX Series routers.

`aggregation-interface-set-name` option added in Junos OS Release 18.4R1 on MX Series routers.

`sub-system` added in Junos OS Release 22.3R1.

RELATED DOCUMENTATION

Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration

Verifying and Managing Configurations for Dynamic VLANs Based on Access-Line Identifiers

Verifying and Managing Junos OS Enhanced Subscriber Management

show subscribers summary

IN THIS SECTION

Syntax

```
show subscribers summary
<all>
<detail | extensive | terse>
<count>
<physical-interface physical-interface-name>
<logical-system logical-system pic | port | routing-instance routing-instance | slot>
<sub-system (agf | bng)>
```

Description

Display summary information for subscribers.

Options

none	Display summary information by state and client type for all subscribers.
all	(Optional) Display summary information by state, client type, and logical system and routing instance (LS:RI).
detail | extensive | terse	(Not supported on MX Series routers) (Optional) Display the specified level of output.
count	(Not supported on MX Series routers) (Optional) Display the count of total subscribers and active subscribers for any specified option.
logical-system *logical-system*	(Optional) Display subscribers whose logical system matches the specified logical system.
physical-interface *physical-interface-name*	(M120, M320, and MX Series routers only) (Optional) Display the count of subscribers whose physical interface matches the specified physical interface, by subscriber state, client type, and LS:RI.
pic	(M120, M320, and MX Series routers only) (Optional) Display the count of subscribers by PIC number and the total number of subscribers.
port	(M120, M320, and MX Series routers only) (Optional) Display the count of subscribers by port number and the total number of subscribers.

routing-instance *routing-instance*	(Optional) Display subscribers whose routing instance matches the specified routing instance.
slot	(M120, M320, and MX Series routers only) (Optional) Display the count of subscribers by Flexible PIC Concentrator (FPC) slot number and the total number of subscribers.
sub-system (agf | bng)	(Optional) Display a count of subscribers using either the Access Gateway Function (AGF) or broadband network gateway (BNG) services.

NOTE: The subsystem option is only available when both the AGF and BNG subscribers are logged into the router at the same time.

NOTE: Because of display limitation, the logical system and routing instance output values are truncated when necessary.

Starting from Junos OS 20.4R1 release, you need a license to use the Extensible Subscribers Services Manager (ESSM) feature.

Required Privilege Level

view

Output Fields

Table 38 on page 869 lists the output fields for the `show subscribers summary` command. Output fields are listed in the approximate order in which they appear.

Table 38: show subscribers summary Output Fields

Field Name	Field Description	Level of Output
`Subscribers by State`	Number of subscribers summarized by state. The summary includes the following information: • Init—Number of subscribers currently in the initialization state. • Configured—Number of configured subscribers. • Active—Number of active subscribers. • Terminating—Number of subscribers currently terminating. • Terminated—Number of terminated subscribers. • Total—Total number of subscribers for all states.	`detail` none
`Subscribers by Client Type`	Number of subscribers summarized by client type. Client types can include DHCP, GRE, L2TP, PPP, PPPoE, STATIC-INTERFACE, VLAN, and VLAN-OOB. This field also displays the total number of subscribers for all client types (Total).	`detailextensive` none
`Subscribers by LS:RI`	Number of subscribers summarized by logical system:routing instance (LS:RI) combination. This field also displays the total number of subscribers for all the LS:RI combinations (Total).	`detail` none
`Subscribers by Connection Type`	Number of subscribers summarized by connection type, `Cross-connected` or `Terminated`.	`extensive`
`Subscribers by Sub-System`	Number of subscribers on the subsystem—AGF or BNG as well as the total number of subscriber.	All levels

Table 38: show subscribers summary Output Fields *(Continued)*

Field Name	Field Description	Level of Output

`Interface`	Interface associated with the subscriber. The router or the switch displays subscribers whose interface matches or begins with the specified interface.
	
	The asterisk (*) indicates a continuation of addresses for the same session.
	
	For aggregated Ethernet interfaces, the output of the `summary (pic | port | slot)` options prefixes the interface name with ae0:.
	
	For pseudowire IFDs, this field displays both the pseudowire and the associated logical tunnel (LT) and the redundant logical tunnel (RLT) anchor interface. For example:
	
	`ps0: lt-2/1/0`
	`ps1: rlt0: lt-4/0/0`
		All levels

`Count`	Count of subscribers displayed for each PIC, port, or slot when those options are specified with the `summary` option. For an aggregated Ethernet configuration, the total subscriber count does not equal the sum of the individual PIC, port, or slot counts, because each subscriber can be in more than one aggregated Ethernet link. Multiple pseudowire interfaces can share a given logical tunnel or redundant logical tunnel anchor interface. Starting in Junos OS Release 18.1R1, the field displays subscribers per individual pseudowire interface. In earlier releases, the field displays the same number of subscribers for all the pseudowire interfaces that share the same tunnel interface as their anchor point.	`detailextensive` none
`Total Subscribers`	Total number of subscribers for all physical interfaces, all PICs, all ports, or all LS:RI slots.	`detailextensive` none
`IP Address/VLAN ID`	Subscriber IP address or VLAN ID associated with the subscriber in the form *tpid.vlan-id*	`terse`

Table 38: show subscribers summary Output Fields *(Continued)*

Field Name	Field Description	Level of Output
User Name	Name of the subscriber.	terse
LS:RI	Logical system and routing instance associated with the subscriber.	terse

Sample Output

show subscribers summary

```
user@host> show subscribers summary

Subscribers by State
   Active: 52194
   Total: 52194

Subscribers by Client Type
   DHCP: 10000
   VLAN: 15997
   VLAN-OOB: 3600
   PPPoE: 15998
   ESSM: 6599
   Total: 52194
```

show subscribers summary all

```
user@host> show subscribers summary all
Subscribers by State
    Init                    3
    Configured             2
    Active                  183
    Terminating             2
    Terminated             1

    TOTAL                   191
```

```
Subscribers by Client Type
    DHCP                     107
    PPP                      76
    VLAN                      8

    TOTAL                191

Subscribers by LS:RI
    default:default      1
    default:ri1              28
    default:ri2              16
    ls1:default             22
    ls1:riA                 38
    ls1:riB                 44
    logsysX:routinstY     42

    TOTAL                    191
```

show subscribers summary physical-interface

```
user@host> show subscribers summary physical-interface ge-1/0/0
Subscribers by State
   Active: 3998
   Total: 3998

Subscribers by Client Type
   DHCP: 3998
   Total: 3998

Subscribers by LS:RI
   default:default: 3998
   Total: 3998
```

show subscribers summary physical-interface pic

```
user@host> show subscribers summary physical-interface ge-0/2/0 pic
Subscribers by State
   Active: 4825
   Total: 4825
```

```
Subscribers by Client Type
   DHCP: 4825
   Total: 4825

Subscribers by LS:RI
   default:default: 4825
   Total: 4825
```

