Junos® OS

Layer 2 Network Access Protocols Feature Guide for Routing Devices

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Junos® OS Layer 2 Network Access Protocols Feature Guide for Routing Devices

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About the Documentation

Documentation and Release Notes

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If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

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Using the Examples in This Manual

If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   system {
     scripts {
       commit {
         file ex-script.xsl;
       }
     }
   }
   interfaces {
     fxp0 {
       disable;
       unit 0 {
         family inet {
           address 10.0.0.1/24;
         }
       }
     }
   }
   ```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

   ```
   [edit]
   user@host# load merge /var/tmp/ex-script.conf
   load complete
   ```

Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   commit {
     file ex-script-snippet.xsl; }
   ```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

   ```
   [edit]
   ```

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

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see CLI Explorer.

Documentation Conventions

Table 1 on page xiii defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Table 2 on page xiii defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the **configure** command: user@host> **configure**

Table 2: Text and Syntax Conventions (continued)

Convention	Description	Examples
`Fixed-width text like this`	Represents output that appears on the terminal screen.	`user@host>` **show chassis alarms** `No alarms currently active`
Italic text like this	• Introduces or emphasizes important new terms. • Identifies guide names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS CLI User Guide* • RFC 1997, *BGP Communities Attribute*
Italic text like this	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# **set system domain-name** *domain-name*
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	• To configure a stub area, include the **stub** statement at the **[edit protocols ospf area area-id]** hierarchy level. • The console port is labeled **CONSOLE**.
< > (angle brackets)	Encloses optional keywords or variables.	**stub <default-metric** ***metric*****>;**
| (pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	**broadcast | multicast** **(*string1* | *string2* | *string3*)**
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	**rsvp { # Required for dynamic MPLS only**
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	**community name members [** ***community-ids*** **]**

Indention and braces ({ })	Identifies a level in the configuration hierarchy.	[edit]
		routing-options {
		  static {
		  route default {
		  nexthop *address*;
		  retain;
		  }
		  }
		}

; (semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	• In the Logical Interfaces box, select **All Interfaces**. • To cancel the configuration, click **Cancel**.

Table 2: Text and Syntax Conventions (continued)

Convention	Description	Examples
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

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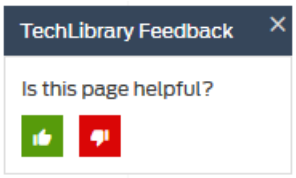
We encourage you to provide feedback so that we can improve our documentation. You can use either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the Juniper Networks TechLibrary site, and do one of the following:



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- Join and participate in the Juniper Networks Community Forum: https://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: https://www.juniper.net/cm/

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://entitlementsearch.juniper.net/entitlementsearch/

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You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at https://www.juniper.net/cm/.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see https://www.juniper.net/support/requesting-support.html.

PART 1

Overview

CHAPTER 1

Network Access Configuration Overview

Network Access Configuration Overview

The Junos operating system (Junos OS) enables you to configure network access features for the device at the **[edit access]** hierarchy level. This includes Layer 2 Tunneling Protocol (L2TP), Point-to-Point Protocol (PPP), and Subscriber Access configuration.

The PPP is an encapsulation protocol for transporting IP traffic across point-to-point links. For M7i, M10i, and M120 routers, you can configure L2TP tunneling security services on an Adaptive Services or a MultiServices Physical Interface Card (PIC).

The L2TP protocol allows PPP) to be tunneled within a network.

For a complete hierarchy of access configuration statements, see "Access Configuration Statements" on page 96.

For information about configuring Subscriber Access, see *Broadband Subscriber Sessions Feature Guide*

Related Documentation

- Access Configuration Statements on page 96
- Configuring the PPP Authentication Protocol on page 8
- Configuring L2TP for Enabling PPP Tunneling Within a Network on page 12
- Defining the Minimum L2TP Configuration on page 14
- Configuring the Address Pool for L2TP Network Server IP Address Allocation on page 15
- Configuring the Group Profile for Defining L2TP Attributes on page 17
- Configuring Access Profiles for L2TP or PPP Parameters on page 20

PART 2

Configuration

CHAPTER 2

Configuring PPP and L2TP

Configuring the PPP Authentication Protocol

The Point-to-Point Protocol (PPP) is an encapsulation protocol for transporting IP traffic across point-to-point links. To configure PPP, you can configure the Challenge Handshake Authentication Protocol (CHAP). CHAP allows each end of a PPP link to authenticate its peer, as defined in RFC 1994. The authenticator sends its peer a randomly-generated challenge that the peer must encrypt using a one-way hash; the peer must then respond with that encrypted result. The key to the hash is a secret known only to the authenticator and authenticated. When the response is received, the authenticator compares its calculated result with the peer's response. If they match, the peer is authenticated.

Each end of the link identifies itself to its peer by including its name in the CHAP challenge and response packets it sends to the peer. This name defaults to the local hostname, or you can explicitly set it using the **local-name** option. When a host receives a CHAP challenge or CHAP response packet on a particular interface, it uses the peer identity to look up the CHAP secret key to use.

To configure CHAP, include the **profile** statement at the **[edit access]** hierarchy level:

```
[edit access]
profile profile-name {
   client client-name chap-secret chap-secret;
}
```

Then reference the CHAP profile name at the **[edit interfaces]** hierarchy level.

You can configure multiple CHAP profiles, and configure multiple clients for each profile.

Definitions:

- **profile** is the mapping between peer identifiers and CHAP secret keys. The identity of the peer contained in the CHAP challenge or response queries the profile for the secret key to use.
- **client** is the peer identity.
- **chap-secret** is the secret key associated with that peer.

Related Documentation

- Example: Configuring PPP CHAP on page 9

- Example: Configuring CHAP Authentication with RADIUS on page 9

Example: Configuring PPP CHAP

The following example shows how to configure the profile **pe-A-ppp-clients** at the **[edit access]** hierarchy level; then reference it at the **[edit interfaces]** hierarchy level:

```
[edit]
access {
  profile pe-A-ppp-clients {
    client cpe-1 chap-secret "$1$dQYsZ$B5ojUeUjDsUo.yKwcCZ0";
    # SECRET-DATA
    client cpe-2 chap-secret "$1$kdAsfaDAfkdjDsASxfafdKdFKJ";
    # SECRET-DATA
  }
}
interfaces {
  so-1/1/1 {
    encapsulation ppp;
    ppp-options {
      chap {
        access-profile pe-A-ppp-clients;
        local-name "pe-A-so-1/1/1";
      }
    }
  }
  so-1/1/2 {
    encapsulation ppp;
    ppp-options {
      chap {
        passive;
        access-profile pe-A-ppp-clients;
        local-name "pe-A-so-1/1/2";
      }
    }
  }
}
```

Related Documentation

- Configuring the PPP Authentication Protocol on page 8

Example: Configuring CHAP Authentication with RADIUS

You can send RADIUS messages through a routing instance to customer RADIUS servers in a private network. To configure the routing instance to send packets to a RADIUS server, include the **routing-instance** statement at the **[edit access profile profile-name radius-server]** hierarchy level and apply the profile to an interface with the **access-profile** statement at the **[edit interfaces** ***interface-name*** **unit** ***logical-unit-number*** **ppp-options chap]** hierarchy level.

In this example, PPP peers of interfaces **at-0/0/0.0** and **at-0/0/0.1** are authenticated by a RADIUS server reachable via routing instance **A**. PPP peers of interfaces **at-0/0/0.2** and **at-0/0/0.3** are authenticated by a RADIUS server reachable via routing instance **B**.

For more information about RADIUS authentication, see *Configuring RADIUS Server Authentication*.

```
system {
  radius-server {
    1.1.1.1 secret $9$dalkfj;
    2.2.2.2 secret $9$adsfaszx;
  }
}
routing-instances {
  A {
    instance-type vrf;
    ...
  }
  B {
    instance-type vrf;
    ...
  }
}
access {
  profile A-PPP-clients {
    authentication-order radius;
    radius-server {
      3.3.3.3 {
        port 3333;
        secret "$9$LO/7NbDjqmPQGDmT"; # # SECRET-DATA
        timeout 3;
        retry 3;
        source-address 99.99.99.99;
        routing-instance A;
      }
      4.4.4.4 {
        routing-instance A;
        secret $9$adsfaszx;
      }
    }
  }
  profile B-PPP-clients {
    authentication-order radius;
    radius-server {
      5.5.5.5 {
        routing-instance B;
        secret $9$kljhlkhl;
      }
      6.6.6.6 {
        routing-instance B;
        secret $9$kljhlkhl;
      }
    }
  }
}
```

```
interfaces {
  at-0/0/0 {
    atm-options {
      vpi 0;
    }
    unit 0 {
      encapsulation atm-ppp-llc;
      ppp-options {
        chap {
          access-profile A-PPP-clients;
        }
      }
      keepalives {
        interval 20;
        up-count 5;
        down-count 5;
      }
      vci 0.128;
      family inet {
        address 21.21.21.21/32 {
          destination 21.21.21.22;
        }
      }
    }
    unit 1 {
      encapsulation atm-ppp-llc;
      ...
      ppp-options {
        chap {
          access-profile A-PPP-clients;
        }
      }
      ...
    }
    unit 2 {
      encapsulation atm-ppp-llc;
      ...
      ppp-options {
        chap {
          access-profile B-PPP-clients;
        }
      }
      ...
    }
    unit 3 {
      encapsulation atm-ppp-llc;
      ...
      ppp-options {
        chap {
          access-profile B-PPP-clients;
        }
      }
      ...
    }
    ...
  }
```

```
    ...
}
```

Users who log in to the router with telnet or SSH connections are authenticated by the RADIUS server **1.1.1.1**. The backup RADIUS server for these users is **2.2.2.2**.

Each profile may contain one or more backup RADIUS servers. In this example, PPP peers are CHAP authenticated by the RADIUS server **3.3.3.3** (with **4.4.4.4**. as the backup server) or RADIUS server **5.5.5.5** (with **6.6.6.6** as the backup server).

Related Documentation

- Configuring the Authentication Order on page 21
- Example: Configuring PPP CHAP on page 9
- Configuring the PPP Authentication Protocol on page 8

Configuring L2TP for Enabling PPP Tunneling Within a Network

For M7i and M10i routers, you can configure Layer 2 Tunneling Protocol (L2TP) tunneling security services on an Adaptive Services Physical Interface Card (PIC) or a MultiServices PIC. The L2TP protocol allows Point-to-Point Protocol (PPP) to be tunneled within a network.

NOTE: For information about how to configure L2TP service, see the *Junos OS Services Interfaces Library for Routing Devices* and the *Junos OS Network Interfaces Library for Routing Devices*.

To configure L2TP, include the following statements at the **[edit access]** hierarchy level:

```
[edit access]
address-pool pool-name {
  address address-or-prefix;
  address-range low <lower-limit> high <upper-limit>;
}
group-profile profile-name {
  l2tp {
    interface-id interface-id;
    lcp-renegotiation;
    local-chap;
    maximum-sessions-per-tunnel number;
    ppp {
      cell-overhead;
      encapsulation-overhead bytes;
      framed-pool pool-id;
      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;
    }
```

```
    }
    profile profile-name {
      authentication-order [ authentication-methods ];
      accounting-order radius;
      client client-name {
        chap-secret chap-secret;
        group-profile profile-name;
        l2tp {
          interface-id interface-id;
          lcp-renegotiation;
          local-chap;
          maximum-sessions-per-tunnel number;
          ppp-authentication (chap | pap);
          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;
      }
    }
    radius-disconnect-port port-number {
      radius-disconnect {
        client-address {
          secret password;
        }
      }
    }
    radius-server server-address {
      accounting-port port-number;
      port port-number;
      retry attempts;
      routing-instance routing-instance-name;
      secret password;
      source-address source-address;
      timeout seconds;
    }
  }
```

Related Documentation

- Defining the Minimum L2TP Configuration on page 14
- Configuring RADIUS Authentication for L2TP on page 53

Defining the Minimum L2TP Configuration

To define the minimum configuration for the Layer 2 Tunneling Protocol (L2TP), include at least the following statements at the **[edit access]** hierarchy level:

```
[edit access]
address-pool pool-name {
  address address-or-prefix;
  address-range low <lower-limit> high <upper-limit>;
}
profile profile-name {
  authentication-order [ authentication-methods ];
  client client-name {
    chap-secret chap-secret;
    l2tp {
      interface-id interface-id;
      maximum-sessions-per-tunnel number;
      ppp-authentication (chap | pap);
      shared-secret shared-secret;
    }
    pap-password pap-password;
    ppp {
      framed-ip-address ip-address;
      framed-pool framed-pool;
      interface-id interface-id;
      primary-dns primary-dns;
      primary-wins primary-wins;
      secondary-dns secondary-dns;
      secondary-wins secondary-wins;
    }
  }
}
radius-server server-address {
  accounting-port port-number;
  port port-number;
  retry attempts;
  secret password;
}
```

NOTE: When the L2TP network server (LNS) is configured with RADIUS authentication, the default behavior is to accept the preferred RADIUS-assigned IP address. Previously, the default behavior was to accept and install the nonzero peer IP address received in the Internet Protocol Control Protocol (IPCP) configuration request packet.

Related Documentation

- Configuring the Address Pool for L2TP Network Server IP Address Allocation on page 15

Configuring the Address Pool for L2TP Network Server IP Address Allocation

With an address pool, you configure an address or address range. When you define an address pool for a client, the L2TP network server (LNS) allocates IP addresses for clients from an address pool. If you do not want to use an address pool, you can specify an IP address by means of the **framed-ip-address** statement at the **[edit access profile *profile-name* client *client-name* ppp]** hierarchy level. For information about specifying an IP address, see "Configuring PPP Properties for a Client-Specific Profile" on page 32.

NOTE: When an address pool is modified or deleted, all the sessions using that pool are deleted.

To define an address or a range of addresses, include the **address-pool** statement at the **[edit access]** hierarchy level:

```
[edit access]
address-pool pool-name;
```

pool-name is the name assigned to the address pool.

To configure an address, include the **address** statement at the **[edit access address-pool *pool-name*]** hierarchy level:

```
[edit access address-pool pool-name]
address address-or-prefix;
```

address-or-prefix is one address or a prefix value.

When you specify an address range, it cannot exceed 65,535 IP addresses.

To configure the address range, include the **address-range** statement at the **[edit access address-pool *pool-name*]** hierarchy level:

```
[edit access address-pool pool-name]
address-range <low lower-limit> <high upper-limit>;
```

- **low *lower-limit***—The lower limit of an address range.
- **high *upper-limit***—The upper limit of an address range.

NOTE: The address pools for user access and Network Address Translation (NAT) can overlap. When you configure an address pool at the **[edit access address-pool *pool-name*]** hierarchy level, you can also configure an address pool at the **[edit services nat pool *pool-name*]** hierarchy level.

Related Documentation

- Configuring the Group Profile for Defining L2TP Attributes on page 17
- Defining the Minimum L2TP Configuration on page 14

Example: Configuring an Address-Assignment Pool

This example shows an address-assignment pool configuration that creates two pools, one for IPv4 DHCP clients (**isp_1**) , and a second pool (**chi-fiber-ra**) that is used for router advertisement.

```
[edit access]
address-assignment {
   network-discovery-router-advertisement chi-fiber-ra;
   pool isp_1 {
      family inet {
         network 192.168.0.0/16;
         range southeast {
            low 192.168.102.2 high 192.168.102.254;
         }
         range northeast {
            low 192.168.119.2 high 192.168.119.250;
         }
         host svale6.boston.example.net {
            hardware-address 00:00:5E:00:53:90;
            ip-address 192.168.44.12;
         }
         dhcp-attributes {
            option-match {
               option-82 {
                  circuit-id fiber range northeast;
               }
               option-82 {
                  circuit-id cable_net range southeast;
               }
            }
            boot-file boot.client;
            boot-server 192.168.200.100;
            grace-period 3600;
            maximum-lease-time 18000;
            netbios-node-type p-node;
            router 192.168.44.44 192.168.44.45;
         }
      }
   }
   pool chi-fiber-ra {
      family inet6 {
         prefix 2001:db8:2008:2009:2010::/48;
         range fiber3 {
            low 2001:db8:2008:2009:2010::1/64;
            high 2001:db8:2008:2009:2010::5/64;
         }
      }
   }
}
```

This example creates an IPv4 address-assignment pool named **isp-1**, which contains two named address ranges, **southeast** and **northeast**. The address-assignment pool also contains a static binding for client **host sval6.boston.example.net**. The ISP_1 pool

configuration also includes the **dhcp-attributes** statement, indicating that the pool is used for DHCP clients. If the option 82 **circuit-id** entry matches the string **fiber**, then DHCP assigns the client an address from the **northeast** range. If the option 82 **circuit-id** matches the string **cable_net**, DHCP assigns an address from the **southeast** range.

The second address-assignment pool created in this example is **chi-fiber-ra**. The **neighbor-discovery-router-advertisement** statement at the beginning of the syntax specifies that this named address-assignment pool is used for router advertisement. The syntax at the end of the example configures the address-assignment pool named **chi-fiber-ra**.

Related Documentation

- *Address-Assignment Pools Overview*
- *Address-Assignment Pool Configuration Overview*

Configuring the Group Profile for Defining L2TP Attributes

Optionally, you can configure the group profile to define the Point-to-Point Protocol (PPP) or Layer 2 Tunneling Protocol (L2TP) attributes. Any client referencing the configured group profile inherits all the group profile attributes.

NOTE: The **group-profile** statement overrides the **user-group-profile** statement, which is configured at the **[edit access profile** *profile-name***]** hierarchy level. The **profile** statement overrides the attributes configured at the **[edit access group-profile** *profile-name***]** hierarchy level. For information about the **user-group-profile** statement, see "Applying a Configured PPP Group Profile to a Tunnel" on page 34.

Tasks for configuring the group profile are:

1. Configuring L2TP for a Group Profile on page 17
2. Configuring the PPP Attributes for a Group Profile on page 18

Configuring L2TP for a Group Profile

To configure the Layer 2 Tunneling Protocol (L2TP) for the group profile, include the following statements at the **[edit access group-profile** *profile-name* **l2tp]** hierarchy level:

```
[edit access group-profile profile-name l2tp]
interface-id interface-id;
lcp-renegotiation;
local-chap;
maximum-sessions-per-tunnel number;
```

interface-id is the identifier for the interface representing an L2TP session configured at the **[edit interfaces** *interface-name* **unit** *local-unit-number* **dial-options]** hierarchy level.

You can configure the LNS so that it renegotiates the link control protocol (LCP) with the PPP client (in the **renegotiation** statement). By default, the PPP client negotiates the LCP with the L2TP access concentrator (LAC). When you do this, the LNS discards the

last sent and the last received LCP configuration request attribute value pairs (AVPs) from the LAC; for example, the LCP negotiated between the PPP client and the LAC.

You can configure the Junos OS so that the LNS ignores proxy authentication AVPs from the LAC and reauthenticates the PPP client using a CHAP challenge (in the **local-chap** statement). When you do this, the LNS directly authenticates the PPP client. By default, the PPP client is not reauthenticated by the LNS.

number is the maximum number of sessions per L2TP tunnel.