show subscribers summary physical-interface port

```
user@host> show subscribers summary physical-interface ge-0/3/0 port
Subscribers by State
   Active: 4825
   Total: 4825

Subscribers by Client Type
   DHCP: 4825
   Total: 4825

Subscribers by LS:RI
   default:default: 4825
   Total: 4825
```

show subscribers summary physical-interface slot

```
user@host> show subscribers summary physical-interface ge-2/0/0 slot
Subscribers by State
   Active: 4825
   Total: 4825

Subscribers by Client Type
   DHCP: 4825
   Total: 4825

Subscribers by LS:RI
   default:default: 4825
   Total: 4825
```

show subscribers summary pic

```
user@host> show subscribers summary pic
Interface           Count
ge-1/0              1000
ge-1/3              1000

Total Subscribers: 2000
```

show subscribers summary pic (Aggregated Ethernet Interfaces)

```
user@host> show subscribers summary pic
Interface           Count
ae0: ge-1/0         801
ae0: ge-1/3         801

Total Subscribers: 801
```

show subscribers summary port

```
user@host> show subscribers summary port
Interface           Count
ge-5/0/1              201
ge-5/0/2              301

Total Subscribers: 502
```

show subscribers summary port (Pseudowire Interfaces)

```
user@host> show subscribers summary port
ps0: lt-2/1/0 10
ps1: lt-2/1/0 20

Total Subscribers: 30
```

show subscribers summary port extensive

```
user@host>show subscribers summary port extensive
Interface: xe-3/0/3
Port Count: 100
Detail:
Subscribers by Client Type
   PPPoE: 1
   ESSM: 99
Subscribers by Connection Type
   Terminated: 1

Interface: xe-3/1/3
Port Count: 3100
Detail:
Subscribers by Client Type
   PPPoE: 1600
   ESSM: 1100
   VLAN-OOB: 400
Subscribers by Connection Type
   Tunneled: 500
   Terminated: 1100
   Cross-connected: 400

Total Subscribers: 26197
```

show subscribers summary slot

```
user@host> show subscribers summary slot
Interface           Count
ge-1                2000

Total Subscribers: 2000
```

show subscribers summary terse

```
user@host> show subscribers summary terse
Interface                      IP Address/VLAN ID   User Name         LS:RI
ge-1/3/0.1073741824         100                                    default:default
```

```
demux0.1073741824           203.0.113.10         WHOLESALER-CLIENT default:default
demux0.1073741825           203.0.113.13         RETAILER1-CLIENT  test1:retailer1
demux0.1073741826           203.0.113.213        RETAILER2-CLIENT  test1:retailer2
```

show subscribers summary (agf)

```
user@host> show subscribers summary
Subscribers by Sub-System
   AGF: 3000
   BNG: 0
   Total: 3000

Subscribers by State
   Active: 4000
   Total: 4000

Subscribers by Client Type
   VLAN: 1000
   PPPoE: 3000
   Total: 4000
```

show subscribers summary sub-system agf

```
user@host> show subscribers summary sub-system agf
AGF Subscribers by State
    Init:     3
    Active:  12
    Total:   15

AGF Subscribers by Client Type
     DHCP:           2
     PPPOE:          5
     PPPOE-5G        5
     TOTAL          12
```

Release Information

Command introduced in Junos OS Release 10.2.

`sub-system` added in Junos OS Release 22.3R1.

RELATED DOCUMENTATION

show subscribers | 812

show vpls connections

IN THIS SECTION

Syntax

```
show vpls connections
<brief | extensive>
<down | up | up-down>
<history>
<instance instance-name local-site local-site-name remote-site remote-site-name>
<instance-history>
<logical-system (all | logical-system-name)>
<status>
<summary>
```

Description

(T Series and M Series routers, except for the M160 router) Display virtual private LAN service (VPLS) connection information.

Options

none	Display information about all VPLS connections for all routing instances.
brief | extensive	(Optional) Display the specified level of output.
down | up | up-down	(Optional) Display nonoperational, operational, or both types of connections.
history	(Optional) Display information about connection history.
instance *instance-name*	(Optional) Display the VPLS connections for the specified routing instance only.
instance-history	(Optional) Display information about connection history for a particular instance.
local-site *local-site-name*	(Optional) Display the VPLS connections for the specified local site name or ID only.
remote-site *remote-site-name*	(Optional) Display the VPLS connections for the specified remote site name or ID only. Label block size information is always shown as 0 when using this option.
logical-system (all | *logical-system-name***)**	(Optional) Perform this operation on all logical systems or on a particular logical system.
status	(Optional) Display information about the connection and interface status.
summary	(Optional) Display summary of all VPLS connections information.

Required Privilege Level

view

Output Fields

Table 39 on page 879 lists the output fields for the `show vpls connections` command. Output fields are listed in the approximate order in which they appear.

Table 39: show vpls connections Output Fields

Field Name	Field Description
`Instance`	Name of the VPLS instance.
`Local site`	Name of the local site.
`VPLS-id`	Identifier for the VPLS site.
`Number of local interfaces`	Number of interfaces configured for the local site.
`Number of local interfaces up`	Number of interfaces configured for the local site that are currently up.
`IRB interface present`	Indicates whether or not an integrated routing and bridging (IRB) interface is present (`yes` or `no`).

Table 39: show vpls connections Output Fields *(Continued)*

Field Name	Field Description
Intf	List of all of the interfaces configured for the local site. The types of interfaces can include VPLS virtual loopback tunnel interfaces and label-switched interfaces. Any interface that supports VPLS could be listed here. Virtual loopback tunnel interfaces are displayed using the vt-*fpc*/*pic*/*port*.*nnnnn* format. Label-switched interfaces are displayed using the lsi.*nnnnn* format. In both cases, *nnnnn* is a dynamically generated virtual port used to transport and receive packets from other provider edge (PE) routers in the VPLS domain. Each interface might include the following information: • Identification as a VPLS interface • Name of the associated VPLS routing instance • Local site number • Remote site number • VPLS neighbor address • VPLS identifier
Interface flags	Flag associated with the interface. Can include the following: • VC-Down—The virtual circuit associated with this interface is down.
Label-base	First label in a block of labels. A remote PE router uses this first label when sending traffic toward the advertising PE router.
Offset	Displays the VPLS Edge (VE) block offset in the Layer 2 VPN NLRI. The VE block offset is used to identify a label block from which a particular label value is selected to setup a pseduowire for a remote site. The block offset value itself indicates the starting VE ID that maps to the label base contained in the VPLS NLRI advertisement.
Size	Label block size. A configurable value that represents the number of label blocks required to cover all the pseudowires for the remote peer. Acceptable configuration values are: 2, 4, 8 and 16. The default value is 2. A value of 0 will be displayed when using the remote-site option.

Table 39: show vpls connections Output Fields *(Continued)*

Field Name	Field Description
`Range`	Label block range. A value that keeps track of the numbers of remote sites discovered within each label block.
`Preference`	Preference value advertised for a VPLS site. When multiple PE routers are assigned the same VE ID for multihoming, you might need to specify that a particular PE router acts as the designated forwarder by configuring the site preference value. The site preference indicates the degree of preference for a particular customer site. The site preference is one of the tie-breaking criteria used in a designated forwarder election.
`status-vector`	Bit vector advertising the state of local PE-CE circuits to remote PE routers. A bit value of `0` indicates that the local circuit and LSP tunnel to the remote PE router are up, whereas a value of `1` indicates either one or both are down.
`connection-site`	Name of the connection site.
`Neighbor`	IP address and VPLS identifier for the VPLS neighbor. If multiple pseudowires have been configured, the IP address will also show the PW-specific *vpls-id-list*, for example, 203.0.113.144 (vpls-id 200).
`Type`	Type of connection: `loc` (local) or `rmt` (remote).

Table 39: show vpls connections Output Fields *(Continued)*

Field Name	Field Description
St	Status of the VPLS connection (corresponds with Legend for Connection Status): • EI—The local VPLS interface is configured with an encapsulation that is not supported. • EM—The encapsulation type received on this VPLS connection from the neighbor does not match the local VPLS connection interface encapsulation type. • VC-Dn—The virtual circuit is currently down. • CM—The two routers do not agree on a control word, which causes a control word mismatch. • CN—The virtual circuit is not provisioned properly. • OR—The label associated with the virtual circuit is out of range. • OL—No advertisement has been received for this virtual circuit from the neighbor. There is no outgoing label available for use by this virtual circuit. • LD—All of the CE-facing interfaces to the local site are down. Therefore, the connection to the local site is signaled as down to the other PE routers. No pseudowires can be established. • RD—All the interfaces to the remote neighbor are down. Therefore, the remote site has been signaled as down to the other PE routers. No pseudowires can be established. • LN—The local site has lost path selection to the remote site and therefore no pseduowires can be established from this local site. • RN—The remote site has lost path selection to a local site or other remote site and therefore no pseudowires are established to this remote site. In a multihoming configuration, one multihomed PE site displays the state LN, and the other multihomed PE site displays the state RN in the following circumstances: • The multihomed links are both configured to be the backup site. • The two multihomed PE routers have the same site ID, but have a peering relationship with a route reflector (RR) that has a different site ID. • XX—The VPLS connection is down for an unn reason. This is a programming error.

Table 39: show vpls connections Output Fields *(Continued)*

Field Name	Field Description
	• MM—The MTU for the local site and the remote site do not match. • BK—The router is using a backup connection. • PF—Profile parse failure. • RS—The remote site is in a standby state. • NC—The interface encapsulation is not configured as an appropriate CCC, TCC, or VPLS encapsulation. • WE—The encapsulation configured for the interface does not match the encapsulation configured for the associated connection within the VPLS routing instance. • NP—The router detects that interface hardware is not present. The hardware might be offline, a PIC might not be of the desired type, or the interface might be configured in a different routing instance. • -->—Only the outbound connection is up. • <--—Only the inbound connection is up. • Up—The VPLS connection is operational. • Dn—The VPLS connection is down. • CF—The router cannot find enough bandwidth to the remote router to satisfy the VPLS connection bandwidth requirement. • SC—The local site identifier matches the remote site identifier. No pseudowire can be established between these two sites. You should configure different values for the local and remote site identifiers. • LM—The local site identifier is not the minimum designated, meaning it is not the lowest. There is another local site with a lower site identifier. Pseudowires are not being established to this local site. and the associated local site identifier is not being used to distribute VPLS label blocks. However, this is not an error state. Traffic continues to be forwarded to the PE router interfaces connected to the local sites when the local sites are in this state. • RM—The remote site identifier is not the minimum designated, meaning it is not the lowest. There is another remote site connected to the same PE router which has

Table 39: show vpls connections Output Fields *(Continued)*

Field Name	Field Description
	lower site identifier. The PE router cannot established a pseudowire to this remote site and the associated remote site identifier cannot be used to distribute VPLS label blocks. However, this is not an error state. Traffic can continue to be forwarded to the PE router interface connected to this remote site when the remote site is in this state. • IL—The incoming packets for the VPLS connection have no MPLS label. • MI—The configured mesh group identifier is in use by another system in the network. • ST—The router has switched to a standby connection. • PB—Profile busy. • SN—The VPLS neighbor is static.
Time last up	Time connection was last in the Up condition.
# Up trans	Number of transitions from Down to Up condition.
Status	Status of the (local or remote circuit) local interface: • Up—Operational • Dn—Down • NP—Not present • DS—Disabled • WE—Wrong encapsulation • UN—Uninitialized
Encapsulation	Type of encapsulation: VPLS.
Remote PE	Address of the remote provider edge router.

Table 39: show vpls connections Output Fields *(Continued)*

Field Name	Field Description
`Negotiated control-word`	Whether a control word has been negotiated: `Yes` or `No`.
`Incoming label`	Name of the incoming label.
`Outgoing label`	Name of the outgoing label.
`Negotiated PW status TLV`	Indicates whether or not the pseudowire status TLV has been negotiated for the VPLS connection.
`Local interface`	Provides the following information about the local interface configured for the VPLS neighbor: • Name of the local interface • `Status`—Interface status (`Up` or `Down`) • `Encapsulation`—Interface encapsulation (for example, `ETHERNET`) • `Description`—Includes the VPLS instance name, the VPLS neighbor address, and the VPLS identifier
`Time`	Date and time of VPLS connection event.
`Event`	Type of event.
`Interface/Lbl/PE`	Interface, label, or PE router.
`Connection History`	Each entry can include the date, time, year, and the connection event. Connection events include any of a variety of events related to VPLS connections, such as route changes, label updates, and interfaces going down or coming up.