Configuring the PPP Attributes for a Group Profile

To configure the Point-to-Point Protocol (PPP) attributes for a group profile, include the following statements at the **[edit access group-profile *profile-name* ppp]** hierarchy level:

```
[edit access group-profile profile-name ppp]
cell-overhead;
encapsulation-overhead bytes;
framed-pool pool-id;
idle-timeout seconds;
interface-id interface-id;
keepalive seconds;
ppp-options {
   aaa-options aaa-options-name;
   chap;
   ignore-magic-number-mismatch;
   initiate-ncp (ip | ipv6 | dual-stack-passive)
   ipcp-suggest-dns-option;
   mru;
   mtu;
   pap;
   peer-ip-address-optional;
}
primary-dns primary-dns;
primary-wins primary-wins;
secondary-dns secondary-dns;
secondary-wins secondary-wins;
```

The **cell-overhead** statement configures the session to use Asynchronous Transfer Mode (ATM)-aware egress shaping on the IQ2 PIC.

bytes (in the **encapsulation-overhead** statement) configures the number of bytes used as overhead for class-of-service calculations.

pool-id (in the **framed-pool** statement) is the name assigned to the address pool.

seconds (in the **idle-timeout** statement) is the number of seconds a user can remain idle before the session is terminated. By default, idle timeout is set to 0. You can configure this to be a value in the range from 0 through 4,294,967,295.

interface-id (in the **interface-id** statement) is the identifier for the interface representing an L2TP session configured at the **[edit interfaces *interface-name* unit *local-unit-number* dial-options]** hierarchy level.

seconds (in the **keepalive** statement) is the time period that must elapse before the Junos OS checks the status of the PPP session by sending an echo request to the peer. For each session, Junos OS sends out three keepalives at 10-second intervals and the session is close if there is no response. By default, the time to send a keepalive message is set to 10 seconds. You configure this to be a value in the range from 0 through 32,767.

primary-dns (in the **primary-dns** statement) is an IP version 4 (IPv4) address.

secondary-dns (in the **secondary-dns** statement) is an IPv4 address.

primary-wins (in the **primary-wins** statement) is an IPv4 address.

secondary-wins (in the **secondary-wins** statement) is an IPv4 address.

See Also

- Example: Group Profile Configuration on page 19
- Defining the Minimum L2TP Configuration on page 14
- Configuring Access Profiles for L2TP or PPP Parameters on page 20

Example: Group Profile Configuration

The following example shows how to configure an L2TP and PPP group profile:

```
[edit access]
group-profile westcoast_users {
   ppp {
      framed-pool customer_a;
      keepalive 15;
      primary-dns 192.120.65.1;
      secondary-dns 192.120.65.2;
      primary-wins 192.120.65.3;
      secondary-wins 192.120.65.4;
      interface-id west
   }
}
group-profile eastcoast_users {
   ppp {
      framed-pool customer_b;
      keepalive 15;
      primary-dns 192.120.65.5;
      secondary-dns 192.120.65.6;
      primary-wins 192.120.65.7;
      secondary-wins 192.120.65.8;
      interface-id east;
   }
}
group-profile westcoast_tunnel {
   l2tp {
      maximum-sessions-per-tunnel 100;
   }
}
group-profile east_tunnel {
   l2tp {
```

```
        maximum-sessions-per-tunnel 125;
    }
}
```

Related Documentation

- Configuring the Group Profile for Defining L2TP Attributes on page 17
- Defining the Minimum L2TP Configuration on page 14
- Referencing the Group Profile from the L2TP Profile on page 28

Configuring Access Profiles for L2TP or PPP Parameters

To validate Layer 2 Tunneling Protocol (L2TP) connections and session requests, you set up access profiles by configuring the profile statement at the **[edit access]** hierarchy level. You can configure multiple profiles. You can also configure multiple clients for each profile.

Tasks for configuring the access profile are:

1. Configuring the Access Profile on page 20
2. Configuring the L2TP Properties for a Profile on page 20
3. Configuring the PPP Properties for a Profile on page 21
4. Configuring the Authentication Order on page 21
5. Configuring the Accounting Order on page 22
6. Example: Access Profile Configuration on page 23

Configuring the Access Profile

To configure the profile, include the **profile** statement at the **[edit access]** hierarchy level:

```
[edit access]
profile profile-name;
```

profile-name is the name assigned to the profile.

NOTE: The **group-profile** statement overrides the **user-group-profile** statement, which is configured at the **[edit access profile *profile-name*]** hierarchy level. The **profile** statement overrides the attributes configured at the **[edit access group-profile *profile-name*]** hierarchy level. For information about the **user-group-profile** statement, see "Applying a Configured PPP Group Profile to a Tunnel" on page 34.

When you configure a profile, you can only configure either L2TP or PPP parameters. You cannot configure both at the same time.

Configuring the L2TP Properties for a Profile

To configure the Layer 2 Tunneling Protocol (L2TP) properties for a profile, include the following statements at the **[edit access profile *profile-name*]** hierarchy level:

```
[edit access profile profile-name]
authentication-order [ authentication-methods ];
accounting-order radius;
client client-name {
  group-profile profile-name;
  l2tp {
    interface-id interface-id;
    lcp-renegotiation;
    local-chap;
    maximum-sessions-per-tunnel number;
    ppp-authentication (chap | pap);
    shared-secret shared-secret;
  }
}
user-group-profile profile-name;
```

Configuring the PPP Properties for a Profile

To configure the PPP properties for a profile, include the following statements at the **[edit access profile *profile-name*]** hierarchy level:

```
[edit access profile profile-name]
authentication-order [ authentication-methods ];
client client-name {
  chap-secret chap-secret;
  group-profile profile-name;
  pap-password pap-password;
  ppp {
    cell-overhead;
    encapsulation-overhead bytes;
    framed-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;
  }
}
```

NOTE: When you configure PPP properties for a profile, you typically configure the **chap-secret** statement or **pap-password** statement.

Configuring the Authentication Order

You can configure the order in which the Junos OS tries different authentication methods when authenticating peers. For each access attempt, the software tries the authentication methods in order, from first to last.

To configure the authentication order, include the **authentication-order** statement at the **[edit access profile *profile-name*]** hierarchy level:

```
[edit access profile profile-name]
authentication-order [ authentication-methods ];
```

In ***authentication-methods***, specify one or more of the following in the preferred order, from first tried to last tried:

- **radius**—Verify the client using RADIUS authentication services.
- **password**—Verify the client using the information configured at the **[edit access profile *profile-name* client *client-name*]** hierarchy level.

NOTE: When you configure the authentication methods for L2TP, only the first configured authentication method is used.

For L2TP, RADIUS authentication servers are configured at the **[edit access radius-server]** hierarchy level. For more information about configuring RADIUS authentication servers, see "Configuring RADIUS Authentication for L2TP" on page 53.

If you do not include the **authentication-order** statement, clients are verified by means of **password** authentication.

Configuring the Accounting Order

You can configure RADIUS accounting for an L2TP profile.

With RADIUS accounting enabled, Juniper Networks routers or switches, acting as RADIUS clients, can notify the RADIUS server about user activities such as software logins, configuration changes, and interactive commands. The framework for RADIUS accounting is described in RFC 2866.

To configure RADIUS accounting, include the **accounting-order** statement at the **[edit access profile *profile-name*]** hierarchy level:

```
[edit access profile profile-name]
accounting-order radius;
```

When you enable RADIUS accounting for an L2TP profile, it applies to all the clients within that profile. You must enable RADIUS accounting on at least one LT2P profile for the RADIUS authentication server to send accounting stop and start messages.

NOTE: When you enable RADIUS accounting for an L2TP profile, you do not need to configure the **accounting-port** statement at the **[edit access radius-server *server-address*]** hierarchy level. When you enable RADIUS accounting for an L2TP profile, accounting is triggered on the default port of 1813.

For L2TP, RADIUS authentication servers are configured at the **[edit access radius-server]** hierarchy level.

Example: Access Profile Configuration

The following example shows a configuration of an access profile:

```
[edit access]
profile westcoast_bldg_1 {
   client white {
      chap-secret "$9$3s2690IeK8X7VKM7VwgaJn/Ctu1hclv87Ct87";
      # SECRET-DATA
      ppp {
         idle-timeout 22;
         primary-dns 192.120.65.10;
         framed-ip-address 12.12.12.12/32;
      }
      group-profile westcoast_users;
   }
   client blue {
      chap-secret "$9$eq1KWxbwgZUHNdjqmTF3uO1Rhr-dsoJDNd";
      # SECRET-DATA
      group-profile sunnyvale_users;
   }
   authentication-order password;
}
profile westcoast_bldg_1_tunnel {
   client test {
      l2tp {
         shared-secret "$9$r3HKvLg4ZUDkX7JGjif5p0BIRS8LN";
         # SECRET-DATA
         maximum-sessions-per-tunnel 75;
         ppp-authentication chap;
      }
      group-profile westcoast_tunnel;
   }
   client production {
      l2tp {
         shared-secret "$9$R2QErv8X-goGylVwg4jiTz36/t0BEleWFnRh
         rlXxbs2aJDHqf3nCP5";
         # SECRET-DATA
         ppp-authentication chap;
      }
      group-profile westcoast_tunnel;
   }
}
```

See Also

- Defining the Minimum L2TP Configuration on page 14
- Configuring the L2TP Client on page 25
- Configuring an IKE Access Profile on page 23

Configuring an IKE Access Profile

An Internet Key Exchange (IKE) access profile is used to negotiate IKE and IPsec security associations with dynamic peers. You can configure only one tunnel profile per service

set for all dynamic peers. The configured preshared key in the profile is used for IKE authentication of all dynamic peers terminating in that service set. You can also use the digital certificate method for IKE authentication with dynamic peers. Include the **ike-policy *policy-name*** statement at the **[edit access profile *profile-name* client * ike]** hierarchy level. ***policy-name*** is the name of the IKE policy you define at the **[edit services ipsec-vpn ike policy *policy-name*]** hierarchy level.

The IKE tunnel profile specifies all the information you need to complete the IKE negotiation. Each protocol has its own statement hierarchy within the client statement to configure protocol-specific attribute value pairs, but only one client configuration is allowed for each profile. The following is the configuration hierarchy.

```
[edit access]
profile profile-name {
  client * {
    ike {
      allowed-proxy-pair {
        remote remote-proxy-address local local-proxy-address;
      }
      dead-peer-detection{
        interval seconds
        threshold number
      }
      ike-policy policy-name;
      initiate-dead-peer-detection;
      interface-id string-value;
      ipsec-policy ipsec-policy;
      pre-shared-key (ascii-text character-string | hexadecimal hexadecimal-digits);
      reverse-route
    }
  }
}
```

For dynamic peers, the Junos OS supports only IKE main mode with both the preshared key and digital certificate methods. In this mode, an IPv6 or IPv4 address is used to identify a tunnel peer to obtain the preshared key or digital certificate information. The client value * (wildcard) means that configuration within this profile is valid for all dynamic peers terminating within the service set accessing this profile.

The following statement makes up the IKE profile:

- **allowed-proxy-pair**—During phase 2 IKE negotiation, the remote peer supplies its network address (**remote**) and its peer's network address (**local**). Since multiple dynamic tunnels are authenticated through the same mechanism, this statement must include the list of possible combinations. If the dynamic peer does not present a valid combination, the phase 2 IKE negotiation fails.

By default, **remote 0.0.0.0/0 local 0.0.0.0/0** is used if no values are configured.

- **dead-peer-detection**—Enable the device to use dead peer detection (DPD). DPD is a method used by devices to verify the current existence and availability of IPsec peer devices. A device performs this verification by sending encrypted IKE Phase 1 notification payloads (R-U-THERE) to peers and waiting for DPD acknowledgements (R-U-THERE-ACK).Use the option **interval** to specify the seconds between which messages should be sent. Use the **threshold** option to specify the maximum number of messages (1-10) to be sent.
- **ike-policy**—Name of the IKE policy that defines either the local digital certificate or the preshared key used to authenticate the dynamic peer during IKE negotiation. You must include this statement to use the digital certificate method for IKE authentication with a dynamic peer. You define the IKE policy at the **[edit services ipsec-vpn ike policy *policy-name*]** hierarchy level.
- **initiate-dead-peer-detection**—Detects dead peers on dynamic IPsec tunnels.
- **interface-id**—Interface identifier, a mandatory attribute used to derive the logical service interface information for the session.
- **ipsec-policy**—Name of the IPsec policy that defines the IPsec policy information for the session. You define the IPsec policy at the **[edit services ipsec-vpn ipsec policy *policy-name*]** hierarchy level. If no policy is set, any policy proposed by the dynamic peer is accepted.
- **pre-shared-key**—Key used to authenticate the dynamic peer during IKE phase 1 negotiation. This key is known to both ends through an out-of-band secure mechanism. You can configure the value either in **hexadecimal** or **ascii-text** format. It is a mandatory value.
- **reverse-route** —(M Series and MX Series routers with an AS or MultiServices PIC only) Configure a reverse route for dynamic endpoint IPsec tunnels.

Related Documentation

- Configuring Access Profiles for L2TP or PPP Parameters on page 20

Configuring the L2TP Client

To configure the client, include the **client** statement at the **[edit access profile *profile-name*]** hierarchy level:

```
[edit access profile profile-name]
client client-name;
```

client-name is the peer identity.

For L2TP, you can optionally use the wildcard (*) to define a default tunnel client to authenticate multiple LACs with the same secret and L2TP attributes. If an LAC with a specific name is not defined in the configuration, the wildcard tunnel client authenticates it.

NOTE: The * for the default client configuration applies only to M Series routers. On MX Series routers, use default instead. See *Configuring an L2TP Access Profile on the LNS* for more about MX Series routers.

Related Documentation

- Example: Defining the Default Tunnel Client on page 26

Example: Defining the Default Tunnel Client

Use the wildcard (*) to define a default tunnel client to authenticate multiple LACs with the same secret:

```
[edit access profile profile-name]
client * {
   l2tp {
      interface-id interface1;
      lcp-renegotiation;
      local-chap;
      maximum-sessions-per-tunnel 500;
      ppp-authentication chap;
      shared-secret "$1$dQYsZ$B5ojUeUjDsUo.yKwcCZ0";
   }
}
```

For any tunnel client, you can optionally use the user group profile to define default PPP attributes for all users coming in through a tunnel. The user group profile must define PPP attributes. If the user group profile is specified, all users (PPP sessions) use the PPP attributes specified in the user group profile. The PPP attributes specified in the local or RADIUS server take precedence over those specified in the user group profile.

Optionally, you can use a wildcard client to define a user group profile. When you do this, any client entering this tunnel uses the PPP attributes (defined user group profile attributes) as its default PPP attributes.

Related Documentation

- Configuring the L2TP Client on page 25
- Example: Defining the User Group Profile on page 26

Example: Defining the User Group Profile

Use a wildcard client to define a user group profile:

```
[edit access profile profile]
client * {
  user-group-profile user-group-profile1;
}
```

Related Documentation

- Applying a Configured PPP Group Profile to a Tunnel on page 34.

Configuring the CHAP Secret for an L2TP Profile

CHAP allows each end of a PPP link to authenticate its peer, as defined in RFC 1994. The authenticator sends its peer a randomly generated challenge that the peer must encrypt using a one-way hash; the peer must then respond with that encrypted result. The key to the hash is a secret known only to the authenticator and authenticated. When the response is received, the authenticator compares its calculated result with the peer's response. If they match, the peer is authenticated.

Each end of the link identifies itself to its peer by including its name in the CHAP challenge and response packets it sends to the peer. This name defaults to the local hostname, or you can explicitly set it using the **local-name** option. When a host receives a CHAP challenge or CHAP response packet on a particular interface, it uses the peer identity to look up the CHAP secret key to use.

NOTE: When you configure PPP properties for a Layer 2 Tunneling Protocol (L2TP) profile, you typically configure the **chap-secret** statement or **pap-password** statement.

To configure CHAP, include the **profile** statement and specify a profile name at the **[edit access]** hierarchy level:

```
[edit access]
profile profile-name {
  client client-name chap-secret data;
}
```

Then reference the CHAP profile name at the **[edit interfaces** *interface-name* **ppp-options chap]** hierarchy level.

You can configure multiple profiles. You can also configure multiple clients for each profile.

profile is the mapping between peer identifiers and CHAP secret keys. The identity of the peer contained in the CHAP challenge or response queries the profile for the secret key to use.

client is the peer identity.

chap-secret ***secret*** is the secret key associated with that peer.

Related Documentation

- Example: Configuring L2TP PPP CHAP on page 28

Example: Configuring L2TP PPP CHAP

Configure the profile **westcoast_bldg1** at the **[edit access]** hierarchy level, then reference it at the **[edit interfaces]** hierarchy level:

```
[edit]
access {
  profile westcoast_bldg1 {
    client cpe-1 chap-secret "$1$dQYsZ$B5ojUeUjDsUo.yKwcCZ0";
    # SECRET-DATA
    client cpe-2 chap-secret "$1$kdAsfaDAfkdjDsASxfafdKdFKJ";
    # SECRET-DATA
  }
}
```

Related Documentation

- Configuring the CHAP Secret for an L2TP Profile on page 27

Referencing the Group Profile from the L2TP Profile

You can reference a configured group profile from the L2TP tunnel profile.

To reference the group profile configured at the **[edit access group-profile *profile-name*]** hierarchy level, include the **group-profile** statement at the **[edit access profile *profile-name* client *client-name*]** hierarchy level:

```
[edit access profile profile-name client client-name]
group-profile profile-name;
```

profile-name references a configured group profile from a PPP user profile.

Related Documentation

- Example: Defining the User Group Profile on page 26
- Configuring Access Profiles for L2TP or PPP Parameters on page 20
- Configuring L2TP Properties for a Client-Specific Profile on page 28

Configuring L2TP Properties for a Client-Specific Profile

To define L2TP properties for a client-specific profile, include one or more of the following statements at the **[edit access profile *profile-name* client *client-name* l2tp]** hierarchy level:

NOTE: When you configure the profile, you can configure either L2TP or PPP parameters, but not both at the same time.

```
[edit access profile profile-name client client-name l2tp]
interface-id interface-id;
```

```
lcp-renegotiation;
local-chap;
maximum-sessions-per-tunnel number;
multilink {
  drop-timeout milliseconds;
  fragment-threshold bytes;
}
ppp-authentication (chap | pap);
shared-secret shared-secret;
```

interface-id (in the **interface-id** statement) is the identifier for the interface representing an L2TP session configured at the **[edit interfaces *interface-name* unit *local-unit-number* dial-options]** hierarchy level.

number (in the **maximum-sessions-per-tunnel** statement) is the maximum number of sessions for an L2TP tunnel.

shared-secret (in the **shared-secret** statement) is the shared secret for authenticating the peer.

You can specify PPP authentication (in the **ppp-authentication** statement). By default, the PPP authentication uses CHAP. You can configure this to use Password Authentication Protocol (PAP).

You can configure LNS so it renegotiates LCP with the PPP client (in the **lcp-negotiation** statement). By default, the PPP client negotiates the LCP with the LAC. When you do this, the LNS discards the last sent LCP configuration request and last received LCP configuration request AVPs from the LAC; for example, the LCP negotiated between the PPP client and LAC.

You can configure the Junos OS so that the LNS ignores proxy authentication AVPs from the LAC and reauthenticates the PPP client using a CHAP challenge (in the **local-chap** statement). By default, the PPP client is not reauthenticated by the LNS. When you do this, the LNS directly authenticates the PPP client.

You can configure the PPP MP for L2TP if the PPP sessions that are coming into the LNS from the LAC have multilink PPP negotiated. When you do this, you join multilink bundles based on the endpoint discriminator (in the **multilink** statement).