Sample Output

show vpls connections

```
user@host> show vpls connections
Layer-2 VPN connections:

Legend for connection status (St)
EI -- encapsulation invalid      NC -- interface encapsulation not CCC/TCC/VPLS
EM -- encapsulation mismatch     WE -- interface and instance encaps not same
VC-Dn -- Virtual circuit down    NP -- interface hardware not present
CM -- control-word mismatch      -< -- only outbound connection is up
CN -- circuit not provisioned    >- -- only inbound connection is up
OR -- out of range               Up -- operational
OL -- no outgoing label          Dn -- down
LD -- local site signaled down   CF -- call admission control failure
RD -- remote site signaled down  SC -- local and remote site ID collision
LN -- local site not designated  LM -- local site ID not minimum designated
RN -- remote site not designated RM -- remote site ID not minimum designated
XX -- unn connection status  IL -- no incoming label
MM -- MTU mismatch               MI -- Mesh-Group ID not available
BK -- Backup connection          ST -- Standby connection
PF -- Profile parse failure      PB -- Profile busy

Legend for interface status
Up -- operational
Dn -- down

Instance: vpls-1
  Local site: 1 (11)
    Number of local interfaces: 1
    Number of local interfaces up: 1
    IRB interface present: no
    lt-1/3/0.10496
    vt-1/3/0.1048588    1         Intf - vpls vpls-1 local site 11 remote site 1
    vt-1/2/0.1048591    2         Intf - vpls vpls-1 local site 11 remote site 2
    vt-1/2/0.1048585    3         Intf - vpls vpls-1 local site 11 remote site 3
    vt-1/2/0.1048587    4         Intf - vpls vpls-1 local site 11 remote site 4
    vt-1/2/0.1048589    5         Intf - vpls vpls-1 local site 11 remote site 5
    vt-1/3/0.1048586    6         Intf - vpls vpls-1 local site 11 remote site 6
    vt-1/3/0.1048590    7         Intf - vpls vpls-1 local site 11 remote site 7
    vt-1/3/0.1048584    8         Intf - vpls vpls-1 local site 11 remote site 8
```

```
    Label-base        Offset     Size  Range     Preference
    800256            1          16     16        100
    Timer Values:
        Startup wait time: 120 seconds
        New site wait-time: 20 seconds
        Collision detect time: 30 seconds
        Reclaim wait time: 748 milliseconds
    connection-site           Type  St     Time last up          # Up trans
    1                         rmt   Up     Apr 28 13:28:24 2009           2
      Remote PE: 192.0.2.1, Negotiated control-word: No
      Incoming label: 800256, Outgoing label: 800026
      Local interface: vt-1/3/0.1048588, Status: Up, Encapsulation: VPLS
        Description: Intf - vpls vpls-1 local site 11 remote site 1
    Connection History:
        Apr 28 13:28:24 2009  status update timer
        Apr 28 13:28:24 2009  PE route down
        Apr 28 13:24:27 2009  status update timer
        Apr 28 13:24:27 2009  loc intf up             vt-1/3/0.1048588
        Apr 28 13:24:27 2009  PE route changed
        Apr 28 13:24:27 2009  Out lbl Update                   800026
        Apr 28 13:24:27 2009  In lbl Update                    800256
        Apr 28 13:24:27 2009  loc intf down
    2                         rmt   Up     Apr 28 13:28:24 2009           2
      Remote PE: 192.0.2.71, Negotiated control-word: No
      Incoming label: 800257, Outgoing label: 800034
      Local interface: vt-1/2/0.1048591, Status: Up, Encapsulation: VPLS
        Description: Intf - vpls vpls-1 local site 11 remote site 2
    Connection History:
        Apr 28 13:28:24 2009  status update timer
        Apr 28 13:28:24 2009  PE route down
        Apr 28 13:24:28 2009  status update timer
        Apr 28 13:24:28 2009  loc intf up             vt-1/2/0.1048591
        Apr 28 13:24:28 2009  PE route changed
        Apr 28 13:24:28 2009  Out lbl Update                   800034
        Apr 28 13:24:28 2009  In lbl Update                    800257
        Apr 28 13:24:28 2009  loc intf down
```

show vpls connections (with FEC128 and FEC129 in the same routing-instance)

```
user@host> show vpls connections
Instance: fec129
```

```
  L2vpn-id: 1:1
  Local-id: 203.0.113.0
FEC129-VPLS State:
  Mesh-group connections: __ves__
    Remote-id                Type  St     Time last up          # Up trans
    203.0.3.3                 rmt   Up     Sep 19 09:59:56 2017           1
      Remote PE: 203.0.3.3, Negotiated control-word: No
      Incoming label: 262155, Outgoing label: 262164
      Negotiated PW status TLV: No
      Local interface: lsi.1048844, Status: Up, Encapsulation: ETHERNET
        Description: Intf - vpls fec129 local-id 10.4.4.4 remote-id 203.0.3.3 neighbor 203.0.3.3
      Flow Label Transmit: No, Flow Label Receive: No
    203.0.2.2                 rmt   Up     Sep 19 09:59:52 2017           1
      Remote PE: 203.0.2.2, Negotiated control-word: No
      Incoming label: 262154, Outgoing label: 262157
      Negotiated PW status TLV: No
      Local interface: lsi.1048846, Status: Up, Encapsulation: ETHERNET
        Description: Intf - vpls fec129 local-id 10.4.4.4 remote-id 203.0.2.2 neighbor 203.0.2.2
      Flow Label Transmit: No, Flow Label Receive: No
    203.0.1.1                 rmt   Up     Sep 19 09:59:48 2017           1
      Remote PE: 203.0.1.1, Negotiated control-word: No
      Incoming label: 262156, Outgoing label: 262157
      Negotiated PW status TLV: No
      Local interface: lsi.1048845, Status: Up, Encapsulation: ETHERNET
        Description: Intf - vpls fec129 local-id 10.4.4.4 remote-id 203.0.1.1 neighbor 203.0.1.1
      Flow Label Transmit: No, Flow Label Receive: No

LDP-VPLS State
   Mesh-group connections: MG1
     Neighbor                 Type  St     Time last up          # Up trans
     203.0.6.6(vpls-id 1)      rmt   Up     Sep 17 19:17:11 2017           1
       Remote PE: 203.0.6.6, Negotiated control-word: No
       Incoming label: 262423, Outgoing label: 262145
       Negotiated PW status TLV: No
       Local interface: lsi.1049859, Status: Up, Encapsulation: ETHERNET
         Description: Intf - vpls bgp-vpls neighbor 203.0.6.6 vpls-id 1
       Flow Label Transmit: No, Flow Label Receive: No
     203.0.7.7(vpls-id 1)      rmt   Up     Sep 17 19:17:04 2017           1
       Remote PE: 203.0.7.7, Negotiated control-word: No
       Incoming label: 262424, Outgoing label: 262145
       Negotiated PW status TLV: No
       Local interface: lsi.1049857, Status: Up, Encapsulation: ETHERNET
         Description: Intf - vpls bgp-vpls neighbor 203.0.7.7 vpls-id 1
```

```
      Flow Label Transmit: No, Flow Label Receive: No
  Mesh-group connections: MG2
    Neighbor                Type  St     Time last up          # Up trans
    203.0.5.5(vpls-id 1)      rmt   Up     Sep 17 19:17:00 2017           1
      Remote PE: 203.0.5.5, Negotiated control-word: No
      Incoming label: 262425, Outgoing label: 299872
      Negotiated PW status TLV: No
      Local interface: lsi.1049856, Status: Up, Encapsulation: ETHERNET
        Description: Intf - vpls bgp-vpls neighbor 203.0.5.5 vpls-id 1
      Flow Label Transmit: No, Flow Label Receive: No
```

show vpls connections (with multiple pseudowires)

```
user@host> show vpls connections
Layer-2 VPN connections:

Legend for connection status (St)
EI -- encapsulation invalid      NC -- interface encapsulation not CCC/TCC/VPLS
EM -- encapsulation mismatch     WE -- interface and instance encaps not same
VC-Dn -- Virtual circuit down    NP -- interface hardware not present
CM -- control-word mismatch      -> -- only outbound connection is up
CN -- circuit not provisioned    <- -- only inbound connection is up
OR -- out of range               Up -- operational
OL -- no outgoing label          Dn -- down
LD -- local site signaled down   CF -- call admission control failure
RD -- remote site signaled down  SC -- local and remote site ID collision
LN -- local site not designated  LM -- local site ID not minimum designated
RN -- remote site not designated RM -- remote site ID not minimum designated
XX -- unknown connection status  IL -- no incoming label
MM -- MTU mismatch               MI -- Mesh-Group ID not available
BK -- Backup connection          ST -- Standby connection
PF -- Profile parse failure      PB -- Profile busy
RS -- remote site standby        SN -- Static Neighbor
LB -- Local site not best-site   RB -- Remote site not best-site
VM -- VLAN ID mismatch

Legend for interface status
Up -- operational
Dn -- down

Instance: vpls
```

```
  VPLS-id: 100
  Mesh-group connections: __ves__
    Neighbor                Type  St     Time last up          # Up trans
    10.255.114.3 (vpls-id 100)  rmt   Up     Apr 11 23:38:38 2013           1
      Remote PE: 10.255.114.3, Negotiated control-word: No
      Incoming label: 262145, Outgoing label: 262145
      Negotiated PW status TLV: No
      Local interface: lsi.1049090, Status: Up, Encapsulation: ETHERNET
        Description: Intf - vpls h-vpls neighbor 10.255.114.3 vpls-id 100

  Mesh-group connections: spokes
    Neighbor                Type  St     Time last up          # Up trans
    10.255.114.4 (vpls-id 200)  rmt   Up     Apr 11 23:39:25 2013           1
      Remote PE: 10.255.114.4, Negotiated control-word: No
      Incoming label: 262148, Outgoing label: 304224
      Negotiated PW status TLV: Yes
      local PW status code: 0x00000000, Neighbor PW status code: 0x00000000
      Local interface: lsi.1049091, Status: Up, Encapsulation: ETHERNET
        Description: Intf - vpls h-vpls neighbor 10.255.114.4 vpls-id 200
      10.255.114.4 (vpls-id 201)  rmt   Up     Apr 11 23:39:25 2013           1
        Remote PE: 10.255.114.4, Negotiated control-word: No
        Incoming label: 262149, Outgoing label: 304225
        Negotiated PW status TLV: Yes
        local PW status code: 0x00000000, Neighbor PW status code: 0x00000000
        Local interface: lsi.1049096, Status: Up, Encapsulation: ETHERNET
        Description: Intf - vpls h-vpls neighbor 10.255.114.4 vpls-id 201
```

show vpls connections extensive (Static VPLS Neighbors)

```
user@host> show vpls connections extensive instance red
Layer-2 VPN connections:

Legend for connection status (St)
EI -- encapsulation invalid      NC -- interface encapsulation not CCC/TCC/VPLS
EM -- encapsulation mismatch     WE -- interface and instance encaps not same
VC-Dn -- Virtual circuit down    NP -- interface hardware not present
CM -- control-word mismatch      -> -- only outbound connection is up
CN -- circuit not provisioned    <- -- only inbound connection is up
OR -- out of range              Up -- operational
OL -- no outgoing label          Dn -- down
LD -- local site signaled down   CF -- call admission control failure
```

```
RD -- remote site signaled down  SC -- local and remote site ID collision
LN -- local site not designated  LM -- local site ID not minimum designated
RN -- remote site not designated RM -- remote site ID not minimum designated
XX -- unn connection status  IL -- no incoming label
MM -- MTU mismatch              MI -- Mesh-Group ID not available
BK -- Backup connection                ST -- Standby connection
PF -- Profile parse failure      PB -- Profile busy
RS -- remote site standby       SN -- Static Neighbor

Legend for interface status
Up -- operational
Dn -- down

Instance: static
  VPLS-id: 1
   Number of local interfaces: 1
   Number of local interfaces up: 1
   ge-0/0/5.0
   lsi.1049344                  Intf - vpls static neighbor 10.255.114.3 vpls-id 1
   Neighbor                 Type  St     Time last up          # Up trans
   10.255.114.3(vpls-id 1)(SN) rmt Up     Mar  4 08:48:41 2010           1
     Remote PE: 10.255.114.3, Negotiated control-word: No
     Incoming label: 29696, Outgoing label: 29697
     Negotiated PW status TLV: No
     Local interface: lsi.1049344, Status: Up, Encapsulation: ETHERNET
       Description: Intf - vpls static neighbor 10.255.114.3 vpls-id 1
   Connection History:
       Mar  4 08:48:41 2010  status update timer
       Mar  4 08:48:41 2010  PE route changed
       Mar  4 08:48:41 2010  Out lbl Update                   29697
       Mar  4 08:48:41 2010  In lbl Update                    29696
       Mar  4 08:48:41 2010  loc intf up                lsi.1049344
```

command-name

```
user@PE1> show vpls connections extensive (Multihoming with FEC 129)
Layer-2 VPN connections:

Legend for connection status (St)
EI -- encapsulation invalid      NC -- interface encapsulation not CCC/TCC/VPLS
EM -- encapsulation mismatch     WE -- interface and instance encaps not same
```

```
VC-Dn -- Virtual circuit down    NP -- interface hardware not present
CM -- control-word mismatch      -> -- only outbound connection is up
CN -- circuit not provisioned    <- -- only inbound connection is up
OR -- out of range               Up -- operational
OL -- no outgoing label          Dn -- down
LD -- local site signaled down   CF -- call admission control failure
RD -- remote site signaled down  SC -- local and remote site ID collision
LN -- local site not designated  LM -- local site ID not minimum designated
RN -- remote site not designated RM -- remote site ID not minimum designated
XX -- unknown connection status  IL -- no incoming label
MM -- MTU mismatch               MI -- Mesh-Group ID not available
BK -- Backup connection          ST -- Standby connection
PF -- Profile parse failure      PB -- Profile busy
RS -- remote site standby        SN -- Static Neighbor
LB -- Local site not best-site   RB -- Remote site not best-site
VM -- VLAN ID mismatch

Legend for interface status
Up -- operational
Dn -- down

Instance: green
  L2vpn-id: 100:100
  Local-id: 192.0.2.2
    Number of local interfaces: 2
    Number of local interfaces up: 2
    ge-0/3/1.0
    ge-0/3/3.0
    lsi.101711873                Intf - vpls green local-id 192.0.2.2 remote-id 192.0.2.4
neighbor 192.0.2.4
    Remote-id                Type  St     Time last up          # Up trans
    192.0.2.4                  rmt   Up     Jan 31 13:49:52 2012           1
      Remote PE: 192.0.2.4, Negotiated control-word: No
      Incoming label: 262146, Outgoing label: 262146
      Local interface: lsi.101711873, Status: Up, Encapsulation: ETHERNET
        Description: Intf - vpls green local-id 192.0.2.2 remote-id 192.0.2.4 neighbor 192.0.2.4
    Connection History:
        Jan 31 13:49:52 2012  status update timer
        Jan 31 13:49:52 2012  PE route changed
        Jan 31 13:49:52 2012  Out lbl Update                    262146
        Jan 31 13:49:52 2012  In lbl Update                     262146
        Jan 31 13:49:52 2012  loc intf up               lsi.101711873
  Multi-home:
```

```
Local-site                Id     Pref   State
test                      1      100    Up
  Number of interfaces: 1
  Number of interfaces up: 1
    ge-0/3/1.0
  Received multi-homing advertisements:
    Remote-PE         Pref   flag   Description
    192.0.2.4           100    0x0
```