- ***milliseconds*** (in the drop-timeout statement) specifies the number of milliseconds for the timeout that associated with the first fragment on the reassembly queue. If the timeout expires before all the fragments have been collected, the fragments at the beginning of the reassembly queue are dropped. If the drop timeout is not specified, the Junos OS holds on to the fragments (fragments may still be dropped if the multilink reassembly algorithm determines that another fragment belonging to the packet on a reassembly queue has been lost).

NOTE: The drop timeout and fragmentation threshold for a bundled multilink might belong to different tunnels. The different tunnels might have different drop timeout and fragmentation thresholds. We recommend configuring group profiles instead of profiles when you have L2TP tunnels.

- ***bytes*** specifies the maximum size of a packet, in bytes (in the **fragment-threshold** statement). If a packet exceeds the fragmentation threshold, the Junos OS fragments it into two or more multilink fragments.

Related Documentation

- Configuring PPP Properties for a Client-Specific Profile on page 32
- Example: PPP MP for L2TP on page 30
- Example: L2TP Multilink PPP Support on Shared Interfaces on page 30

Example: PPP MP for L2TP

Join multilink bundles based on the endpoint discriminator:

```
[edit access]
profile tunnel-profile {
   client remote-host {
      l2tp {
         multilink {
            drop-timeout 600;
            fragmentation-threshold 100;
         }
      }
   }
}
```

Related Documentation

- Referencing the Group Profile from the L2TP Profile on page 28
- Example: L2TP Multilink PPP Support on Shared Interfaces on page 30

Example: L2TP Multilink PPP Support on Shared Interfaces

On M7i and M10i routers, L2TP multilink PPP sessions are supported on both dedicated and shared interfaces. This example shows how to configure many multilink bundles on a single ASP shared interface.

```
[edit]
interfaces {
   sp-1/3/0 {
      traceoptions {
         flag all;
      }
      unit 0 {
         family inet;
      }
      unit 20 {
         dial-options {
            l2tp-interface-id test;
            shared;
         }
         family inet;
      }
```

```
    }
  }
  access {
    profile t {
      client cholera {
        l2tp {
          interface-id test;
          multilink;
          shared-secret "$9$n8HX6A01RhlvL1R"; # SECRET-DATA
        }
      }
    }
    profile u {
      authentication-order radius;
    }
    radius-server {
      192.168.65.63 {
        port 1812;
        secret "$9$Vyb4ZHkPQ39mf9pORlexNdbgoZUjqP5"; # SECRET-DATA
      }
    }
  }
  services {
    l2tp {
      tunnel-group 1 {
        tunnel-access-profile t;
        user-access-profile u;
        local-gateway {
          address 10.70.1.1;
        }
        service-interface sp-1/3/0;
      }
      traceoptions {
        flag all;
        debug-level packet-dump;
        filter {
          protocol l2tp;
          protocol ppp;
          protocol radius;
        }
      }
    }
  }
```

Related Documentation

- Referencing the Group Profile from the L2TP Profile on page 28

Configuring the PAP Password for an L2TP Profile

When you configure PPP properties for an L2TP profile, you typically configure the **chap-secret** statement or **pap-password** statement. For information about how to configure the CHAP secret, see "Configuring the CHAP Secret for an L2TP Profile" on page 27.

To configure the Password Authentication Protocol (PAP) password, include the **pap-password** statement at the **[edit access profile *profile-name* client *client-name*]** hierarchy level:

```
[edit access profile profile-name client client-name]
pap-password pap-password;
```

pap-password is the password for PAP.

Related Documentation

- Example: Configuring PAP for an L2TP Profile on page 32

Example: Configuring PAP for an L2TP Profile

The following examples shows you how to configure the password authentication protocol for an L2TP profile:

```
[edit access]
profile sunnyvale_bldg_2 {
   client green {
      pap-password "$9$24gGiPfz6CuQFu1EyW8VwYgZUik.5z3";
      ppp {
         interface-id west;
      }
      group-profile sunnyvale_users;
   }
   client red {
      chap-secret "$9$24gGiPfz6CuQFu1EyW8VwYgZUik.5z3";
      group-profile sunnyvale_users;
   }
   authentication-order radius;
}
profile Sunnyvale_bldg_1_tunnel {
   client test {
      l2tp {
         shared-secret "$9$24gGiPfz6CuQFu1EyW8VwYgZUik.5z3";
         ppp-authentication pap;
      }
   }
}
```

Related Documentation

- Configuring the PAP Password for an L2TP Profile on page 31

Configuring PPP Properties for a Client-Specific Profile

To define PPP properties for a profile, include one or more of the following statements at the **[edit access profile *profile-name* client *client-name* ppp]** hierarchy level.

NOTE: The properties defined in the profile take precedence over the values defined in the group profile.

```
[edit access profile profile-name client client-name ppp]
cell-overhead;
encapsulation-overhead bytes;
framed-ip-address ip-address;
framed-pool pool-id;
idle-timeout seconds;
interface-id interface-id;
keepalive seconds;
keepalive-retries number-of-retries;
primary-dns primary-dns;
primary-wins primary-wins;
secondary-dns secondary-dns;
secondary-wins secondary-wins;
```

NOTE: When you configure a profile, you can configure either L2TP or PPP parameters, but not both at the same time.

The **cell-overhead** statement configures the session to use ATM-aware egress shaping on the IQ2 PIC.

bytes (in the **encapsulation-overhead** statement) configures the number of bytes used as overhead for class-of-service calculations.

ip-address (in the **framed-ip-address** statement) is the IPv4 prefix.

pool-id (in the **framed-pool** statement) is a configured address pool.

seconds (in the **idle-timeout** statement) is the number of seconds a user can remain idle before the session is terminated. By default, idle timeout is set to 0. You can configure this to be a value in the range from 0 through 4,294,967,295.

interface-id (in the **interface-id** statement) is the identifier for the interface representing an L2TP session configured at the **[edit interfaces *interface-name* unit *local-unit-number* dial-options]** hierarchy level.

keepalive *seconds* is the time period that must elapse before the Junos OS checks the status of the PPP session by sending an echo request to the peer. For each session, Junos OS sends a maximum of ten keepalives at 10-second intervals and the session is closed if there is no response. By default, the time to send a keepalive messages is set to 10 seconds. You can configure this to be a value in the range from 0 through 32,767 seconds.

keepalive-retries *number-of-retries* is the number of retry attempts for checking the keepalive status of a Point-to-Point (PPP) protocol session. Configuring a lower number of retries helps reduce the detection time for PPP client session failures or timeouts if you have configured a **keepalive *seconds*** value. By default, the number of retries is set to 10 times. You can configure this to be a value in the range from 3 through 32,767 times.

primary-dns (in the **primary-dns** statement) is an IPv4 address.

secondary-dns (in the **secondary-dns** statement) is an IPv4 address.

primary-wins (in the **primary-wins** statement) is an IPv4 address.

secondary-wins (in the **secondary-wins** statement) is an IPv4 address.

Related Documentation

- Configuring L2TP Properties for a Client-Specific Profile on page 28

Applying a Configured PPP Group Profile to a Tunnel

On Mi7 and M10i routers, you can optionally apply a configured PPP group profile to a tunnel. For any tunnel client, you can use the **user-group-profile** statement to define default PPP attributes for all users coming in through a tunnel. The user group profile must define PPP attributes. If the user group profile is specified, all users (PPP sessions) use the PPP attributes specified in the user group profile.

When a PPP client enters a tunnel, the Junos OS first applies the PPP user group profile attributes and then any PPP attributes from the local or RADIUS server. The PPP attributes defined in the RADIUS or local server take precedence over the attributes defined in the user group profile.

To apply configured PPP attributes to a PPP client, include the **user-group-profile** statement at the **[edit access profile *profile-name* client *client-name*]** hierarchy level:

```
[edit access profile profile-name client client-name]
user-group-profile profile-name;
```

profile-name is a PPP group profile configured at the **[edit access group-profile *profile-name*]** hierarchy level. When a client enters this tunnel, it uses the **user-group-profile** attributes as the default attributes.

Related Documentation

- Example: Applying a User Group Profile on the M7i or M10i Router on page 34
- Example: Defining the User Group Profile on page 26

Example: Applying a User Group Profile on the M7i or M10i Router

The following example shows how to apply a configured PPP group profile to a tunnel:

```
[edit access]
group-profile westcoast_users {
   ppp {
      idle-timeout 100;
   }
}
group-profile westcoast_default_configuration {
   ppp {
      framed-pool customer_b;
      idle-timeout 20;
      interface-id west;
      primary-dns 192.120.65.5;
      secondary-dns 192.120.65.6;
      primary-wins 192.120.65.7;
      secondary-wins 192.120.65.8;
   }
```

```
}
profile westcoast_bldg_1_tunnel {
  client test {
    l2tp {
      interface-id west;
      shared-secret "$9$r3HKvLg4ZUDkX7JGjif5p0BIRS8LN";
      # SECRET-DATA
      maximum-sessions-per-tunnel 75;
      ppp-authentication chap;
    }
    user-group-profile westcoast_default_configuration; # Apply default PPP
  }
}
profile westcoast_bldg_1 {
  client white {
    chap-secret "$9$3s2690IeK8X7VKM7VwgaJn/Ctu1hclv87Ct87";
    # SECRET-DATA
    ppp {
      idle-timeout 22;
      primary-dns 192.120.65.9;
      framed-ip-address 12.12.12.12/32;
    }
    group-profile westcoast_users; # Reference the west_users group
  }
}
```

Related Documentation

- Applying a Configured PPP Group Profile to a Tunnel on page 34

Example: Configuring L2TP

The following example shows how to configure L2TP:

```
[edit]
access {
  address-pool customer_a {
    address 1.1.1.1/32;
  }
  address-pool customer_b {
    address-range low 2.2.2.2 high 2.2.3.2;
  }
  group-profile westcoast_users {
    ppp {
      framed-pool customer_a;
      idle-timeout 15;
      primary-dns 192.120.65.1;
      secondary-dns 192.120.65.2;
      primary-wins 192.120.65.3;
      secondary-wins 192.120.65.4;
      interface-id west;
    }
  }
  group-profile eastcoast_users {
    ppp {
      framed-pool customer_b;
```

```
        idle-timeout 20;
        primary-dns 192.120.65.5;
        secondary-dns 192.120.65.6;
        primary-wins 192.120.65.7;
        secondary-wins 192.120.65.8;
        interface-id east;
    }
}
group-profile westcoast_tunnel {
    l2tp {
        maximum-sessions-per-tunnel 100;
    }
}
group-profile east_tunnel {
    l2tp {
        maximum-sessions-per-tunnel 125;
    }
}
profile westcoast_bldg_1 {
    client white {
        chap-secret "$9$3s2690IeK8X7VKM7VwgaJn/Ctu1hclv87Ct87";
        # SECRET-DATA
        ppp {
            idle-timeout 22;
            primary-dns 192.120.65.10;
            framed-ip-address 12.12.12.12/32;
        }
        group-profile westcoast_users;
    }
    client blue {
        chap-secret "$9$eq1KWxbwgZUHNdjqmTF3uO1Rhr-dsoJDNd";
        # SECRET-DATA
        group-profile sunnyvale_users;
    }
    authentication-order password;
}
profile west-coast_bldg_2 {
    client red {
        pap-password "$9$3s2690IeK8X7VKM8888Ctu1hclv87Ct87";
        # SECRET-DATA
        ppp {
            idle-timeout 22;
            primary-dns 192.120.65.11;
            framed-ip-address 12.12.12.12/32;
        }
        group-profile westcoast_users;
    }
}
profile westcoast_bldg_1_tunnel {
    client test {
        l2tp {
            shared-secret "$9$r3HKvLg4ZUDkX7JGjif5p0BIRS8LN";
            # SECRET-DATA
            maximum-sessions-per-tunnel 75;
            ppp-authentication chap;# The default for PPP authentication is CHAP.
        }
```

```
        group-profile westcoast_tunnel;
      }
      client production {
        l2tp {
          shared-secret "$9$R2QErv8X-goGylVwg4jiTz36/t0BEleWFnRh
          rlXxbs2aJDHqf3nCP5"; # SECRET-DATA
          ppp-authentication chap;
        }
        group-profile westcoast_tunnel;
      }
    }
    profile westcoast_bldg_2_tunnel {
      client black {
        l2tp {
          shared-secret "$9$R2QErv8X-goGylVwg4jiTz36/t0BEleWFnRh
          rlXxbs2aJDHqf3nCP5";
          # SECRET-DATA
          ppp-authentication pap;
        }
        group-profile westcoast_tunnel;
      }
    }
  }
```

Related Documentation

- Configuring L2TP for Enabling PPP Tunneling Within a Network on page 12

Supported PPP Interface Standards on ACX Series

Junos OS substantially supports the following RFCs, which define standards for Point-to-Point Protocol (PPP) interfaces.

- RFC 1332, *The PPP Internet Protocol Control Protocol (IPCP)*
- RFC 1334, *PPP Authentication Protocols*
- RFC 1661, *The Point-to-Point Protocol (PPP)*

Related Documentation

- *Accessing Standards Documents on the Internet*

Configuring PPP Address and Control Field Compression

For interfaces with PPP, PPP CCC, or PPP TCC encapsulation, you can configure compression of the Data Link Layer address and control fields, as defined in RFC 1661, *The Point-to-Point Protocol (PPP)*. By default, the address and control fields are not compressed. This means PPP-encapsulated packets are transmitted with two 1-byte fields (0xff and 0x03). If you configure address and control field compression (ACFC) and ACFC is successfully negotiated with the local router's peer, the local router transmits packets without these 2 bytes. ACFC allows you to conserve bandwidth by transmitting less data.

On M320, M120, and T Series routers, ACFC is not supported for any ISO family protocols. Do not include the **acfc** statement at the **[edit interfaces *interface-name* ppp-options compression]** hierarchy level when you include the **family iso** statement at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level.

NOTE: The address and control fields cannot be compressed in Link Control Protocol (LCP) packets.

The PPP session restarts when you configure or modify compression options.

To configure ACFC:

1. In configuration mode, go to the **[edit interfaces *interface-name* ppp-options]** hierarchy level.

   ```
   [edit ]
   user@host# edit interfaces interface-name ppp-options
   ```

2. Include the **compression** statement at the **[edit interfaces *interface-name* ppp-options]** hierarchy level, and specify **acfc**.

   ```
   [edit interfaces interface-name ppp-options]
   compression acfc;
   ```

To monitor the configuration, issue the **show interfaces *interface-name*** command. Configured options are displayed in the **link flags** field for the physical interface. Successfully negotiated options are displayed in the **flags** field for the logical interface. In this example, both ACFC and PFC are configured, but neither compression feature has been successfully negotiated.

```
user@router# run show interfaces so-0/1/1
Physical interface: so-0/1/1, Enabled, Physical link is Up
 Interface index: 133, SNMP ifIndex: 27
 Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC3,
Loopback: None, FCS: 16
  Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : No-Keepalives ACFC PFC
```

```
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
  CHAP state: Not-configured
  CoS queues      : 4 supported
  Last flapped    : 2004-12-29 10:49:32 PST (00:18:35 ago)
  Input rate      : 0 bps (0 pps)
  Output rate     : 0 bps (0 pps)
  SONET alarms    : None
  SONET defects   : None
  Logical interface so-0/1/1.0 (Index 68) (SNMP ifIndex 169)
    Flags: Point-To-Point SNMP-Traps ACFC Encapsulation: PPP
    Protocol inet, MTU: 4470
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 3.3.3/24, Local: 3.3.3.2, Broadcast: 3.3.3.255
```

This configuration causes the local router to try to negotiate ACFC with its peer. If ACFC is successfully negotiated, the local router sends packets with compressed address and control fields. When you include the **compression acfc** statement in the configuration, the PPP session restarts, and the local router sends the ACFC option in the LCP Configure-Request packet. The ACFC option informs the local router's peer that the local router can receive packets with compression. If the peer indicates that it, too, can receive packets with compression, then ACFC is negotiated. If ACFC is successfully negotiated, the local router can receive packets with or without the address and control bytes included.

Related Documentation

- *ppp-options*
- *compression*
- *acfc*

Configuring the PPP Restart Timers

You can configure a restart timer for the Link Control Protocol (LCP) and Network Control Protocol (NCP) components of a PPP session. You can configure the LCP restart timer on interfaces with PPP, PPP TCC, PPP over Ethernet, PPP over ATM, and PPP over Frame Relay encapsulations. You can configure the NCP restart timer on interfaces with PPP and PPP TCC encapsulations and on multilink PPP bundle interfaces.

To configure the restart timer for the NCP component of a PPP session, include the **ncp-restart-timer** statement, and specify the number of milliseconds.

To configure the restart timer for the LCP component of a PPP session, include the **lcp-restart-timer** statement, and specify the number of milliseconds:

lcp-restart-timer *milliseconds*;
ncp-restart-timer *milliseconds*;

You can include these statements at the following hierarchy levels:

- **[edit interfaces** *interface-name* **unit** *logical-unit-number* **ppp-options]**

- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ppp-options]

To monitor the configuration, issue the **show interfaces *interface-name*** command. Configured options are displayed in the **PPP parameters** field for the physical interface.

```
user@host> run show interfaces t1-0/0/0:1:1.0 detail
   Logical interface t1-0/0/0:1:1.0 (Index 67) (SNMP ifIndex 40)
   (Generation 156)
     Flags: Hardware-Down Device-Down Point-To-Point SNMP-Traps 0x4000
     Encapsulation: PPP
     PPP parameters:
       LCP restart timer: 2000 msec
       NCP restart timer: 2000 msec
     Protocol inet, MTU: 1500, Generation: 163, Route table: 0
       Flags: Protocol-Down
       Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
         Destination: 1.1.1/24, Local: 1.1.1.2, Broadcast: 1.1.1.255,
```

Configuring PPP CHAP Authentication

For interfaces with PPP encapsulation, you can configure interfaces to support the PPP Challenge Handshake Authentication Protocol (CHAP), as defined in RFC 1994, *PPP Challenge Handshake Authentication Protocol (CHAP)*. When you enable CHAP on an interface, the interface can authenticate its peer and can be authenticated by its peer.

For information about configuring CHAP, see "Configuring the PPP Challenge Handshake Authentication Protocol" on page 41.

Configuring the PPP Clear Loop Detected Timer

When a Point-to-Point Protocol (PPP) session detects a loop, the loop detected flag is set. If the flag is not cleared by the protocol after the loopback is cleared, the clear loop detected timer clears the flag after the specified time has elapsed.

To configure the clear loop detected timer for the LCP component of a PPP session, include the **loopback-clear-timer** statement, and specify the number of seconds.

loopback-clear-timer *seconds*;

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ppp-options]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ppp-options]

To monitor the configuration, issue the **show interfaces *interface-name* extensive** command.

Configuring Dynamic Profiles for PPP

A dynamic profile acts as a template that enables you to create, update, or remove a configuration that includes attributes for client access (for example, interface or protocol) or service (for example, IGMP). Using these profiles you can consolidate all of the common attributes of a client (and eventually a group of clients) and apply the attributes simultaneously.