Release Information

Command introduced before Junos OS Release 7.4.

`instance-history` option introduced in Junos OS Release 12.3R2.

show vpls flood event-queue

IN THIS SECTION

Syntax

```
show vpls flood event-queue
```

Description

Display the pending events in the VPLS flood queue.

Options

This command has no options.

Required Privilege Level

view

Output Fields

Table 40 on page 894 lists the output fields for the `show vpls flood event-queue` command. Output fields are listed in the approximate order in which they appear.

Table 40: show vpls flood event-queue Output Fields

Field Name	Field Description
Current Pending Event	Provides information on the current event in the VPLS flood event queue.
Name	Name of the event.
Owner Name	Name of the interface associated with the flood event.
Pending Op	Pending operation for the event.
Last Error	Name of the last error encountered.
Number of Retries	Number of attempts made to update the event queue.
Pending Event List	List of the events awaiting processing.
Event Name	Name of the event.

Table 40: show vpls flood event-queue Output Fields *(Continued)*

Field Name	Field Description
Pending Op	Pending operation for the event.
Event Identifier	Name of the interface associated with the flood event.

Sample Output

show vpls flood event-queue

```
user@host> show vpls flood event-queue
Current Pending Event
    Name:          Flood Nexthop
    Owner Name:ge-4/3/0.0
    Pending Op: ADD
    Last Error:ENOMEM
    Number of Retries:3
    Pending Event List:
    Event Name      Pending Op      Event Identifier
    Flood Nexthop   ADD             ge-4/3/0.0
    Flood Route     ADD             ge-4/3/0.0
```

Release Information

Command introduced in Junos OS Release 8.0.

show vpls flood instance

IN THIS SECTION

Syntax

```
show vpls flood instance
<brief | detail | extensive>
 <instance-name>
<logical-system logical-system-name>
```

Description

Display VPLS information related to the flood process.

Options

none	Display VPLS information related to the flood process for all routing instances.
brief | detail | extensive	(Optional) Display the specified level of output.
instance-name	(Optional) Display VPLS information related to the flood process for the specified routing instance.
logical-system *logical-system-name*	(Optional) Display VPLS information related to the flood process for the specified logical system.

Required Privilege Level

view

Output Fields

Table 41 on page 897 lists the output fields for the `show vpls flood instance` command. Output fields are listed in the approximate order in which they appear.

Table 41: show vpls flood instance Output Fields

Field Name	Field Description
Logical system	Name of the logical system.
Name	Name of the VPLS routing instance.
CEs	Number of CE routers connected to the VPLS instance.
VEs	Number of VE routers connected to the VPLS instance.
Flood routes	List of all flood routes associated with the VPLS instance.
Prefix	Prefix for the route.
Type	Type of route.
Owner	VPLS routing instance or interface associated with the route.
Nhtype	Next-hop type. For example, **flood** for a flood route.
Nhindex	Next-hop index number for the route.

Sample Output

show vpls flood instance

```
user@host> show vpls flood instance

Logical system: __example_ls1__
```

```
Name: green
CEs: 1
VEs: 1
Flood Routes:
  Prefix    Type          Owner                NhType          NhIndex
  default   ALL_CE_FLOOD  green                flood           383
  0x47/16   CE_FLOOD      fe-1/2/1.0           flood           388
```

show vpls flood instance logical-system-name

```
user@host:__example_ls1__> show vpls flood instance example_ls1


Logical system: __example_ls1__
Name: green
CEs: 1
VEs: 1
Flood Routes:
  Prefix    Type          Owner                NhType          NhIndex
  default   ALL_CE_FLOOD  green                flood           383
  0x47/16   CE_FLOOD      fe-1/2/1.0           flood           388
```

show vpls flood instance detail

```
user@host:__example_ls1__> show vpls flood instance detail


Logical system: __example_ls1__
Name: green
CEs: 1
VEs: 1
Flood Routes:
  Prefix    Type          Owner                NhType          NhIndex
  default   ALL_CE_FLOOD  green                flood           383
  0x47/16   CE_FLOOD      fe-1/2/1.0           flood           388
```

Release Information

Command introduced in Junos OS Release 8.0.

show vpls flood route

IN THIS SECTION

Syntax

```
show vpls flood route
(all-ce-flood instance-name instance-name <logical-system-name logical-system-name> |
ce-flood interface interface-name)
```

Description

Display VPLS route information related to the flood process for either the specified routing instance or the specified interface.

Options

all-ce-flood	Display the flood next-hop route for all customer edge routers for traffic coming from the core of the network.
ce-flood interface *interface-name*	Display the flood next-hop route for traffic coming from the specified customer edge interface.
instance-name *instance-name*	Display the flood routes for the specified instance.

logical-system-name *logical-system-name* (Optional) Specify the logical system whose flood routes you want to display. You can only specify the default logical system name for VPLS. The default logical system name is **__example_ls1__**\ (the name must be entered in the command with the underscore characters).

Required Privilege Level

view

Output Fields

Table 42 on page 900 lists the output for the `show vpls flood route` command. Output fields are listed in the approximate order in which they appear.

Table 42: show vpls flood route Output Fields

Field Name	Field Description
Flood route prefix	Prefix for the flood route.
Flood route type	Type of flood route (either **CE_FLOOD** or **ALL_CE_FLOOD**).
Flood route owner	VPLS routing instance or interface associated with the flood route.
Nexthop type	Next-hop type. For example, **flood** for a flood route.
Nexthop index	Next-hop index number for the route.
Interfaces flooding to	Interfaces to which VPLS routes are being flooded.
Name	Name of the interface.
Type	Type of VPLS router (**CE** or **VE**).
Nh type	Next-hop type.

Table 42: show vpls flood route Output Fields *(Continued)*

Field Name	Field Description
Index	Index number for the flood route.

Sample Output

show vpls flood route all-ce-flood

```
user@host:__example_ls1__> show vpls flood route all-ce-flood logical-system-name
__example_ls1__instance-name green


  Flood route prefix: default
  Flood route type: ALL_CE_FLOOD
  Flood route owner: green
  Nexthop type: flood
  Nexthop index: 383
    Interfaces Flooding to:
    Name             Type          NhType          Index
    fe-1/2/1.0       CE
```

show vpls flood route ce-flood

```
user@host:__example_ls1__> show vpls flood route ce-flood interface fe-1/2/1.0


  Flood route prefix: 0x47/16
  Flood route type: CE_FLOOD
  Flood route owner: fe-1/2/1.0
  Nexthop type: flood
  Nexthop index: 388
    Interfaces Flooding to:
    Name             Type          NhType          Index
    lsi.49152        VE             indr            262142
```

Release Information

Command introduced in Junos OS Release 8.0.

show vpls mac-table

IN THIS SECTION

Syntax

```
show vpls mac-table
<age>
<brief | detail | extensive | summary>
<bridge-domain bridge-domain-name>
<instance instance-name>
<interface interface-name>
<logical-system (all | logical-system-name)>
<mac-address>
<vlan-id vlan-id-number>
```

Description

Display learned virtual private LAN service (VPLS) media access control (MAC) address information.

Options

none	Display all learned VPLS MAC address information.
age	(Optional) Display age of a single mac-address.
brief | detail | extensive | summary	(Optional) Display the specified level of output.
bridge-domain *bridge-domain-name*	(Optional) Display learned VPLS MAC addresses for the specified bridge domain.
instance *instance-name*	(Optional) Display learned VPLS MAC addresses for the specified instance.
interface *interface-name*	(Optional) Display learned VPLS MAC addresses for the specified instance.
logical-system (all | *logical-system-name*)	(Optional) Display learned VPLS MAC addresses for all logical systems or for the specified logical system.
mac-address	(Optional) Display the specified learned VPLS MAC address information..
vlan-id *vlan-id-number*	(Optional) Display learned VPLS MAC addresses for the specified VLAN.

Required Privilege Level

view

Output Fields

Table 43 on page 903 describes the output fields for the `show vpls mac-table` command. Output fields are listed in the approximate order in which they appear.

Table 43: show vpls mac-table Output fields

Field Name	Field Description
Age	Age of a single mac-address.
Routing instance	Name of the routing instance.

Table 43: show vpls mac-table Output fields *(Continued)*

Field Name	Field Description
Bridging domain	Name of the bridging domain.
MAC address	MAC address or addresses learned on a logical interface.
MAC flags	Status of MAC address learning properties for each interface: • S—Static MAC address configured. • D—Dynamic MAC address learned. • SE—MAC accounting is enabled. • NM—Nonconfigured MAC.
Logical interface	Name of the logical interface.
MAC count	Number of MAC addresses learned on a specific routing instance or interface.
Learning interface	Logical interface or logical Label Switched Interface (LSI) the address is learned on.
Base learning interface	Base learning interface of the MAC address. This field is introduced in Junos OS Release 14.2.
Learn VLAN ID/ VLAN	VLAN ID of the routing instance or bridge domain in which the MAC address was learned.
VXLAN ID/VXLAN	VXLAN Network Identifier (VNI)
Layer 2 flags	Debugging flags signifying that the MAC address is present in various lists.
Epoch	Spanning Tree Protocol epoch number identifying when the MAC address was learned. Used for debugging.
Sequence number	Sequence number assigned to this MAC address. Used for debugging.

Table 43: show vpls mac-table Output fields *(Continued)*

Field Name	Field Description
Learning mask	Mask of Packet Forwarding Engines where this MAC address was learned. Used for debugging.
IPC generation	Creation time of the logical interface when this MAC address was learned. Used for debugging.

Sample Output

show vpls mac-table

```
user@host> show vpls mac-table
MAC flags (S -static MAC, D -dynamic MAC,
           SE -Statistics enabled, NM -Non configured MAC)

Routing instance : vpls_ldp1
VLAN : 223
   MAC                 MAC      Logical
   address             flags    interface
   00:00:5e:00:53:5d   D        ge-0/2/5.400

MAC flags (S -static MAC, D -dynamic MAC,
           SE -Statistics enabled, NM -Non configured MAC)

Routing instance : vpls_red
VLAN : 401
   MAC                 MAC      Logical
   address             flags    interface
   00:00:5e:00:53:12   D        lsi.1051138
   00:00:5e:00:53:f0   D        lsi.1051138
```

show vpls mac-table (with Layer 2 Services over GRE Interfaces)

```
user@host> show vpls mac-table
MAC flags (S -static MAC, D -dynamic MAC, L -locally learned
```

```
           SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC)

Routing instance : vpls_4site:1000
 Bridging domain : __vpls_4site:1000__,   MAC                MAC      Logical
   address             flags    interface
   00:00:5e:00:53:f4   D,SE     ge-4/2/0.1000
   00:00:5e:00:53:33   D,SE     lsi.1052004
   00:00:5e:00:53:32   D,SE     lsi.1048840
   00:00:5e:00:53:14   D,SE     lsi.1052005
   00:00:5e:00:53:f7   D,SE     gr-1/2/10.10
```

show vpls mac-table (with VXLAN enabled)

```
user@host> show vpls mac-table
MAC flags (S -static MAC, D -dynamic MAC, L -locally learned
           SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC)

Routing instance : vpls_4site:1000
 Bridging domain : __vpls_4site:1000__, VLAN : 4094,4093
  VXLAN: Id : 300, Multicast group: 233.252.0.1
   MAC                 MAC      Logical
   address             flags    interface
   00:00:5e:00:53:f4   D,SE     ge-4/2/0.1000
   00:00:5e:00:53:33   D,SE     lsi.1052004
   00:00:5e:00:53:32   D,SE     lsi.1048840
   00:00:5e:00:53:14   D,SE     lsi.1052005
   00:00:5e:00:53:f7   D,SE     vtep.1052010
   00:00:5e:00:53:3f   D,SE     vtep.1052011
```

show vpls mac-table age (for GE interface)

```
user@host> show vpls mac-table age 00:00:5e:00:53:1a instance vpls_instance_1
MAC Entry Age information
Current Age: 4 seconds
```

show vpls mac-table age (for AE interface)

```
user@host> show vpls mac-table age 000:00:5e:00:53:1a instance vpls_instance_1
MAC Entry Age information
Current Age on FPC1: 102 seconds
Current Age on FPC2: 94 seconds
```