After they are created, the profiles reside in a profile library on the router. You can then use the **dynamic-profile** statement to attach profiles to interfaces. To assign a dynamic profile to a PPP interface, you can include the **dynamic-profile** statement at the **[edit interfaces *interface-name* unit *logical-unit-number* ppp-options]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number ppp-options]
dynamic-profile profile-name;
```

To monitor the configuration, issue the **show interfaces *interface-name*** command.

For information about dynamic profiles, see *Dynamic Profiles Overview* in the *Junos Subscriber Access Configuration Guide*.

For information about creating dynamic profiles, see *Configuring a Basic Dynamic Profile* in the *Junos Subscriber Access Configuration Guide*.

For information about assigning a dynamic profile to a PPP interface, see *Attaching Dynamic Profiles to Static PPP Subscriber Interfaces* in the *Junos Subscriber Access Configuration Guide*.

NOTE: Dynamic profiles for PPP subscribers are supported only on PPPoE interfaces for this release.

Related Documentation

- *Configuring Dynamic Authentication for PPP Subscribers*

Configuring the PPP Challenge Handshake Authentication Protocol

PPP Challenge Handshake Authentication Protocol

For interfaces with PPP encapsulation, you can configure interfaces to support the PPP Challenge Handshake Authentication Protocol (CHAP), as defined in RFC 1994, PPP Challenge Handshake Authentication Protocol (CHAP). When you enable CHAP on an interface, the interface can authenticate its peer and can be authenticated by its peer. By default, PPP CHAP is disabled. If CHAP is not explicitly enabled, the interface makes

no CHAP challenges and denies all incoming CHAP challenges. To enable CHAP, you must create an access profile, and you must configure the interfaces to use CHAP.

Configuring the PPP Challenge Handshake Authentication Protocol

When you configure an interface to use CHAP, you must assign an access profile to the interface. When an interface receives CHAP challenges and responses, the access profile in the packet is used to look up the shared secret, as defined in RFC 1994. If no matching access profile is found for the CHAP challenge that was received by the interface, the optionally configured default CHAP secret is used. The default CHAP secret is useful if the CHAP name of the peer is unknown, or if the CHAP name changes during PPP link negotiation.

To enable CHAP, you must create an access profile, and you must configure the interfaces to use PAP. For more information on how to configure access profile, see "Configuring Access Profiles for L2TP or PPP Parameters" on page 20.

To configure the PPP challenge handshake authentication protocol, on each physical interface with PPP encapsulation, perform the following steps.

1. To assign an access profile to an interface, include the **access-profile** statement at the **[edit interfaces interface-name ppp-options chap]** hierarchy level.

   ```
   [edit interfaces interface-name ppp-options chap]
   user@host# set access-profile name
   ```

   

   NOTE: You must include the access-profile statement when you configure the CHAP authentication method. If an interface receives a CHAP challenge or response from a peer that is not in the applied access profile, the link is immediately dropped unless a default CHAP secret has been configured.

2. The default CHAP secret is used when no matching CHAP access profile exists, or if the CHAP name changes during PPP link negotiation. To configure a default CHAP secret for an interface, include the **default-chap-secret** statement at the **[edit interfaces *interface-name* ppp-options chap]** hierarchy level.

   ```
   [edit interfaces interface-name ppp-options chap]
   user@host# set default-chap-secret name
   ```

3. To configure the name the interface uses in CHAP challenge and response packets, include the **local-name** statement at the **[edit interfaces *interface-name* ppp-options chap]** hierarchy level:

   ```
   [edit interfaces interface-name ppp-options chap]
   user@host# set local-name name
   ```

NOTE:

- The local name is any string from 1 through 32 characters in length, starting with an alphanumeric or underscore character, and including only the following characters:

  a-z A-Z 0-9 % @ # / \ . _ -

- By default, when CHAP is enabled on an interface, the interface uses the router's system hostname as the name sent in CHAP challenge and response packets.

4. You can configure the interface not to challenge its peer, and only respond when challenged. To configure the interface not to challenge its peer, include the **passive** statement at the **[edit interfaces *interface-name* ppp-options chap]** hierarchy level:

   ```
   [edit interfaces interface-name ppp-options chap]
   user@host# set passive;
   ```

NOTE: By default, when CHAP is enabled on an interface, the interface always challenges its peer and responds to challenges from its peer.

See Also • Configuring the PPP Authentication Protocol on page 8

Displaying the Configured PPP Challenge Handshake Authentication Protocol

Purpose To display the configured PPP CHAP at the **[edit access]** and **[edit interfaces]** hierarchy levels.

- Access profile—**pe-A-ppp-clients**
- default CHAP secret data—**"$ABC123"**
- hostname for the CHAP challenge and response packets—**"pe-A-so-1/1/1"**
- Interface—so-1/1/2

Action • Run the **show** command at the **[edit access]** hierarchy level.

```
profile pe-A-ppp-clients;
client cpe-1 chap-secret "$ABC123";
            # SECRET-DATA
[edit interfaces so-1/2/0]
encapsulation ppp;
ppp-options {
   chap {
      access-profile pe-A-ppp-clients;
      default-chap-secret "$ABC123";
      local-name "pe-A-so-1/1/1";
   }
```

```
}
```

- Run the **show** command at the **[edit interfaces s0-1/1/2]** hierarchy level.

```
ppp-options {
  chap {
    access-profile pe-A-ppp-clients;
    default-chap-secret "$ABC123";
    local-name “pe-A-so-1/1/2";
  }
}
```

Meaning The configured CHAP and its associated set options are displayed as expected.

Configuring the PPP Password Authentication Protocol On a Physical Interface

Understanding PPP Password Authentication Protocol

For interfaces with PPP encapsulation, you can configure interfaces to support the Password Authentication Protocol (PAP), as defined in RFC 1334, *PAP Authentication Protocols*. If authentication is configured, the PPP link negotiates using CHAP or PAP protocol for authentication during the Link Control Protocol (LCP) negotiation phase. PAP is only performed after the link establishment phase (LCP up) portion of the authentication phase.

During authentication, the PPP link sends a PAP authentication-request packet to the peer with an ID and password. The authentication-request packet is sent every 2 seconds, similar to the CHAP challenge, until a response is received (acknowledgment packet, nonacknowledgment packet). If an acknowledgment packet is received, the PPP link transitions to the next state, the network phase. If a nonacknowledgment packet is received, an LCP terminate request is sent, and the PPP link goes back to the link establishment phase. If no response is received, and an optional retry counter is set to **true**, a new request acknowledgment packet is resent. If the retry counter expires, the PPP link transitions to the LCP negotiate phrase.

You can configure the PPP link with PAP in passive mode. By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

Configuring the PPP Password Authentication Protocol On a Physical Interface

When you configure an interface to use PAP, you must assign an access profile to the interface. When an interface receives PAP authentication requests, the access profile in the packet is used to look up the password.

To enable PAP, you must create an access profile, and you must configure the interfaces to use PAP. For more information on how to configure access profile, see "Configuring Access Profiles for L2TP or PPP Parameters" on page 20.

To configure the PPP password authentication protocol, on each physical interface with PPP encapsulation, perform the following steps.

1. To assign an access profile to an interface, include the **access-profile** statement at the **[edit interfaces interface-name ppp-options pap]** hierarchy level.

   ```
   [edit interfaces interface-name ppp-options pap]
   user@host# set access-profile name
   ```

2. To configure the name the interface uses in PAP request and response packets, include the **local-name** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

   ```
   [edit interfaces interface-name ppp-options pap]
   user@host# set local-name name
   ```

3. You need to configure the password to be used for authentication. To configure the host password for sending PAP requests, include the **local-password** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

   ```
   [edit interfaces interface-name ppp-options pap]
   user@host# set local-password password
   ```

   

   NOTE: By default, when PAP is enabled on an interface, the interface uses the router's system hostname as the name sent in PAP request and response packets.

4. To configure the interface to authenticate with PAP in passive mode, include the **passive** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

   ```
   [edit interfaces interface-name ppp-options pap]
   user@host# set passive
   ```

NOTE: By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

See Also
- Configuring the PPP Authentication Protocol on page 8

Configuring the PPP Password Authentication Protocol On a Logical Interface

When you configure an interface to use PAP, you must assign an access profile to the interface. When an interface receives PAP authentication requests, the access profile in the packet is used to look up the password. If no matching access profile is found for the PAP authentication request that was received by the interface, the optionally configured default PAP password is used.

To configure the PPP password authentication protocol, on each logical interface with PPP encapsulation, perform the following steps.

1. To configure the default PAP password, include the **pap-password** statement at the **[edit interfaces *interface-name* unit *logical-unit-number* ppp-options pap]** hierarchy level:

   [edit interfaces *interface-name* unit *logical-unt-number* ppp-options pap]
   user@host# **set default-pap-password *password***

2. To configure the name the interface uses in PAP request and response packets, include the **local-name** statement at the **[edit interfaces *interface-name* unit *logical-unt-number* ppp-options pap]** hierarchy level:

   [edit interfaces *interface-name* ppp-options pap]
   user@host# **set local-name *name***

3. You need to configure the password to be used for authentication. To configure the host password for sending PAP requests, include the **local-password** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

   [edit interfaces *interface-name* unit *logical-unt-number* ppp-options pap]
   user@host# **set local-password *password***

   NOTE: By default, when PAP is enabled on an interface, the interface uses the router's system hostname as the name sent in PAP request and response packets.

4. To configure the interface to authenticate with PAP in passive mode, include the **passive** statement at the **[edit interfaces *interface-name* unit *logical-unt-number*ppp-options pap]** hierarchy level:

   [edit interfaces *interface-name* unit *logical-unt-number* ppp-options pap]
   user@host# **set passive**

NOTE: By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

See Also
- Configuring the PPP Authentication Protocol on page 8

PPP Encapsulation on ACX Series Routers

You can configure Point-to-Point Protocol (PPP) encapsulation on physical interfaces on ACX Series routers. PPP provides a standard method for transporting multiprotocol datagrams over a point-to-point link. PPP uses the High-Speed Data Link Control (HDLC) protocol for its physical interface and provides a packet- oriented interface for the network-layer protocols.

PPP is supported on the following MICs on ACX Series routers:

- On ACX1000 routers with 8-port built-in T1/E1 TDM MICs.
- On ACX2000, ACX2100, ACX2200, and ACX4000 routers with 16-port built-in T1/E1 TDM MICs.
- On ACX4000 routers with 16-Port Channelized E1/T1 Circuit Emulation MICs.

Starting with Release 12.3X54, you can configure Point-to-Point Protocol (PPP) encapsulation on physical interfaces on Channelized OC3/STM1 (Multi-Rate) Circuit Emulation MIC with SFP on ACX4000 Series routers

On ACX Series routers, E1, T1, and *N*xDS0 interfaces support PPP encapsulation.

PPP is the default encapsulation type for physical interfaces. You need not configure encapsulation for any physical interfaces that support PPP encapsulation. If you do not configure encapsulation, PPP is used by default. For physical interfaces that do not support PPP encapsulation, you must configure an encapsulation to use for packets transmitted on the interface.

To configure the encapsulation on a physical interface, include the **encapsulation ppp** statement at the **[edit interfaces *interface-name*]** hierarchy level.

IP class of service (CoS) is not supported on PPP interfaces. All the traffic is sent to the best effort queue (queue 0) and CoS code points are not processed. Also, fixed classifiers are not supported. Circuit cross-connect (CCC) version of PPP (**ppp-ccc** option) and translational cross-connect (TCC) version of PPP (**ppp-tcc** option) are not supported for configuration with the **encapsulation** statement.

PPP is supported only for IPv4 networks. If you configure PPP encapsulation, you can configure an INET family by including the **family inet** statement at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level. MPLS family is not supported on logical interfaces if you configured PPP encapsulation. On interfaces with PPP encapsulation, configure PPP-specific interface properties by including the **ppp-options** statement at the **[edit interfaces *interface-name*]** hierarchy level. For interfaces with PPP encapsulation, you can configure interfaces to support the PPP Challenge Handshake Authentication Protocol (CHAP) and Password Authentication Protocol (PAP).

For full T1/E1 interfaces on which PPP encapsulation needs to be enabled, create the T1/E1 interfaces out of channelized T1/E1 interfaces (CT1/CE1) by including the **framing** statement at the **[edit chassis fpc *fpc-slot* pic *pic-slot*]** hierarchy level:

```
[edit chassis fpc fpc-slot pic pic-slot]
user@host# set framing (t1 | e1);
```

Configure a CT1 port down to a T1 channel. On the CT1 interface, set the **no-partition** option and then set the interface type as T1.

```
[edit interfaces ct1-mpc-slot/mic-slot/port-number]
user@host# set no-partition interface-type t1
```

Configure a CE1 port down to an E1 channel. On the CE1 interface, set the **no-partition** option and then set the interface type as E1.

```
[edit interfaces ce1-mpc-slot/mic-slot/port-number]
user@host# set no-partition interface-type t1
```

For *N*xDS0 interfaces on which PPP encapsulation needs to be enabled, partition the CE1 and CT1 interfaces by including the **ce1-*x/y/z* partition *partition-number* timeslots *timeslots* interface-type ds** and **ct1-*x/y/z* partition *partition-number* timeslots *timeslots* interface-type ds** statements at the [**edit interfaces *interface-name***] hierarchy level.

The following operational mode commands can be used to view PPP configuration settings and statistical details:

- The **show ppp address-pool** command is used to display PPP address pool information.
- The **show ppp interface** command is used to display PPP session information for an interface.
- The **show ppp statistics** command is used to display PPP session statistics.
- The **show ppp summary** command is used to display summary information about PPP-configured interfaces.
- The **show interfaces e1-*fpc/pic/port***, **show interfaces t1-*fpc/pic/port***, and **show interfaces ds-*fpc/pic/port*** commands are used to display the PPP settings of a specific E1, T1, and DS interface, respectively.

Related Documentation

- Configuring Interface Encapsulation on Physical Interfaces in ACX Series on page 49
- *encapsulation*
- *ppp-options*

Configuring Interface Encapsulation on Physical Interfaces in ACX Series

Point-to-Point Protocol (PPP) encapsulation is the default encapsulation type for physical interfaces. You need not configure encapsulation for any physical interfaces that support PPP encapsulation. If you do not configure encapsulation, PPP is used by default. For physical interfaces that do not support PPP encapsulation, you must configure an encapsulation to use for packets transmitted on the interface.

You can optionally configure an encapsulation on a logical interface, which is the encapsulation used within certain packet types. For more information about logical interface encapsulation, see *Configuring Interface Encapsulation on Logical Interfaces*.

This section contains the following topics:

- Configuring the Encapsulation on a Physical Interface on page 49
- Encapsulation Capabilities on page 51

Configuring the Encapsulation on a Physical Interface

By default, PPP is the encapsulation type for physical interfaces. To configure the encapsulation on a physical interface, include the **encapsulation** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]
encapsulation (atm-ccc-cell-relay | atm-pvc | cisco-hdlc | cisco-hdlc-ccc | cisco-hdlc-tcc
  | ethernet-ccc | ethernet-over-atm | ethernet-tcc | ethernet-vpls |
  extended-frame-relay-ccc | extended-frame-relay-ether-type-tcc |
  extended-frame-relay-tcc | extended-vlan-ccc | extended-vlan-tcc | extended-vlan-vpls
  | flexible-ethernet-services | flexible-frame-relay | frame-relay | frame-relay-ccc |
  frame-relay-ether-type | frame-relay-ether-type-tcc | frame-relay-port-ccc |
  frame-relay-tcc | multilink-frame-relay-uni-nni | ppp | ppp-ccc | ppp-tcc | vlan-ccc |
  vlan-vpls);
```

NOTE: ACX Series routers do not support *cisco-hdlc* encapsulation.

The physical interface encapsulation can be one of the following:

- ATM CCC cell relay—Connects two remote virtual circuits or ATM physical interfaces with a label-switched path (LSP). Traffic on the circuit is ATM cells.

  For more information, see the *Junos OS Administration Library*.

- ATM PVC—Defined in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*. When you configure physical ATM interfaces with ATM PVC encapsulation, an RFC 2684-compliant ATM Adaptation Layer 5 (AAL5) tunnel is set up to route the

ATM cells over a Multiprotocol Label Switching (MPLS) path that is typically established between two MPLS-capable routers using the Label Distribution Protocol (LDP).

- Ethernet cross-connect—Ethernet interfaces without VLAN tagging can use Ethernet CCC encapsulation. Two related versions are supported:
  - CCC version (**ethernet-ccc**)—Ethernet interfaces with standard Tag Protocol ID (TPID) tagging can use Ethernet CCC encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
  - TCC version (**ethernet-tcc**)—Similar to CCC, but used for circuits with different media on either side of the connection.

    For 8-port, 12-port, and 48-port Fast Ethernet PICs, TCC is not supported.

- VLAN CCC (**vlan-ccc**)—Ethernet interfaces with VLAN tagging enabled can use VLAN CCC encapsulation. VLAN CCC encapsulation supports TPID 0x8100 only. When you use this encapsulation type, you can configure the **ccc** family only.
- Extended VLAN cross-connect—Gigabit Ethernet interfaces with VLAN 802.1Q tagging enabled can use extended VLAN cross-connect encapsulation. (Ethernet interfaces with standard TPID tagging can use VLAN CCC encapsulation.) Two related versions of extended VLAN cross-connect are supported:
  - CCC version (**extended-vlan-ccc**)—Extended VLAN CCC encapsulation supports TPIDs 0x8100, 0x9100, and 0x9901. When you use this encapsulation type, you can configure the **ccc** family only.
  - TCC version (**extended-vlan-tcc**)—Similar to CCC, but used for circuits with different media on either side of the connection.

    For 8-port, 12-port, and 48-port Fast Ethernet PICs, extended VLAN CCC is not supported. For 4-port Gigabit Ethernet PICs, extended VLAN CCC and extended VLAN TCC are not supported.

NOTE: In ACX Series routers, VPLS is supported only on ACX5048 and ACX5096 routers.

- Ethernet VPLS (**ethernet-vpls**)—Ethernet interfaces with VPLS enabled can use Ethernet VPLS encapsulation. For more information about VPLS, see the *Junos OS VPNs Library for Routing Devices*.
- Ethernet VLAN VPLS (**vlan-vpls**)—Ethernet interfaces with VLAN tagging and VPLS enabled can use Ethernet VLAN VPLS encapsulation. For more information about VPLS, see the *Junos OS VPNs Library for Routing Devices*.
- Extended VLAN VPLS (**extended-vlan-vpls**)—Ethernet interfaces with VLAN 802.1Q tagging and VPLS enabled can use Ethernet Extended VLAN VPLS encapsulation. (Ethernet interfaces with standard TPID tagging can use Ethernet VLAN VPLS encapsulation.) Extended Ethernet VLAN VPLS encapsulation supports TPIDs 0x8100, 0x9100, and 0x9901. For more information about VPLS, see the *Junos OS VPNs Library for Routing Devices*.

- Flexible Ethernet services (**flexible-ethernet-services**)—Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) can use flexible Ethernet services encapsulation. Aggregated Ethernet bundles can use this encapsulation type. You use this encapsulation type when you want to configure multiple per-unit Ethernet encapsulations. This encapsulation type allows you to configure any combination of route, TCC, CCC, Layer 2 virtual private networks (VPNs), and VPLS encapsulations on a single physical port. If you configure flexible Ethernet services encapsulation on the physical interface, VLAN IDs from 1 through 511 are no longer reserved for normal VLANs.
- PPP—Defined in RFC 1661, *The Point-to-Point Protocol (PPP) for the Transmission of Multiprotocol Datagrams over Point-to-Point Links*. PPP is the default encapsulation type for physical interfaces. E1, E3, SONET/SDH, T1, and T3 interfaces can use PPP encapsulation.

NOTE: When the encapsulation type is set to Cisco-compatible Frame Relay encapsulation, ensure that the LMI type is set to ANSI or Q933-A.

In ACX Series routers, VPLS is supported only on ACX5048 and ACX5096 routers.

Encapsulation Capabilities

When you configure a point-to-point encapsulation (such as PPP or Cisco HDLC) on a physical interface, the physical interface can have only one logical interface (that is, only one **unit** statement) associated with it. When you configure a multipoint encapsulation (such as Frame Relay), the physical interface can have multiple logical units, and the units can be either point-to-point or multipoint.

Ethernet CCC encapsulation for Ethernet interfaces with standard TPID tagging requires that the physical interface have only a single logical interface. Ethernet interfaces in VLAN mode can have multiple logical interfaces.

For Ethernet interfaces in VLAN mode, VLAN IDs are applicable as follows:

- VLAN ID 0 is reserved for tagging the priority of frames.
- For encapsulation type **vlan-ccc**, VLAN IDs 1 through 511 are reserved for normal VLANs. VLAN IDs 512 and above are reserved for VLAN CCCs.

  When you configure Ethernet virtual LAN (VLAN) encapsulation on CCC circuits (by using the **encapsulation vlan-ccc** statement at the **[edit interfaces *interface-name*]** hierarchy level), you can bind a list of VLAN IDs to the interface by using the **vlan-id-list [*vlan-id-numbers*]** statement to configure a CCC for multiple VLANs. Configuring this statement creates a CCC for:

  - Each VLAN listed—for example, **vlan-id-list [100 200 300]**
  - Each VLAN in a range—for example, **vlan-id-list [100-200]**

  - Each VLAN in a list and range combination—for example, **vlan-id-list [50, 100-200, 300]**

- For encapsulation type **vlan-vpls**, VLAN IDs 1 through 511 are reserved for normal VLANs, and VLAN IDs 512 through 4094 are reserved for VPLS VLANs. For 4-port Fast Ethernet interfaces, you can use VLAN IDs 512 through 1024 for VPLS VLANs.
- For Gigabit Ethernet interfaces and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), you can configure flexible Ethernet services encapsulation on the physical interface. For interfaces with **flexible-ethernet-services** encapsulation, all VLAN IDs are valid. VLAN IDs from 1 through 511 are not reserved.
- For encapsulation types **extended-vlan-ccc** and **extended-vlan-vpls**, all VLAN IDs are valid.

The upper limits for configurable VLAN IDs vary by interface type.

When you configure a TCC encapsulation, some modifications are needed to handle VPN connections over unlike Layer 2 and Layer 2.5 links and terminate the Layer 2 and Layer 2.5 protocol locally.

The router performs the following media-specific change:

- ATM—Operation, Administration, and Maintenance (OAM) and Interim Local Management Interface (ILMI) processing is terminated at the router. Cell relay is not supported. The Junos OS strips all ATM encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to ATM encapsulation.

Example: Configuring the Encapsulation on a Physical Interface

Configure PPP encapsulation on a SONET/SDH interface. The second and third **family** statements allow Intermediate System-to-Intermediate System (IS-IS) and MPLS to run on the interface.

```
[edit interfaces]
so-7/0/0 {
  encapsulation ppp;
  unit 0 {
    point-to-point;
    family inet {
      address 192.168.1.113/32 {
        destination 192.168.1.114;
      }
    }
    family iso;
    family mpls;
  }
}
```

Related Documentation

- *Configuring Interface Encapsulation on Logical Interfaces*

CHAPTER 3

Configuring RADIUS Authentication for L2TP

Configuring RADIUS Authentication for L2TP

The L2TP network server (LNS) sends RADIUS authentication requests or accounting requests. Authentication requests are sent out to the authentication server port. Accounting requests are sent to the accounting port. To configure RADIUS authentication for L2TP on an M10i or M7i router, include the following statements at the **[edit access]** hierarchy level:

```
[edit access]
radius-server server-address {
   accounting-port port-number;
   port port-number;
   retry attempts;
   routing-instance routing-instance-name;
   secret password;
   source-address source-address;
   timeout seconds;
}
```

NOTE: The RADIUS servers at the **[edit access]** hierarchy level are not used by the network access server process (NASD).

You can specify an accounting port number on which to contact the accounting server (in the **accounting-port** statement). Most RADIUS servers use port number 1813 (as specified in RFC 2866, *Radius Accounting*).

NOTE: If you enable RADIUS accounting at the **[edit access profile *profile-name* accounting-order]** hierarchy level, accounting is triggered on the default port of 1813 even if you do not specify a value for the **accounting-port** statement.

server-address specifies the address of the RADIUS authentication server (in the **radius-server** statement).

You can specify a port number on which to contact the RADIUS authentication server (in the **port** statement). Most RADIUS servers use port number 1812 (as specified in RFC 2865, *Remote Authentication Dial In User Service [RADIUS]*).

You must specify a password in the **secret** statement. If a password includes spaces, enclose the password in quotation marks. The secret used by the local router must match that used by the RADIUS authentication server.

Optionally, you can specify the amount of time that the local router waits to receive a response from a RADIUS server (in the **timeout** statement) and the number of times that the router attempts to contact a RADIUS authentication server (in the **retry** statement). By default, the router waits 3 seconds. You can configure this to be a value in the range from 1 through 90 seconds. By default, the router retries connecting to the server three times. You can configure this to be a value in the range from 1 through 30 times. If the maximum number of retries is reached, the radius server is considered dead for 5 minutes (300 seconds).

In the **source-address** statement, specify a source address for each configured RADIUS server. Each RADIUS request sent to a RADIUS server uses the specified source address. The source address is a valid IPv4 address configured on one of the router interfaces.

To configure multiple RADIUS servers, include multiple **radius-server** statements. For information about how to configure the RADIUS disconnect server for L2TP, see "Configuring the RADIUS Disconnect Server for L2TP" on page 60.

NOTE: When the L2TP network server (LNS) is configured with RADIUS authentication, the default behavior is to accept the preferred RADIUS-assigned IP address. Previously, the default behavior was to accept and install the nonzero peer IP address received by the Internet Protocol Control Protocol (IPCP) configuration request packet.

Related Documentation

- RADIUS Attributes for L2TP on page 55
- Configuring L2TP for Enabling PPP Tunneling Within a Network on page 12
- Configuring the RADIUS Disconnect Server for L2TP on page 60

RADIUS Attributes for L2TP

Junos OS supports the following types of RADIUS attributes for L2TP:

- Juniper Networks vendor-specific attributes (VSAs)
- Attribute-value pairs (AVPs) defined by the Internet Engineering Task Force (IETF)
- RADIUS accounting stop and start AVPs

Juniper Networks vendor-specific RADIUS attributes are described in RFC 2865, *Remote Authentication Dial In User Service (RADIUS)*. These attributes are encapsulated with the vendor ID set to the Juniper Networks ID number 2636. Table 3 on page 55 lists the Juniper Networks VSAs you can configure for L2TP.

Table 3: Juniper Networks Vendor-Specific RADIUS Attributes for L2TP

Attribute Name	Standard Number	Value
Juniper-Primary-DNS	31	IP address
Juniper-Primary-WINS	32	IP address
Juniper-Secondary-DNS	33	IP address
Juniper-Secondary-WINS	34	IP address
Juniper-Interface-ID	35	String
Juniper-IP-Pool-Name	36	String
Juniper-Keep-Alive	37	Integer

Table 4 on page 55 lists the IETF RADIUS AVPs supported for LT2P.

Table 4: Supported IETF RADIUS Attributes for L2TP

Attribute Name	Standard Number	Value
User-Name	1	String
User-Password	2	String
CHAP-Password	3	String
NAS-IP-Address	4	IP address

Table 4: Supported IETF RADIUS Attributes for L2TP (continued)

Attribute Name	Standard Number	Value
NAS-Port	5	Integer
Service-Type	6	Integer
Framed-Protocol	7	Integer
Framed-IP-Address	8	IP address
Framed-IP-Netmask	9	IP address
Framed-MTU	12	Integer
Framed-Route	22	String
Session-Timeout	27	Integer
Idle-Timeout	28	Integer
Called-Station-ID	30	String
Calling-Station-ID	31	String
CHAP-Challenge	60	String
NAS-Port-Type	61	Integer
Framed-Pool	88	Integer

Table 5 on page 56 lists the supported RADIUS accounting start AVPs for L2TP.

Table 5: Supported RADIUS Accounting Start Attributes for L2TP

Attribute Name	Standard Number	Value
User-Name	1	String
NAS-IP-Address	4	IP address
NAS-Port	5	Integer
Service-Type	6	Integer
Framed-Protocol	7	Integer
Framed-IP-Address	8	IP address
Called-Station-ID	30	String

Table 5: Supported RADIUS Accounting Start Attributes for L2TP (continued)

Attribute Name	Standard Number	Value
Calling-Station-ID	31	String
Acct-Status-Type	40	Integer
Acct-Delay-Time	41	Integer
Acct-Session-ID	44	String
Acct-Authentic	45	Integer
NAS-Port-Type	61	Integer
Tunnel-Client-Endpoint	66	String
Tunnel-Server-Endpoint	67	String
Acct-Tunnel-Connection	68	String
Tunnel-Client-Auth-ID	90	String
Tunnel-Server-Auth-ID	91	String

Table 6 on page 57 lists the supported RADIUS accounting stop AVPs for L2TP.

Table 6: Supported RADIUS Accounting Stop Attributes for L2TP

Attribute Name	Standard Number	Value
User-Name	1	String
Local-Loopback-Interface	3	String
NAS-IP-Address	4	IP address
NAS-Port	5	Integer
Service-Type	6	Integer
Framed-Protocol	7	Integer
Framed-IP-Address	8	IP address
Called-Station-ID	30	String
Calling-Station-ID	31	String
Acct-Status-Type	40	Integer

Table 6: Supported RADIUS Accounting Stop Attributes for L2TP (continued)

Attribute Name	Standard Number	Value
Acct-Delay-Time	41	Integer
Acct-Input-Octets	42	Integer
Acct-Output-Octets	43	Integer
Acct-Session-ID	44	String
Acct-Authentic	45	Integer
Acct-Session-Time	46	Integer
Acct-Input-Packets	47	Integer
Acct-Output-Packets	48	Integer
Acct-Terminate-Cause	49	Integer
Acct-Multi-Session-ID	50	String
Acct-Link-Count	51	Integer
NAS-Port-Type	61	Integer
Tunnel-Client-Endpoint	66	String
Tunnel-Server-Endpoint	67	String
Acct-Tunnel-Connection	68	String
Tunnel-Client-Auth-ID	90	String
Tunnel-Server-Auth-ID	91	String

Related Documentation

- Example: Configuring RADIUS Authentication for L2TP on page 59

RADIUS Local Loopback Interface Attribute for L2TP Overview

You can configure the Local-Loopback-Interface attribute on a RADIUS server to manage multiple LAC devices. This attribute is used as the LAC source address on an LNS tunnel for PPPoE subscribers tunneled over L2TP.

When you use the Tunnel-Client-Endpoint attribute as the LAC source address, you must configure the Tunnel-Client-Endpoint attribute for each MX Series router that uses the same RADIUS server. Starting with this release you can use the Local-Loopback-Interface

attribute, which needs to be configured only once. When the LAC initiates an Access-Request message to RADIUS for authentication, RADIUS returns the Local-Loopback-Interface attribute in the Access-Accept message. This attribute contains the name of the loopback interface, either as a generic interface name such as “lo0” or as a specific name like “lo0.0”. The MX Series router then uses the configured loopback interface IP address as the source address during tunnel negotiation with the LNS.

NOTE: An MX Series router can act as the LAC and use any interface address on it as an L2TP tunnel source address. The source address can be dynamically assigned by RADIUS through the Tunnel-Client-Endpoint or Local-Loopback-Interface attribute. The tunnel source address can be statically configured on the MX Series router by using the L2TP tunnel profile. If RADIUS does not return the Tunnel-Client-Endpoint or Local-Loopback-Interface attribute, and if there is no corresponding L2TP tunnel profile configured on the MX Series router, then the L2TP tunnel fails to initiate because the router does not have a proper tunnel source address. In this case, the router can use the locally configured loopback address as the source address to successfully establish the L2TP tunnel.

Related Documentation

- RADIUS Attributes for L2TP on page 55

Example: Configuring RADIUS Authentication for L2TP

The following example shows how to configure RADIUS authentication for L2TP:

```
[edit access]
profile sunnyvale_bldg_2 {
   client green {
      chap-secret "$9$24gGiPfz6CuQFu1EyW8VwYgZUik.5z3";
      ppp {
         interface-id west;
      }
      group-profile sunnyvale_users;
   }
   client red {
      chap-secret "$9$24gGiPfz6CuQFu1EyW8VwYgZUik.5z3";
      group-profile sunnyvale_users;
   }
   authentication-order radius;
}
radius-server {
   192.168.65.213 {
      port 1812;
      accounting-port 1813;
      secret "$9$24gGiPfz6CuQFu1EyW8VwYgZUik.5z3"; # SECRET-DATA
   }
   192.168.65.223 {
      port 1812;
      accounting-port 1813;
```

```
        secret "$9$24gGiPfz6CuQFu1EyW8VwYgZUik.5z3"; # SECRET-DATA
    }
}
radius-disconnect-port 2500;
radius-disconnect {
    192.168.65.152 secret "$9$rtkl87ws4ZDkgokPT3tpEcylWL7-VY4a";
    # SECRET-DATA
    192.168.64.153 secret "$9$gB4UHf5F/A0z30Ihr8Lbs24GDHqmTFn";
    # SECRET-DATA
    192.168.64.157 secret "$9$Hk5FCA0IhruOrv87sYGDikfTFn/t0B";
    # SECRET-DATA
    192.168.64.173 secret "$9$Hk5FCA0IhruOrv87sYGDikfTFn/t0B";
    # SECRET-DATA
}
```

Related Documentation

- Configuring RADIUS Authentication for L2TP on page 53

Configuring the RADIUS Disconnect Server for L2TP

To configure the RADIUS disconnect server to listen for disconnect requests from an administrator and process them, include the following statements at the **[edit access]** hierarchy level:

```
[edit access]
radius-disconnect-port port-number;
radius-disconnect {
    client-address {
        secret password;
    }
}
```

port-number is the server port to which the RADIUS client sends disconnect requests. The L2TP network server, which accepts these disconnect requests, is the server. You can specify a port number on which to contact the RADIUS disconnect server. Most RADIUS servers use port number 1700.

NOTE: The Junos OS accepts only disconnect requests from the client address configured at the **[edit access radius-disconnect *client-address*]** hierarchy level.

client-address is the host sending disconnect requests to the RADIUS server. The client address is a valid IP address configured on one of the router or switch interfaces.

password authenticates the RADIUS client. Passwords can contain spaces. The secret used by the local router must match that used by the server.

For information about how to configure RADIUS authentication for L2TP, see "Configuring RADIUS Authentication for L2TP" on page 53.

The following example shows the statements to be included at the **[edit access]** hierarchy level to configure the RADIUS disconnect server:

```
[edit access]
radius-disconnect-port 1700;
radius-disconnect {
  192.168.64.153 secret "$9$rtkl87ws4ZDkgokPT3tpEcylWL7-VY4a";
  # SECRET-DATA
  192.168.64.162 secret "$9$rtkl87ws4ZDkgokPT3tpEcylWL7-VY4a";
  # SECRET-DATA
}
```

Related Documentation

- Configuring RADIUS Authentication for L2TP on page 53

Configuring RADIUS Authentication for an L2TP Client and Profile

On an M10i or M7i router, L2TP supports RADIUS authentication and accounting for users with one set of RADIUS servers under the **[edit access]** hierarchy. You can also configure RADIUS authentication for each tunnel client or user profile.

To configure the RADIUS authentication for L2TP tunnel clients on an M10i or M7i router, include the **ppp-profile** statement with the **l2tp** attributes for tunnel clients:

```
[edit access profile profile-name client client-name l2tp]
ppp-profile profile-name;
```

ppp-profile *profile-name* specifies the profile used to validate PPP session requests through L2TP tunnels. Clients of the referenced profile must have only PPP attributes. The referenced group profile must be defined.

To configure the RADIUS authentication for a profile, include following statements at the **[edit access profile** *profile-name***]** hierarchy level:

```
[edit access profile profile-name]
radius-server server-address {
  accounting-port port-number;
  port port-number;
  retry attempts;
  routing-instance routing-instance-name;
  secret password;
  source-address source-address;
  timeout seconds;
}
```

When a PPP user initiates a session and RADIUS authentication is configured for the user profile on the tunnel group, the following priority sequence is used to determine which RADIUS server is used for authentication and accounting:

- If the **ppp-profile** statement is configured under the tunnel client (LAC), the RADIUS servers configured under the specified **ppp-profile** are used.
- If RADIUS servers are configured under the user profile for the tunnel group, those servers will be used.

- If no RADIUS server is configured for the tunnel client (LAC) or user profile, then the RADIUS servers configured at the **[edit access]** hierarchy level are used.

Related Documentation

- Example: Configuring RADIUS Authentication for an L2TP Profile on page 62

Example: Configuring RADIUS Authentication for an L2TP Profile

The following example shows statements to be included at the **[edit access]** hierarchy level to configure RADIUS authentication for an L2TP profile:

```
[edit access]
profile t {
   client LAC_A {
      l2tp {
         ppp-profile u;
      }
   }
}
profile u {
   client client_1 {
      ppp {
      }
   }
   5.5.5.5 {
      port 3333;
      secret $9$dkafeqwrew;
      source-address 1.1.1.1;
      retry 3;
      timeout 3;
   }
   6.6.6.6 secret $9$fe3erqwrez;
   7.7.7.7 secret $9$f34929ftby;
}
```

Related Documentation

- Configuring RADIUS Authentication for an L2TP Client and Profile on page 61

Example: Configuring RADIUS-Based Subscriber Authentication and Accounting

This example shows a RADIUS-based authentication and accounting configuration.

```
[edit access]
radius-server {
   192.168.1.250 {
      port 1812;
      accounting-port 1813;
      accounting-retry 6;
      accounting-timeout 20;
      retry 3;
      secret $ABC123$ABC123;
      source-address 192.168.1.100;
      timeout 45;
```

```
    }
    192.168.1.251 {
      port 1812;
      accounting-port 1813;
      accounting-retry 6;
      accounting-timeout 20;
      retry 3;
      secret $ABC123;
      source-address 192.168.1.100;
      timeout 30;
    }
    2001:DB8:0f101::2{
      port 1812;
      accounting-port 1813;
      accounting-retry 6;
      accounting-timeout 20;
      retry 4;
      secret $ABC123$ABC123$ABC123-;
      source-address 2001:DB8:0f101::1;
      timeout 20;
    }
  }
  profile isp-bos-metro-fiber-basic {
    authentication-order radius;
    accounting {
      order radius;
      accounting-stop-on-access-deny;
      accounting-stop-on-failure;
      immediate-update;
      statistics time;
      update-interval 12;
      wait-for-acct-on-ack;
      send-acct-status-on-config-change;
    }
    radius {
      authentication-server 192.168.1.251 192.168.1.252;
      accounting-server 192.168.1.250 192.168.1.251;
      options {
        accounting-session-id-format decimal;
        client-accounting-algorithm round-robin;
        client-authentication-algorithm round-robin;
        nas-identifier 56;
        nas-port-id-delimiter %;
        nas-port-id-format {
          nas-identifier;
          interface-description;
        }
        nas-port-type {
          ethernet {
            wireless-80211;
          }
        }
      }
      attributes {
        ignore {
          framed-ip-netmask;
```

```
        }
        exclude {
          accounting-delay-time [accounting-start accounting-stop];
          accounting-session-id [access-request accounting-on accounting-off
          accounting-start accounting-stop];
          dhcp-gi-address [access-request accounting-start accounting-stop];
          dhcp-mac-address [access-request accounting-start accounting-stop];
          nas-identifier [access-request accounting-start accounting-stop];
          nas-port [accounting-start accounting-stop];
          nas-port-id [accounting-start accounting-stop];
          nas-port-type [access-request accounting-start accounting-stop];
        }
      }
    }
}
[edit logical-systems isp-bos-metro-12 routing-instances isp-cmbrg-12-32]
interfaces {
  lo0 {
    unit 0 {
      family inet {
        address 192.168.1.100/24;
      }
    }
  }
  ge-0/0/0 {
    vlan-tagging;
    unit 0 {
      vlan-id 200;
      family inet {
        unnumbered-address lo0.0;
      }
    }
  }
}
```

Related Documentation

- *Configuring Router or Switch Interaction with RADIUS Servers*

Understanding Session Options for Subscriber Access

You can configure several characteristics of the sessions that are created for DHCP, L2TP, and terminated PPP subscribers. You can place limits on subscriber access based on how long the session has been up, how long the user has been inactive, or both. You can also set parameters that modify a subscriber's username at login based on the subscriber's access profile.