show vpls mac-table count

```
user@host> show vpls mac-table count
0 MAC address learned in routing instance __example_private1__

  MAC address count per interface within routing instance:
    Logical interface        MAC count
    lc-0/0/0.32769                   0
    lc-0/1/0.32769                   0
    lc-0/2/0.32769                   0
    lc-2/0/0.32769                   0
    lc-0/3/0.32769                   0
    lc-2/1/0.32769                   0
    lc-9/0/0.32769                   0
    lc-11/0/0.32769                  0
    lc-2/2/0.32769                   0
    lc-9/1/0.32769                   0
    lc-11/1/0.32769                  0
    lc-2/3/0.32769                   0
    lc-9/2/0.32769                   0
    lc-11/2/0.32769                  0
    lc-11/3/0.32769                  0
    lc-9/3/0.32769                   0

  MAC address count per learn VLAN within routing instance:
    Learn VLAN ID            MAC count
                0                    0

1 MAC address learned in routing instance vpls_ldp1

  MAC address count per interface within routing instance:
    Logical interface        MAC count
    lsi.1051137                      0
```

```
    ge-0/2/5.400                    1

  MAC address count per learn VLAN within routing instance:
    Learn VLAN ID            MAC count
                0                    1

1 MAC address learned in routing instance vpls_red

  MAC address count per interface within routing instance:
    Logical interface        MAC count
    ge-0/2/5.300                    1

  MAC address count per learn VLAN within routing instance:
    Learn VLAN ID            MAC count
                0                    1
```

show vpls mac-table detail

```
user@host> show vpls mac-table detail
MAC address: 00:00:5e:00:53:5d
  Routing instance: vpls_ldp1
   Learning interface: ge-0/2/5.400
   Layer 2 flags: in_ifd, in_ifl, in_vlan, kernel
   Epoch: 0                          Sequence number: 1
   Learning mask: 0x1                IPC generation: 0

MAC address: 00:00:5e:00:53:5d
  Routing instance: vpls_red
   Learning interface: ge-0/2/5.300
   Layer 2 flags: in_ifd, in_ifl, in_vlan, kernel
   Epoch: 0                          Sequence number: 1
   Learning mask: 0x1                IPC generation: 0
```

show vpls mac-table extensive

```
user@host> show vpls mac-table extensive

MAC address: 00:00:5e:00:53:00
  Routing instance: vpls_1
   Bridging domain: __vpls_1__, VLAN : NA
```

```
    Learning interface: lsi.1049165
    Base learning interface: lsi.1049165
    Layer 2 flags: in_hash,in_ifd,in_ifl,in_vlan,in_rtt,kernel,in_ifbd
    Epoch: 0                          Sequence number: 1
    Learning mask: 0x00000001

MAC address: 00:00:5e:00:53:01
  Routing instance: vpls_1
    Bridging domain: __vpls_1__, VLAN : NA
    Learning interface: lsi.1049165
    Base learning interface: lsi.1049165
    Layer 2 flags: in_hash,in_ifd,in_ifl,in_vlan,in_rtt,kernel,in_ifbd
    Epoch: 0                          Sequence number: 1
    Learning mask: 0x00000001

MAC address: 00:00:5e:00:53:02
  Routing instance: vpls_1
    Bridging domain: __vpls_1__, VLAN : NA
    Learning interface: lsi.1049165
    Base learning interface: lsi.1049165
    Layer 2 flags: in_hash,in_ifd,in_ifl,in_vlan,in_rtt,kernel,in_ifbd
    Epoch: 0                          Sequence number: 1
    Learning mask: 0x00000001

MAC address: 00:00:5e:00:53:03
  Routing instance: vpls_1
    Bridging domain: __vpls_1__, VLAN : NA
    Learning interface: lsi.1049165
    Base learning interface: lsi.1049165
    Layer 2 flags: in_hash,in_ifd,in_ifl,in_vlan,in_rtt,kernel,in_ifbd
    Epoch: 0                          Sequence number: 1
    Learning mask: 0x00000001
```

Release Information

Command introduced in Junos OS Release 8.5.

show vpls statistics

IN THIS SECTION

Syntax

```
show vpls statistics
<instance instance-name>
<logical-system (all | logical-system-name)>
```

Description

(T Series and M Series routers, except for the M160 router) Display virtual private LAN service (VPLS) statistics.

Options

none	Display VPLS statistics for all routing instances.
instance *instance-name*	(Optional) Display VPLS statistics for a specific VPLS routing instance only.
logical-system (all | *logical-system-name***)**	(Optional) Perform this operation on all logical systems or on a particular logical system.

Required Privilege Level

view

Output Fields

Table 44 on page 911 lists the output fields for the `show vpls statistics` command. Output fields are listed in the approximate order in which they appear.

Table 44: show vpls statistics Output Fields

Field Name	Field Description
Instance	Name of the VPLS instance.
Local interface	Name of the local VPLS virtual loopback tunnel interface, **vt-*fpc/pic/port.nnnnn***, where ***nnnnn*** is a dynamically generated virtual port used to transport and receive packets from other provider edge (PE) routers in the VPLS domain.
Index	Number associated with the next hop.
Remote provider edge router	Address of the remote provider edge router.
Multicast packets	Number of multicast packets received.
Multicast bytes	Number of multicast bytes received.
Flood packets	Number of VPLS flood packets received.
Flood bytes	Number of VPLS flood bytes received.
Current MAC count	Number of MAC addresses learned by the interface and the configured maximum limit on the number of MAC addresses that can be learned.

Sample Output

show vpls statistics

```
user@host> show vpls statistics

VPLS statistics:

Instance: green

   Local interface: fe-2/2/1.0, Index: 69
     Multicast packets:                     1
     Multicast bytes  :                    60
     Flooded packets  :                    18
     Flooded bytes    :                  2556
     Current MAC count:                     1

   Local interface: lt-0/3/0.2, Index: 72
     Multicast packets:                     3
     Multicast bytes  :                   153
     Flooded packets  :                     1
     Flooded bytes    :                    51
     Current MAC count:                     1

   Local interface: lsi.32769, Index: 75
     Current MAC count:                     0

   Local interface: lsi.32771, Index: 77
   Remote PE: 10.255.14.222
     Current MAC count:                     2

Instance: red

   Local interface: vt-0/3/0.32768, Index: 74
     Multicast packets:                     0
     Multicast bytes  :                     0
     Flooded packets  :                     0
     Flooded bytes    :                     0
     Current MAC count:                     0

   Local interface: vt-0/3/0.32770, Index: 76
     Multicast packets:                     0
```

```
    Multicast bytes  :                    0
    Flooded packets  :                    0
    Flooded bytes    :                    0
    Current MAC count:                    0
```

show vpls statistics instance

```
user@host> show vpls statistics instance red


Layer-2 VPN Statistics:
Instance: red

   Local interface: vt-3/2/0.32768, Index: 73
   Remote provider edge router: 10.255.17.35
     Multicast packets:                   0
     Multicast bytes  :                   0
     Flood packets    :                   0
     Flood bytes      :                   0
     Current MAC count:                   1 (Limit 20)
```

Release Information

Command introduced before Junos OS Release 7.4.