- Subscriber Session Timeouts on page 64
- Subscriber Username Modification on page 67

Subscriber Session Timeouts

You can limit subscriber access by configuring a session timeout or an idle timeout. Use a session timeout to specify a fixed period of time that the subscriber is permitted to

have access. Use an idle timeout to specify a maximum period of time that the subscriber can be idle. You can use these timeouts separately or together. By default, neither timeout is present.

NOTE: For all subscriber types other than DHCP (such as L2TP-tunneled and PPP-terminated subscribers), the session timeout value limits the subscriber session. For DHCP subscribers, the session timeout value is used to limit the lease when no other lease time configuration is present. The lease expires when the timeout value expires. If this value is not supplied by either the CLI or RADIUS, the DHCP lease does not expire.

The idle timeout is based on accounting statistics for the subscriber. The router determines subscriber inactivity by monitoring data traffic, both upstream from the user (ingress) and downstream to the user (egress). Control traffic is ignored. The subscriber is not considered idle as long as data traffic is detected in either direction.

Optionally, you can specify that only subscriber ingress traffic is monitored; egress traffic is ignored. This configuration is useful in cases where the LNS sends traffic to the remote peer even when the peer is not up, such as when the LNS does not have PPP keepalives enabled and therefore cannot detect that the peer is not up. In this situation, because by default the LAC monitors both ingress and egress traffic, it detects the egress traffic from the LNS and either does not log out the subscriber or delays detection of inactivity until the egress traffic ceases. When you specify that only ingress traffic is monitored, the LAC can detect that the peer is inactive and then initiate logout.

When either timeout period expires, the non-DHCP subscribers are gracefully logged out, similarly to a RADIUS-initiated disconnect or a CLI-initiated logout. DHCP subscribers are disconnected. The Acct-Terminate-Cause [RADIUS attribute 49] value includes a reason code of 5 for a session timeout and a code of 4 for an idle timeout.

You can configure these limitations to subscriber access on a per-subscriber basis by using the RADIUS attributes Session-Timeout [27] and Idle-Timeout [28]. RADIUS returns these attributes in Access-Accept messages in response to Access-Request messages from the access server.

Service providers often choose to apply the same limitations to large numbers of subscribers. You can reduce the RADIUS provisioning effort for this scenario by defining the limitations for subscribers in an access profile on a per-routing-instance basis. If you do so, RADIUS attributes subsequently returned for a particular subscriber logged in with the profile override the per-routing-instance values.

BEST PRACTICE: We recommend that you do not configure a session timeout for subscribers receiving voice services. Because the session timeout is based only on time and not user activity, it is likely to interrupt subscribers actively using a voice service and terminate their calls unexpectedly (from the subscriber viewpoint). This result is a particular concern for emergency services calls.

BEST PRACTICE: We recommend that you do not configure an idle timeout for DHCP subscribers. When the timeout expires with no activity and the connection is terminated, the protocol has no means to inform the client. Consequently, these subscribers are forced to reboot their CPE device the next time they attempt to access the Internet.

Contrast the behavior when an idle timeout is configured for PPP subscribers. In this case, timeout expiration causes PPP to terminate the link with the peer. Depending on the CPE device, this termination enables the peer to automatically retry the connection either on demand or immediately. In either case, no subscriber intervention is required.

The available range for setting a timeout is the same whether you configure it in the CLI or through the RADIUS attributes:

- Session timeouts can be set for 1 minute through 527,040 minutes in the CLI and the corresponding number of seconds (60 through 31,622,400) in the Session-Timeout attribute [27].
- Idle timeouts can be set for 10 minutes through 1440 minutes in the CLI and the corresponding number of seconds (600 through 86,400) in the Idle-Timeout attribute [28].

The router interprets the values in the attributes to conform to the supported ranges. For example, for Session-Timeout [27]:

- A value of zero is treated as no timeout.
- A value in the range 1 through 59 is raised to 60 seconds.
- A value that exceeds 31,622,400 is reduced to 31,622,400 seconds.

For Idle-Timeout [28]:

- A value of zero is treated as no timeout.
- A value in the range 1 through 599 is raised to 600 seconds.
- A value that exceeds 86,400 is reduced to 86,400 seconds.

In configurations using dynamically created subscriber VLANs, the idle timeout also deletes the inactive subscriber VLANs when the inactivity threshold has been reached. In addition to deleting inactive dynamic subscriber VLANs, the idle timeout also removes dynamic VLANs when no client sessions were ever created (for example, in the event no client sessions are created on the dynamic VLAN or following the occurrence of an error during session creation or client authentication where no client sessions are created on the dynamic VLAN).

Session and idle timeouts for deleting dynamic subscriber VLANs are useful only in very limited use cases; typically neither timeout is configured for this purpose.

A possible circumstance when they might be useful is when the dynamic VLANs have no upper layer protocol that helps determine when the VLAN is removed with the **remove-when-no-subscribers** statement; for example, when the VLAN is supporting IP over Ethernet without DHCP in a business access model with fixed addresses. However, business access is generally a higher-tier service than residential access and as such typically is not subject to timeouts due to inactivity as might be desired for residential subscribers.

An idle timeout might be appropriate in certain Layer 2 wholesale situations, where the connection can be regenerated when any packet is received from the CPE.

When using the idle timeout for dynamic VLAN removal, keep the following in mind:

- The idle timeout period begins after a dynamic subscriber VLAN interface is created or traffic activity stops on a dynamic subscriber VLAN interface.
- If a new client session is created or a client session is reactivated successfully, the client idle timeout resets.
- The removal of inactive subscriber VLANs functions only with VLANs that have been authenticated.

Subscriber Username Modification

For Layer 2 wholesale applications, some network service providers employ username modification to direct subscribers to the appropriate retail enterprise network. This modification is also called username *stripping*, because some of the characters in the username are stripped away and discarded. The remainder of the string becomes the new, modified username. The modified username is used by an external AAA server for session authentication and accounting. The modification parameters are applied according to a subscriber access profile that also determines the subscriber and session context; that is, the logical system:routing instance (LS:RI) used by the subscriber. Only the default (master) logical system is supported. Because the wholesaler differentiates between multiple retailers by placing each in a different LS:RI, the usernames are appropriately modified for each retailer.

You can select up to eight characters as delimiters to mark the boundary between the discarded and retained portions of the original username; there is no default delimiter. The portion of the name to the right of the selected delimiter is discarded along with the delimiter. By configuring multiple delimiters, a given username structure can result in different modified usernames. You can configure the direction in which the original name is parsed to determine which delimiter marks the boundary. By default, the parse direction is from left to right.

Consider the following examples:

- You specify one delimiter, @. The username is user1@example.com. In this case, the parse direction does not matter. In either case, the single delimiter is found and example.com is discarded. The modified username is user1.

parse direction	identify delimiter	modified username
left-to-right	user1@example.com	user1
right-to-left	user1@example.com	user1

- You specify one delimiter, @. The username is user1@test@example.com. In this case, the parse direction results in different usernames.
  - Parse direction is left-to-right—The left-most @ is identified as the delimiter and test@example.com is discarded. The modified username is user1.
  - Parse direction is right-to-left—The right-most @ is identified as the delimiter and example.com is discarded. The modified username is user1@test.

parse direction	identify delimiter	modified username
left-to-right	user1@test@example.com	user1
right-to-left	user1@test@example.com	user1@test

- You specify two delimiters, @ and /. The username is user1@bldg1/example.com. The parse direction results in different usernames.
  - Parse direction is left-to-right—The @ is identified as the delimiter and bldg1/example.com is discarded. The modified username is user1.
  - Parse direction is right-to-left—The / is identified as the delimiter and example.com is discarded. The modified username is user1@bldg1.

parse direction	identify delimiter	modified username
left-to-right	user1@bldg1/example.com	user1
right-to-left	user1@bldg1/example.com	user1@bldg1

You can configure a subscriber access profile so that a portion of each subscriber login string is stripped and subsequently used as a modified username by an external AAA server for session authentication and accounting. The modified username appears, for example, in RADIUS Access-Request, Acct-Start, and Acct-Stop messages, as well as RADIUS-initiated disconnect requests and change of authorization (CoA) requests.

Related Documentation

- *RADIUS IETF Attributes Supported by the AAA Service Framework*
- Configuring Subscriber Session Timeout Options on page 69
- *Configuring Username Modification for Subscriber Sessions*
- *Removing Inactive Dynamic Subscriber VLANs*

Configuring Subscriber Session Timeout Options

Subscriber session timeout options enable you to place limits on subscriber access based on how long the session has been up, how long the user has been inactive, or both. The subscriber session options apply to both L2TP-tunneled and PPP-terminated subscriber sessions. For DHCP subscribers, the session timeout limits the DHCP lease time.

NOTE: To configure the timeout attributes in RADIUS, refer to the documentation for your RADIUS server.

To configure limitations on subscriber sessions, configure the session options in the client profile that applies to the subscriber:

- Terminate the subscriber when the configured session timeout expires, regardless of activity.

  ```
  [edit access profile profile-name session-options]
  user@host# set client-session-timeout minutes
  ```

- Terminate the subscriber when there is no ingress or egress data traffic for the duration of the configured idle timeout.

  ```
  [edit access profile profile-name session-options]
  user@host# set client-idle-timeout minutes
  ```

- Terminate the subscriber when there is no ingress data traffic for the duration of the configured idle timeout; ignore egress traffic.

  ```
  [edit access profile profile-name session-options]
  user@host# set client-idle-timeout minutes
  user@host# set client-idle-timeout-ingress-only
  ```

For example, to configure session timeout options in the **acc-prof** client profile, specifying an idle timeout of 15 minutes, that only ingress traffic is monitored, and that the session times out after 120 minutes:

```
[edit]
access {
  profile {
    acc-prof {
      session-options {
        client-idle-timeout 15;
        client-idle-timeout-ingress-only;
        client-session-timeout 120;
      }
    }
  }
}
```

Related Documentation

- Understanding Session Options for Subscriber Access on page 64
- *Configuring Username Modification for Subscriber Sessions*

- *Removing Inactive Dynamic Subscriber VLANs*
- *Removing Inactive Dynamic Subscriber VLANs*

CHAPTER 4

Configuring MLPPP

Understanding MLPPP Bundles on ACX Series Routers

ACX Series routers support MLPPP encapsulations. MLPPP enables you to bundle multiple PPP links into a single multilink bundle. Multilink bundles provide additional bandwidth, load balancing, and redundancy by aggregating low-speed links, such as T1 and E1 links.

You configure multilink bundles as logical units or channels on the link services interface. With MLPPP, multilink bundles are configured as logical units on the link service interface—for example, **lsq-0/0/0.0**,**lsq-0/0/0.1**. MLPPP is supported on ACX1000, ACX2000, ACX2100 routers, and with Channelized OC3/STM1 (Multi-Rate) MICs with SFP and 16-port Channelized E1/T1 Circuit Emulation MIC on ACX4000 routers.

After creating multilink bundles, you add constituent links to the bundle. The constituent links are the low-speed physical links that are to be aggregated. The following table shows the maximum number of multilink bundles you can create on ACX Series routers:

Table 7: Multilink Bundles Supported by ACX Series Routers

ACX Platform	Maximum Bundles	Maximum Links	Maximum Links Per Bundle
ACX2000 ACX2100	16	16	16
ACX4000 ACX-MIC-16CHE1-T1-CE	16	16	16
ACX4000 ACX-MIC-4COC3-1COC12CE	50	336	16
ACX1000	8	8	8

The following rules apply when you add constituent links to a multilink bundle:

- On each multilink bundle, add only interfaces of the same type. For example, you can add either T1 or E1, but not both.
- Only interfaces with a PPP encapsulation can be added to an MLPPP bundle.
- If an interface is a member of an existing bundle and you add it to a new bundle, the interface is automatically deleted from the existing bundle and added to the new bundle.

With multilink PPP bundles, you can use PPP Challenge Handshake Authentication Protocol (CHAP) and Password Authentication Protocol (PAP) for secure transmission over the PPP interfaces. For link services IQ (lsq) interfaces only, the maximum number of multilink classes to be negotiated when a link joins the bundle that you can specify by using the multilink-max-classes statement at the [edit interfaces interface-name unit logical-unit-number] hierarchy level is limited to 4. Fragmentation size is not specified under fragmentation map; instead, fragmentation size configured on the bundle is used. Compressed Real-Time Transport Protocol (RTP) is not supported. HDLC address and control field compression (ACFC) and PPP protocol field compression (PFC) are not supported.

Related Documentation

- *Link and Multilink Services Overview*
- *Multilink Interfaces on Channelized MICs Overview*

Guidelines for Configuring MLPPP With LSQ Interfaces on ACX Series Routers

You can configure MLPPP bundle interfaces with T1/E1 member links. The traffic that is transmitted over the MLPPP bundle interface is spread over the member links in a round-robin manner. If the packet size is higher than the fragmentation size configured on the MLPPP interface, the packet are fragmented. The fragments are also sent over member links in a round-robin pattern. The PPP control packets received on the interface are terminated on the router. The fragmentation size is configured at the MLPPP bundle-level. This fragmentation size is applied to all the packets on the bundle, regardless of the multilink class.

Multiclass MLPPP segregates the multilink protocol packets in to multiple classes. ACX routers support up to a maximum of four classes. One queue is associated with each of the four classes of multiclass MLPPP (MCML). The packets can be classified to be part of one of the classes. These packets take the queue associated with the class. The packets inside a queue are served in first-in first-out (FIFO) sequence.

Multiclass MLPPP is required to provide preferential treatment to high-priority, delay-sensitive traffic. The delay-sensitive smaller real-time frames are classified such that they end up in higher priority queue. While a lower priority packet is being fragmented, if a higher priority packet is enqueued, the lower priority fragmentation is suspended, the higher priority packet is fragmented and enqueued for transmission, and then the lower priority packet fragmentation is resumed.

Traditional LSQ interfaces (anchored on PICs) are supported to combine T1/E1 interfaces in an MLPPP bundle interface. Inline services (si-) interfaces and inline LSQ interfaces are not supported in MLPPP bundles. On ACX routers, MLPPP bundling is performed on the TDM MICs and traditional LSQ model is most effective mechanism. You can configure channelized OC interfaces (**t1-*x/y/z:n:m***, **e1-*x/y/z:n***) as members of an MLPPP bundle interface. A maximum of 16 member links per bundle is supported. The MPLS, ISO, and inet address families are supported. The ISO address family is supported only for IS-IS. You can configure MLPPP bundles on network-to-network interface (NNI) direction of an Ethernet pseudowire. Interleaving using multiclass MLPPP is supported.

Keep the following points in mind when you configure MLPPP bundles on ACX routers:

- The physical links must be of the same type and bandwidth.
- Round-robin packet distribution is performed over the member links.
- To add a T1 or E1 member link to the MLPPP bundle as link services LSQ interfaces, include the **bundle** statement at the **[edit interfaces t1-*fpc/pic/port* unit *logical-unit-number* family mlppp]** hierarchy level:

  ```
  [edit interfaces t1-fpc/pic/port unit logical-unit-number family mlppp]
  bundle lsq-fpc/pic/port.logical-unit-number;
  ```

- To configure the link services LSQ interface properties, include the following statements at the **[edit interfaces lsq-*fpc/pic/port* unit *logical-unit-number*]** hierarchy level:

  ```
  [edit interfaces lsq-fpc/pic/port unit logical-unit-number]
  encapsulation multilink-ppp;
  ```

```
fragment-threshold bytes;
minimum-links number;
mrru bytes;
short-sequence;
family inet {
  address address;
}
```

You can configure the address family as MPLS for the LSQ interfaces in an MLPPP bundle.

- PPP control protocol support depends on the processing of the PPP application for MLPPP bundle interfaces IPv4, Internet Protocol Control Protocol (IPCP), PPP Challenge Handshake Authentication Protocol (CHAP), and Password Authentication Protocol (PAP) applications are supported for PPP.
- Drop timeout configuration is not applicable to ACX routers
- The member links across MICs cannot be bundled. Only physical interfaces on the same MIC can be bundled.
- Fractional T1 and E1 interfaces are not supported. CoS is supported only for full T1 and E1 interfaces. Selective time slots of T1/E1 cannot be used and full T1/E1 interfaces must be used.
- Detailed statistics displayed depend on the parameters supported by the hardware. The counters that are supported by the hardware are displayed with appropriate values in the output of the **show interfaces lsq-*fpc/pic/port* detail** command. In the following sample output, the fields that are displayed with a value of 0 denote the fields that are not supported for computation by ACX routers. In the lsq- interface statistics, non-fragment statistics of the bundle are not accounted. Non-fragments are typically treated as single-fragment frames and counted in the fragment statistics.

```
user@host# show interfaces lsq-1/1/0 detail
Physical interface: lsq-1/1/0, Enabled, Physical link is Up
  Interface index: 162, SNMP ifIndex: 550, Generation: 165
  Description: LSQ-interface
  Link-level type: LinkService, MTU: 1504
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x0
  Last flapped   : 2015-06-22 19:01:47 PDT (2d 04:56 ago)
  Statistics last cleared: 2015-06-23 05:01:49 PDT (1d 18:56 ago)
  Traffic statistics:
   Input  bytes  :               108824                208896 bps
   Output bytes  :                90185                174080 bps
   Input  packets:                 1075                   256 pps
   Output packets:                 1061                   256 pps
   IPv6 transit statistics:
    Input  bytes  :                   0
    Output bytes  :                   0
    Input  packets:                   0
    Output packets:                   0
  Frame exceptions:
    Oversized frames                  0
    Errored input frames              0
    Input on disabled link/bundle     0
    Output for disabled link/bundle   0
    Queuing drops                     0
```

```
Buffering exceptions:
  Packet data buffer overflow       0
  Fragment data buffer overflow     0
Assembly exceptions:
  Fragment timeout                  0
  Missing sequence number           0
  Out-of-order sequence number      0
  Out-of-range sequence number      0
Hardware errors (sticky):
  Data memory error                 0
  Control memory error              0

Logical interface lsq-1/1/0.0 (Index 326) (SNMP ifIndex 599) (Generation 177)

  Flags: Up Point-To-Point SNMP-Traps 0x0 Encapsulation: Multilink-PPP
  Last flapped: 2015-06-24 23:57:34 PDT (00:00:51 ago)
  Bandwidth: 6144kbps
  Bundle links information:
    Active bundle links       4
    Removed bundle links      0
    Disabled bundle links     0
  Bundle options:
    MRRU                                2000
    Remote MRRU                         2000
    Drop timer period                   0
    Inner PPP Protocol field compression enabled
    Sequence number format              short (12 bits)
    Fragmentation threshold             450
    Links needed to sustain bundle      3
    Multilink classes                   4
    Link layer overhead                 4.0 %
  Bundle status:
    Received sequence number        0x0
    Transmit sequence number        0x0
    Packet drops                    0 (0 bytes)
    Fragment drops                  0 (0 bytes)
    MRRU exceeded                   0
    Fragment timeout                0
    Missing sequence number         0
    Out-of-order sequence number    0
    Out-of-range sequence number    0
    Packet data buffer overflow     0
    Fragment data buffer overflow   0
  Statistics         Frames        fps         Bytes          bps
  Bundle:
    Multilink:
      Input :          1076        256        484200       921600
      Output:          1061        256        477450       921600
    Network:
      Input :          2182        256        201812       208896
      Output:          2168        256        192029       174080
  IPV6 Transit Statistics         Packets        Bytes
    Network:
      Input :                     0              0
      Output:                     0              0
  Multilink class 0:
    Multilink:
      Input :          1075        256        483750       921600
      Output:          1061        256        477450       921600
    Network:
      Input :          1061        256        477450       921600
```

```
    Output:          1075         256         483750         921600
Multilink class 1:
  Multilink:
    Input :             0           0              0              0
    Output:             0           0              0              0
  Network:
    Input :             0           0              0              0
    Output:             0           0              0              0
Multilink class 2:
  Multilink:
    Input :             0           0              0              0
    Output:             0           0              0              0
  Network:
    Input :             0           0              0              0
    Output:             0           0              0              0
Multilink class 3:
  Multilink:
    Input :             0           0              0              0
    Output:             0           0              0              0
  Network:
    Input :             0           0              0              0
    Output:             0           0              0              0
Link:
  t1-1/1/1.0
    Up time: 00:00:51
    Input :           280          64         126000         230400
    Output:           266          64         119700         230400
  t1-1/1/2.0
    Up time: 00:00:51
    Input :           266          64         119700         230400
    Output:           265          64         119250         230400
  t1-1/1/3.0
    Up time: 00:00:51
    Input :           265          64         119250         230400
    Output:           265          64         119250         230400
  t1-1/1/4.0
    Up time: 00:00:51
    Input :           265          64         119250         230400
    Output:           265          64         119250         230400
Multilink detail statistics:
Bundle:
  Fragments:
    Input :          1076         256         484200         921600
    Output:          1061         256         477450         921600
  Non-fragments:
    Input :             0           0              0              0
    Output:             0           0              0              0
  LFI:
    Input :             0           0              0              0
    Output:             0           0              0              0
Multilink class 0:
  Fragments:
    Input :          1076         256         484200         921600
    Output:          1061         256         477450         921600
  Non-fragments:
    Input :             0           0              0              0
    Output:             0           0              0              0
Multilink class 1:
  Fragments:
    Input :             0           0              0              0
    Output:             0           0              0              0
```

```
      Non-fragments:
        Input :             0          0             0            0
        Output:             0          0             0            0
    Multilink class 2:
      Fragments:
        Input :             0          0             0            0
        Output:             0          0             0            0
      Non-fragments:
        Input :             0          0             0            0
        Output:             0          0             0            0
    Multilink class 3:
      Fragments:
        Input :             0          0             0            0
        Output:             0          0             0            0
      Non-fragments:
        Input :             0          0             0            0
        Output:             0          0             0            0
  NCP state: inet: Opened, inet6: Not-configured, iso: Opened, mpls: Opened
    Protocol inet, MTU: 1500, Generation: 232, Route table: 0
      Flags: Sendbcast-pkt-to-re
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 9.1.9/24, Local: 9.1.9.18, Broadcast: Unspecified,
Generation: 212
    Protocol iso, MTU: 1500, Generation: 233, Route table: 0
      Flags: Is-Primary
    Protocol mpls, MTU: 1488, Maximum labels: 3, Generation: 234, Route table:
 0
      Flags: Is-Primary
```

- For modifying the frame checksum (FCS) in the set of T1 options or E1 options on a MLPPP bundle member link, you must remove the member link out of the bundle by deactivating the link or unconfiguring it as a bundle member, and add the link back to the bundle after FCS modification. You must first remove the link from the bundle and modify FCS. If you are configuring FCS for the first time on the member link, specify the value before it is added to the bundle.

The following MLPPP functionalities are not supported:

- Member links across MICs.
- Fragmentation per class (only configurable at bundle level)
- IPv6 address family header compression (no address and control field compression [ACFC] or protocol field compression [PFC])
- Prefix elision as defined in *RFC 2686, The Multi-Class Extension to Multi-Link PPP*
- A functionality that resembles link fragmentation and interleaving (LFI) can be achieved using multiclass MLPPP (RFC 2686), which interleaves the high priority packets between lower priority packets. This methodology ensures that the delay desitive packets are sent as soon as they arrive. While LFI-classified packets are sent to a specific member link as PPP packets, the ACX implementation of interleaving contains multilink PPP (also referred to as PPP Multilink, MLP, and MP) headers and fragments that are sent on all member links in a round-robin manner.
- PPP over MLPPP bundle interfaces

Related Documentation

-

Configuring Encapsulation for Multilink and Link Services Logical Interfaces

NOTE: Only MLPPP is supported on ACX Series routers. MLFR is not supported on ACX Series routers.

Multilink and link services interfaces support the following logical interface encapsulation types:

- MLPPP
- MLFR end-to-end

By default, the logical interface encapsulation type on multilink interfaces is MLPPP. The default logical interface encapsulation type on link services interfaces is MLFR end-to-end. For general information on encapsulation, see the *Junos OS Network Interfaces Library for Routing Devices*.

You can also configure physical interface encapsulation on link services interfaces. For more information, see *Configuring Encapsulation for Link Services Physical Interfaces*.

To configure multilink or link services encapsulation, include the **encapsulation** statement:

encapsulation *type*;

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]**

You must also configure the T1, E1, or DS0 physical interface with the same encapsulation type.

NOTE: ACX Series routers do not support DS0 physical interface as member links.

CAUTION: When you configure the first MLFR encapsulated unit or delete the last MLFR encapsulated unit on a port, it triggers an interface encapsulation change on the port, which causes an interface flap on the other units within the port that are configured with generic Frame Relay.

Related Documentation

- *Link and Multilink Services Overview*

- *Configuring the Drop Timeout Period on Multilink and Link Services Logical Interfaces*
- *Limiting Packet Payload Size on Multilink and Link Services Logical Interfaces*
- *Example: Configuring a Link Services Interface with MLPPP*
- *encapsulation (Logical Interface)*

Configuring the Minimum Number of Active Links on Multilink and Link Services Logical Interfaces

NOTE: Only MLPPP is supported on ACX Series routers. MLFR is not supported on ACX Series routers.

You can set the minimum number of links that must be up for the multilink bundle as a whole to be labeled up. By default, only one link must be up for the bundle to be labeled up. A member link is considered up when the PPP Link Control Protocol (LCP) phase transitions to open state.

The **minimum-links** value should be identical on both ends of the bundle.

To set the minimum number, include the **minimum-links** statement:

minimum-links *number*;

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]**

For link services interfaces, you also can configure the minimum number of links at the physical interface level by including the **minimum-links** statement at the **[edit interfaces ls-*fpc/pic/port*:*channel* mlfr-uni-nni-bundle-options]** hierarchy level:

minimum-links *number*;

The number can be from 1 through 8. The maximum number of links supported in a bundle is 8. When 8 is specified, all configured links of a bundle must be up.

Related Documentation

- *Link and Multilink Services Overview*
- Configuring Encapsulation for Multilink and Link Services Logical Interfaces on page 78
- *Configuring the Drop Timeout Period on Multilink and Link Services Logical Interfaces*
- *Limiting Packet Payload Size on Multilink and Link Services Logical Interfaces*
- Configuring MRRU on Multilink and Link Services Logical Interfaces on page 80

Configuring MRRU on Multilink and Link Services Logical Interfaces

The *maximum received reconstructed unit* (*MRRU*) is similar to a maximum transmission unit (MTU), but applies only to multilink bundles; it is the maximum packet size that the multilink interface can process. By default, the MRRU is set to 1500 bytes; you can configure a different MRRU value if the peer equipment allows this. The MRRU accounts for the original payload, for example the Layer 3 protocol payload, but does not include the 2-byte PPP header or the additional MLPPP or MLFR header applied while the individual multilink packets are traversing separate links in the bundle.

NOTE: Only MLPPP is supported on ACX Series routers. MLFR is not supported on ACX Series routers.

To configure a different MRRU value, include the **mrru** statement:

```
mrru bytes;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces** *interface-name* **unit** *logical-unit-number***]**
- **[edit logical-systems** *logical-system-name* **interfaces** *interface-name* **unit** *logical-unit-number***]**

NOTE: ACX Series routers do not support logical systems.

For link services interfaces, you also can configure a different MRRU at the physical interface level by including the **mrru** statement at the **[edit interfaces ls-***fpc/pic/port***:***channel* **mlfr-uni-nni-bundle-options]** hierarchy level:

```
mrru bytes;
```

The MRRU size can range from 1500 through 4500 bytes.

NOTE: If you set the MRRU on a bundle to a value larger than the MTU of the individual links within it, you must enable a fragmentation threshold for that bundle. Set the threshold to a value no larger than the smallest MTU of any link included in the bundle.

Determine the appropriate MTU size for the bundle by ensuring that the MTU size does not exceed the sum of the encapsulation overhead and the MTU sizes for the links in the bundle.

You can configure separate **family mtu** values on the following protocol families under bundle interfaces: **inet**, **inet6**, **iso**, and **mpls**. If not configured, the default value of 1500 is used on all except for **mpls** configurations, in which the value 1488 is used.

NOTE: ACX Series routers do not support family inet6 on MLPPP interfaces.

NOTE: The effective family MTU might be different from the MTU value specified for MLPPP configurations, because it is adjusted downward by the remote MRRU's constraints. The remote MRRU configuration is not supported on M120 routers.

Related Documentation

- *Link and Multilink Services Overview*
- Configuring Encapsulation for Multilink and Link Services Logical Interfaces on page 78
- *Configuring the Drop Timeout Period on Multilink and Link Services Logical Interfaces*
- *Limiting Packet Payload Size on Multilink and Link Services Logical Interfaces*
- Configuring the Minimum Number of Active Links on Multilink and Link Services Logical Interfaces on page 79

Configuring the Sequence Header Format on Multilink and Link Services Logical Interfaces

NOTE: Only MLPPP is supported on ACX Series routers. MLFR is not supported on ACX Series routers.

For MLPPP, the sequence header format is set to 24 bits by default. You can configure an alternative value of 12 bits, but 24 bits is considered the more robust value for most networks.

To configure a different sequence header value, include the **short-sequence** statement:

```
short-sequence;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]**

For MLFR FRF.15, the sequence header format is set to 24 bits by default. This is the only valid option.

Related Documentation

- *Link and Multilink Services Overview*
- *Configuring the Drop Timeout Period on Multilink and Link Services Logical Interfaces*
- *Limiting Packet Payload Size on Multilink and Link Services Logical Interfaces*

- Configuring the Minimum Number of Active Links on Multilink and Link Services Logical Interfaces on page 79
- Configuring MRRU on Multilink and Link Services Logical Interfaces on page 80
- *Configuring DLCIs on Link Services Logical Interfaces*

Configuring Multiclass MLPPP on LSQ Interfaces

For link services LSQ (**lsq-**) interfaces with MLPPP encapsulation, you can configure multiclass MLPPP (MCML). If you do not configure MCML, fragments from different classes cannot be interleaved. All fragments for a single packet must be sent before the fragments from another packet are sent. Nonfragmented packets can be interleaved between fragments of another packet to reduce latency seen by nonfragmented packets. In effect, latency-sensitive traffic is encapsulated as regular PPP traffic, and bulk traffic is encapsulated as multilink traffic. This model works as long as there is a single class of latency-sensitive traffic, and there is no high-priority traffic that takes precedence over latency-sensitive traffic. This approach to LFI, used on the Link Services PIC, supports only two levels of traffic priority, which is not sufficient to carry the four-to-eight forwarding classes that are supported by M Series and T Series routers. For more information about the Link Services PIC support of LFI, see *Configuring Delay-Sensitive Packet Interleaving on Link Services Logical Interfaces*.

NOTE: ACX Series routers do not support link fragmentation interleaving (LFI).

For link services LSQ interfaces only, you can configure MCML, as defined in RFC 2686, *The Multi-Class Extension to Multi-Link PPP*. MCML makes it possible to have multiple classes of latency-sensitive traffic that are carried over a single multilink bundle with bulk traffic. In effect, MCML allows different classes of traffic to have different latency guarantees. With MCML, you can map each forwarding class into a separate multilink class, thus preserving priority and latency guarantees.

NOTE: Configuring both LFI and MCML on the same bundle is not necessary, nor is it supported, because multiclass MLPPP represents a superset of functionality. When you configure multiclass MLPPP, LFI is automatically enabled.

The Junos OS implementation of MCML does not support compression of common header bytes, which is referred to in RFC 2686 as “prefix elision.”

MCML greatly simplifies packet ordering issues that occur when multiple links are used. Without MCML, all voice traffic belonging to a single flow is hashed to a single link to avoid packet ordering issues. With MCML, you can assign voice traffic to a high-priority class, and you can use multiple links. For more information about voice services support on link services IQ interfaces (**lsq**), see *Configuring Services Interfaces for Voice Services*.

To configure MCML on a link services IQ interface, you must specify how many multilink classes should be negotiated when a link joins the bundle, and you must specify the mapping of a forwarding class into an MCML class.

To specify how many multilink classes should be negotiated when a link joins the bundle, include the **multilink-max-classes** statement:

multilink-max-classes *number*;

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]**

The number of multilink classes can be 1 through 8. The number of multilink classes for each forwarding class must not exceed the number of multilink classes to be negotiated.

NOTE: In ACX Series routers, the multilink classes can be 1 through 4.

To specify the mapping of a forwarding class into a MCML class, include the **multilink-class** statement at the **[edit class-of-service fragmentation-maps *map-name* forwarding-class *class-name*]** hierarchy level:

[edit class-of-service fragmentation-maps *map-name* forwarding-class *class-name*]
multilink-class *number*;

The multilink class index number can be 0 through 7. The **multilink-class** statement and **no-fragmentation** statements are mutually exclusive.

NOTE: In ACX Series routers, the multilink class index number can be 0 through 3. ACX Series routers do not support the **no-fragmentation** statement for fragmentation map.

To view the number of multilink classes negotiated, issue the **show interfaces lsq-*fpc/pic/port*.*logical-unit-number* detail** command.

Related Documentation

- *Layer 2 Service Package Capabilities and Interfaces*
- *Configuring LSQ Interfaces as NxT1 or NxE1 Bundles Using MLPPP*
- *Configuring LSQ Interfaces for ATM2 IQ Interfaces Using MLPPP*
- *Configuring LSQ Interfaces for T3 Links Configured for Compressed RTP over MLPPP*
- *Link Services Configuration for Junos Interfaces*

Configuring LSQ Interfaces as NxT1 or NxE1 Bundles Using MLPPP on ACX Series

To configure an *N*xT1 bundle using MLPPP, you aggregate *N* different T1 links into a bundle. The *N*xT1 bundle is called a logical interface, because it can represent, for example, a routing adjacency. To aggregate T1 links into a an MLPPP bundle, include the **bundle** statement at the **[edit interfaces t1-*fpc/pic/port* unit *logical-unit-number* family mlppp]** hierarchy level:

```
[edit interfaces t1-fpc/pic/port unit logical-unit-number family mlppp]
bundle lsq-fpc/pic/port.logical-unit-number;
```

NOTE: LSQ interfaces support both T1 and E1 physical interfaces. These instructions apply to T1 interfaces, but the configuration for E1 interfaces is similar.

To configure the LSQ interface properties, include the following statements at the **[edit interfaces lsq-*fpc/pic/port* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces lsq-fpc/pic/port unit logical-unit-number]
drop-timeout milliseconds;
encapsulation multilink-ppp;
fragment-threshold bytes;
link-layer-overhead percent;
minimum-links number;
mrru bytes;
short-sequence;
family inet {
   address address;
}
```

NOTE: ACX Series routers do not support drop-timeout and link-layer-overhead properties.

The logical link services IQ interface represents the MLPPP bundle. For the MLPPP bundle, there are four associated queues on M Series routers and eight associated queues on M320 and T Series routers. A scheduler removes packets from the queues according to a scheduling policy. Typically, you designate one queue to have strict priority, and the remaining queues are serviced in proportion to weights you configure.

For MLPPP, assign a single scheduler map to the link services IQ interface (**lsq**) and to each constituent link. The default schedulers for M Series and T Series routers, which assign 95, 0, 0, and 5 percent bandwidth for the transmission rate and buffer size of queues 0, 1, 2, and 3, are not adequate when you configure LFI or multiclass traffic. Therefore, for MLPPP, you should configure a single scheduler with nonzero percent transmission rates and buffer sizes for queues 0 through 3, and assign this scheduler to the link services IQ interface (**lsq**) and to each constituent link, as shown in "Example: Configuring an LSQ Interface as an NxT1 Bundle Using MLPPP" on page 87.

NOTE: For M320 and T Series routers, the default scheduler transmission rate and buffer size percentages for queues 0 through 7 are 95, 0, 0, 5, 0, 0, 0, and 0 percent.

If the bundle has more than one link, you must include the **per-unit-scheduler** statement at the **[edit interfaces lsq-*fpc/pic/port*]** hierarchy level:

```
[edit interfaces lsq-fpc/pic/port]
per-unit-scheduler;
```

To configure and apply the scheduling policy, include the following statements at the **[edit class-of-service]** hierarchy level:

```
[edit class-of-service]
interfaces {
  t1-fpc/pic/port unit logical-unit-number {
    scheduler-map map-name;
  }
}
forwarding-classes {
  queue queue-number class-name;
}
scheduler-maps {
  map-name {
    forwarding-class class-name scheduler scheduler-name;
  }
}
schedulers {
  scheduler-name {
    buffer-size (percent percentage | remainder | temporal microseconds);
    priority priority-level;
    transmit-rate (rate | remainder) <exact>;
  }
}
```

For link services IQ interfaces, a strict-high-priority queue might starve the other three queues because traffic in a strict-high priority queue is transmitted before any other queue is serviced. This implementation is unlike the standard Junos CoS implementation in which a strict-high-priority queue does round-robin with high-priority queues, as described in the *Class of Service Feature Guide for Routing Devices and EX9200 Switches*.

After the scheduler removes a packet from a queue, a certain action is taken. The action depends on whether the packet came from a multilink encapsulated queue (fragmented and sequenced) or a nonencapsulated queue (hashed with no fragmentation). Each queue can be designated as either multilink encapsulated or nonencapsulated, independently of the other. By default, traffic in all forwarding classes is multilink encapsulated. To configure packet fragmentation handling on a queue, include the **fragmentation-maps** statement at the **[edit class-of-service]** hierarchy level:

```
fragmentation-maps {
  map-name {
    forwarding-class class-name {
      multilink-class number;
```

```
    }
  }
}
```

For *N*xT1 bundles using MLPPP, the byte-wise load balancing used in multilink-encapsulated queues is superior to the flow-wise load balancing used in nonencapsulated queues. All other considerations are equal. Therefore, we recommend that you configure all queues to be multilink encapsulated. You do this by including the **fragment-threshold** statement in the configuration. You use the **multilink-class** statement to map a forwarding class into a multiclass MLPPP (MCML). For more information about MCML, see "Configuring Multiclass MLPPP on LSQ Interfaces" on page 82. For more information about fragmentation maps, see *Configuring CoS Fragmentation by Forwarding Class on LSQ Interfaces*.

When a packet is removed from a multilink-encapsulated queue, the software gives the packet an MLPPP header. The MLPPP header contains a sequence number field, which is filled with the next available sequence number from a counter. The software then places the packet on one of the *N* different T1 links. The link is chosen on a packet-by-packet basis to balance the load across the various T1 links.

If the packet exceeds the minimum link MTU, or if a queue has a fragment threshold configured at the **[edit class-of-service fragmentation-maps *map-name* forwarding-class *class-name*]** hierarchy level, the software splits the packet into two or more fragments, which are assigned consecutive multilink sequence numbers. The outgoing link for each fragment is selected independently of all other fragments.

If you do not include the **fragment-threshold** statement in the fragmentation map, the fragmentation threshold you set at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level is the default for all forwarding classes. If you do not set a maximum fragment size anywhere in the configuration, packets are fragmented if they exceed the smallest MTU of all the links in the bundle.

Even if you do not set a maximum fragment size anywhere in the configuration, you can configure the maximum received reconstructed unit (MRRU) by including the **mrru** statement at the **[edit interfaces lsq-*fpc/pic/port* unit *logical-unit-number*]** hierarchy level. The MRRU is similar to the MTU, but is specific to link services interfaces. By default the MRRU size is 1500 bytes, and you can configure it to be from 1500 through 4500 bytes. For more information, see "Configuring MRRU on Multilink and Link Services Logical Interfaces" on page 80.

When a packet is removed from a nonencapsulated queue, it is transmitted with a plain PPP header. Because there is no MLPPP header, there is no sequence number information. Therefore, the software must take special measures to avoid packet reordering. To avoid packet reordering, the software places the packet on one of the *N* different T1 links. The link is determined by hashing the values in the header. For IP, the software computes the hash based on source address, destination address, and IP protocol. For MPLS, the software computes the hash based on up to five MPLS labels, or four MPLS labels and the IP header.

For UDP and TCP the software computes the hash based on the source and destination ports, as well as source and destination IP addresses. This guarantees that all packets

belonging to the same TCP/UDP flow always pass through the same T1 link, and therefore cannot be reordered. However, it does not guarantee that the load on the various T1 links is balanced. If there are many flows, the load is usually balanced.

The *N* different T1 interfaces link to another router, which can be from Juniper Networks or another vendor. The router at the far end gathers packets from all the T1 links. If a packet has an MLPPP header, the sequence number field is used to put the packet back into sequence number order. If the packet has a plain PPP header, the software accepts the packet in the order in which it arrives and makes no attempt to reassemble or reorder the packet.

Example: Configuring an LSQ Interface as an NxT1 Bundle Using MLPPP

```
[edit interfaces]
lsq-1/1/0 {
   per-unit-scheduler;
   unit 0 {
      encapsulation multilink-ppp;
      mrru 2000;
      multilink-max-classes 4;
      family inet {
         address 20.1.1.1/24;
      }
      family mpls;
   }
}
ct1-1/1/4 {
   enable;
   no-partition interface-type t1;
}
t1-1/1/4 {
   encapsulation ppp;
   unit 0 {
      family mlppp {
         bundle lsq-1/1/0.0;
      }
   }
}
ct1-1/1/5 {
   enable;
   no-partition interface-type t1;
}
t1-1/1/5 {
   encapsulation ppp;
   unit 0 {
      family mlppp {
         bundle lsq-1/1/0.0;
      }
   }
}
}
class-of-service {
   classifiers {
      inet-precedence myIPv4 {
         forwarding-class best-effort {
```

```
            loss-priority low code-points 000;
        }
        forwarding-class expedited-forwarding {
            loss-priority low code-points 001;
        }
        forwarding-class assured-forwarding {
            loss-priority low code-points 011;
        }
        forwarding-class network-control {
            loss-priority low code-points 111;
        }
    }
}
drop-profiles {
    dp1 {
        fill-level 50 drop-probability 0;
        fill-level 100 drop-probability 100;
    }
    dp2 {
        fill-level 50 drop-probability 0;
        fill-level 100 drop-probability 100;
    }
}
interfaces {
    lsq-1/1/0 {
        unit 0 {
            scheduler-map sm;
            fragmentation-map frag;
            rewrite-rules {
                inet-precedence myRRIPv4;
            }
        }
    }
}
rewrite-rules {
    inet-precedence myRRIPv4 {
        forwarding-class best-effort {
            loss-priority low code-point 111;
        }
        forwarding-class expedited-forwarding {
            loss-priority low code-point 011;
        }
        forwarding-class assured-forwarding {
            loss-priority low code-point 001;
        }
        forwarding-class network-control {
            loss-priority low code-point 000;
        }
    }
}
scheduler-maps {
    sm {
        forwarding-class best-effort scheduler new;
        forwarding-class network-control scheduler new_nc;
        forwarding-class assured-forwarding scheduler new_af;
        forwarding-class expedited-forwarding scheduler new_ef;
```

```
    }
  }
  fragmentation-maps {
    frag {
      forwarding-class {
        best-effort {
          multilink-class 3;
        }
        network-control {
          multilink-class 0;
        }
        assured-forwarding {
          multilink-class 2;
        }
        expedited-forwarding {
          multilink-class 1;
        }
      }
    }
  }
  schedulers {
    new {
      transmit-rate 32k;
      shaping-rate 3m;
      priority low;
      drop-profile-map loss-priority low protocol any drop-profile dp1;
      drop-profile-map loss-priority high protocol any drop-profile dp2;
    }
    new_nc {
      transmit-rate 32k;
      shaping-rate 3m;
      priority strict-high;
    }
    new_af {
      transmit-rate 32k;
      shaping-rate 3m;
      priority medium-low;
    }
    new_ef {
      transmit-rate 32k;
      shaping-rate 3m;
      priority medium-high;
    }
  }
}
```

Example: Configuring an MLPPP Bundle on ACX Series

The following is a sample for configuring an MLPPP bundle on ACX Series routers:

```
[edit]
user@host# show interfaces
lsq-1/1/0 {
  description LSQ-interface;
    per-unit-scheduler;
```

```
      unit 0 {
      encapsulation multilink-ppp;
        mrru 2000;
        short-sequence;
        fragment-threshold 450;
        minimum-links 3;
        multilink-max-classes 4;
        family inet {
        address 9.1.9.18/24
        }
        family iso;
      family mpls;
    }
}
ct1-1/1/1 {
  enable;
  no-partition interface-type t1;
}
t1-1/1/1 {
  encapsulation ppp;
    unit 0 {
    family mlppp {
      bundle lsq-1/1/0.0;
    }
  }
}
ct1-1/1/2 {
  enable;
  no-partition interface-type t1;
}
t1-1/1/2 {
  encapsulation ppp;
    unit 0 {
    family mlppp {
      bundle lsq-1/1/0.0;
    }
  }
}
ct1-1/1/3 {
  enable;
  no-partition interface-type t1;
}
t1-1/1/3 {
  encapsulation ppp;
    unit 0 {
    family mlppp {
      bundle lsq-1/1/0.0;
    }
  }
}
ct1-1/1/4 {
  enable;
  no-partition interface-type t1;
}
t1-1/1/4 {
  encapsulation ppp;
```

```
        unit 0 {
        family mlppp {
          bundle lsq-1/1/0.0;
        }
      }
    }
```

CHAPTER 5

Configuration Statements

- user-group-profile on page 204
- vlan-nas-port-stacked-format on page 204
- wins-server (Access) on page 205

Access Configuration Statements

To configure access, include the following statements at the **[edit access]** hierarchy level:

```
[edit access]
address-assignment {
   neighbor-discovery-router-advertisement;
   pool pool-name {
      family inet {
            dhcp-attributes {
               [protocol-specific-attributes];
            }
            host hostname {
               hardware-address mac-address;
               ip-address ip-address;
            }
         network address-or-prefix </subnet-mask>;
            range name {
            high upper-limit;
            low lower-limit;
            prefix-length prefix-length;
         }
      }
   }
}
address-pool pool-name {
   address address-or-prefix;
   address-range low <lower-limit> high <upper-limit>;
}
domain {
   delimiter;
   map;
   parse-direction;
};
group-profile profile-name {
   l2tp {
      interface-id interface-id;
      lcp-renegotiation;
      local-chap;
      maximum-sessions-per-tunnel number;
      multilink {
         drop-timeout milliseconds;
         fragment-threshold bytes;
      }
   }
   ppp {
      cell-overhead;
      encapsulation-overhead bytes;
      framed-pool pool-id;
      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;
      }
    }
    profile profile-name {
      accounting {
        accounting-stop-on-access-deny;
        accounting-stop-on-failure;
        coa-immediate-update;
        duplication;
        immediate-update;
        order [ accounting-method ];
        statistics (time | volume-time);
        update-interval minutes;
      }
      accounting-order radius;
      authentication-order [ authentication-methods ];
      authorization-order jsrc;
      client client-name {
        chap-secret chap-secret;
        client-group [ group-names ];
        firewall-user {
        password password;
        }
        group-profile profile-name;
        ike {
          allowed-proxy-pair {
            local local-proxy-address remote remote-proxy-address;
          }
          ike-policy policy-name;
          initiate-dead-peer-detection;
          interface-id interface-id;
          ipsec-policy policy-name;
          pre-shared-key (ascii-text character-key-string | hexadecimal
            hexadecimal-digits-key-string);
        }
        l2tp {
          interface-id interface-identifier;
          lcp-renegotiation;
          local-chap;
          maximum-sessions-per-tunnel number;
          multilink {
            drop-timeout milliseconds;
            fragment-threshold bytes;
          }
          ppp-authentication (chap | pap);
          ppp-profile profile-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;
        }
      provisioning-order jsrc;
      user-group-profile profile-name;
    }
    radius {
      accounting-server [ ip-address ];
      attributes {
        exclude
          accounting-authentic [ accounting-on | accounting-off ];
          accounting-delay-time [ accounting-on | accounting-off ];
          accounting-session-id [ access-request | accounting-on | accounting-off |
            accounting-stop ];
          accounting-terminate-cause [ accounting-off ];
          called-station-id [ access-request | accounting-start | accounting-stop ];
          calling-station-id [ access-request | accounting-start | accounting-stop ];
          class [ accounting-start | accounting-stop ];
          dhcp-options [ access-request | accounting-start | accounting-stop ];
          dhcp-gi-address [ access-request | accounting-start | accounting-stop ];
          dhcp-mac-address [ access-request | accounting-start | accounting-stop ];
          output-filter [ accounting-start | accounting-stop ];
          event-timestamp [ accounting-on | accounting-off | accounting-start |
            accounting-stop ];
          framed-ip-address [ accounting-start | accounting-stop ];
          framed-ip-netmask [ accounting-start | accounting-stop ];
          input-filter [ accounting-start | accounting-stop ];
          input-gigapackets [ accounting-stop ];
          input-gigawords [ accounting-stop ];
          interface-description [ access-request | accounting-start | accounting-stop ];
          nas-identifier [ access-request | accounting-on | accounting-off | 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-gigapackets [ accounting-stop ];
          output-gigawords [ accounting-stop ];
        }
        ignore {
          framed-ip-netmask;
          input-filter;
          logical-system-routing-instance;
          output-filter;
        }
      }
      authentication-server [ ip-address ];
      options {
        accounting-session-id-format (decimal | description);
```

```
        client-accounting-algorithm (direct | round-robin);
        client-authentication-algorithm (direct | round-robin);
        ethernet-port-type-virtual;
        interface-description-format [sub-interface | adapter];
        nas-identifier identifier-value;
        nas-port-extended-format {
          adapter-width width;
          port-width width;
          slot-width width;
          stacked-vlan-width width;
          vlan-width width;
        }
        revert-interval interval;
        vlan-nas-port-stacked-format;
      }
    }
    radius-options {
      revert-interval interval;
    }
    radius-disconnect {
      client-address {
        secret password;
      }
    }
  radius-disconnect-port port-number;
    radius-options {
      revert-interval interval;
    }
    radius-server server-address {
      accounting-port port-number;
      port port-number;
      retry attempts;
      routing-instance routing-instance-name;
      secret password;
      source-address address;
      timeout seconds;
    }
    session-options {
      client-group [ group-names ];
      client-idle-timeout minutes;
      client-session-timeout minutes;
    }
```

Related Documentation

- Configuring the PPP Authentication Protocol on page 8
- Example: Configuring PPP CHAP on page 9
- Configuring the PPP Authentication Protocol on page 8
- Example: Configuring CHAP Authentication with RADIUS on page 9
- Configuring L2TP for Enabling PPP Tunneling Within a Network on page 12
- Defining the Minimum L2TP Configuration on page 14
- Configuring the Address Pool for L2TP Network Server IP Address Allocation on page 15

- Configuring the Group Profile for Defining L2TP Attributes on page 17

accounting (Access Profile)

Syntax

```
accounting {
  accounting-stop-on-access-deny;
  accounting-stop-on-failure;
  address-change-immediate-update;
  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;
}
```

Hierarchy Level [edit access profile *profile-name*]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure RADIUS accounting parameters and enable RADIUS accounting for an access 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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *Configuring Per-Subscriber Session Accounting*
- *Understanding RADIUS Accounting Duplicate Reporting*

accounting-order

Syntax accounting-order (radius | [*accounting-order-data-list*]);

Hierarchy Level [edit access profile *profile-name*]

Release Information Statement introduced in Junos OS Release 8.0.
Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.

Description Specify the order in which accounting methods are used.

Options **radius**—Use the RADIUS accounting method.

[*accounting-order-data-list*]—Set of data listing the accounting order to be used, enclosed in brackets. This can be any combination of accounting methods, up to and including a list of the entire accounting order.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring the Accounting Order on page 22

accounting-port

Syntax accounting-port *port-number*;

Hierarchy Level [edit access radius-server *server-address*],
[edit access profile *profile-name* radius-server *server-address*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches with support for Enhanced Layer 2 software (ELS).
Statement introduced on Junos OS without ELS in the following releases:

- Junos OS Release 12.3 for EX Series switches: Release 12.3R10.
- Junos OS Release 14.1X53 for EX Series switches: Release 14.1X53-D25.
- Junos OS Release 15.1 for EX Series switches: Release 15.1R4.

Description 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.

Options ***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

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS System Accounting*
- *Configuring Router or Switch Interaction with RADIUS Servers*
- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- Configuring RADIUS Authentication for L2TP on page 53

accounting-server

Syntax accounting-server [*ip-address*];

Hierarchy Level [edit access profile *profile-name* radius]

Release Information Statement introduced in Junos OS Release 9.1.

Description Specify a list of the RADIUS accounting servers used for accounting for DHCP, L2TP, and PPP clients.

Options ***ip-address***—IP version 4 (IPv4) address.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

accounting-session-id-format

Syntax accounting-session-id-format (decimal | description);

Hierarchy Level [edit access profile *profile-name* radius options]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure the format the router or switch uses to identify the accounting session.

Default **decimal**

Options **decimal**—Use the decimal format.

description—Use the generic format, in the form: **jnpr** *interface-specifier:subscriber-session-id*.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Configuring RADIUS Server Options for Subscriber Access*
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

accounting-stop-on-access-deny

Syntax accounting-stop-on-access-deny;

Hierarchy Level [edit access profile *profile-name* accounting]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure RADIUS accounting to send an Acct-Stop message when the AAA server refuses a client request for access.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring Authentication and Accounting Parameters for Subscriber Access*

accounting-stop-on-failure

Syntax accounting-stop-on-failure;

Hierarchy Level [edit access profile *profile-name* accounting]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure RADIUS accounting to send an Acct-Stop message when a subscriber session has been successfully authenticated and authorized, but then fails before an Acct-Start message is sent. By default, an Acct-Stop message is sent only if an Acct-Start message has been exchanged with the accounting server.

Consider a situation where RADIUS address pools are used to assign IP/IPv6 addresses. After a subscriber session is successfully authenticated, the RADIUS server authorizes the session by assigning an IP address from the RADIUS address pool and conveying that address in the Framed-IP-Address attribute. If a negotiation failure occurs at this point, the session is terminated before activating. The Acct-Start message is never sent because it is initiated by session activation. By default, an Acct-Stop message cannot be sent because the Acct-Start is never sent. However, if the **acct-stop-on-failure** statement is configured, the negotiation failure causes the Acct-Stop message to be sent, which explicitly notifies the RADIUS server that the session is disconnected and that it can free the allocated IP address back to the pool.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring Authentication and Accounting Parameters for Subscriber Access*

address (Access Address Pool)

Syntax address *address-or-prefix*;

Hierarchy Level [edit access address-pool *pool-name*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure the IP address or prefix value for clients.

Options ***address-or-prefix***—An address or prefix value.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the Address Pool for L2TP Network Server IP Address Allocation on page 15

address-assignment (Address-Assignment Pools)

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]

Release Information Statement introduced in Junos OS Release 9.0.
Statement introduced in Junos OS Release 12.1 for EX Series switches.

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 *pool-name*—Name assigned to an 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.

Related Documentation
- *Address-Assignment Pools Overview*
- *Address-Assignment Pool Configuration Overview*
- *Configuring an Address-Assignment Pool for L2TP LNS with Inline Services*

address-pool

Syntax
```
address-pool pool-name {
  address address-or-prefix;
  address-range <low lower-limit> <high upper-limit>;
}
```

Hierarchy Level
[edit access]

Release Information
Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description
Allocate IP addresses for clients.

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Options
pool-name—Name assigned to an address pool.

The remaining statements are explained separately.

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the Address Pool for L2TP Network Server IP Address Allocation on page 15

address-range

Syntax address-range <low *lower-limit*> <high *upper-limit*>;

Hierarchy Level [edit access address-pool *pool-name*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure the address range.

Options
- high *upper-limit*—Upper limit of an address range.
- low *lower-limit*—Lower limit of an address range.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the Address Pool for L2TP Network Server IP Address Allocation on page 15

allowed-proxy-pair

Syntax
```
allowed-proxy-pair {
  remote remote-proxy-address local local-proxy-address;
}
```

Hierarchy Level [edit access profile *profile-name* client *client-name* ike]

Release Information Statement introduced in Junos OS Release 7.4.

Description Specify the network address of the local and remote peer associated with an IKE access profile.

Options
local *local-proxy-address*—Network address of the local peer.
Default: 0.0.0.0

remote *remote-proxy-address*—Network address of the remote peer.
Default: 0.0.0.0

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring an IKE Access Profile on page 23

attributes (RADIUS Attributes)

Syntax

```
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;
    }
  }
}
```

Hierarchy Level [edit access profile *profile-name* radius]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Specify how the router or switch processes RADIUS attributes.

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.

Related Documentation

- *Filtering RADIUS Attributes and VSAs from RADIUS Messages*

authentication-order

Syntax authentication-order [*authentication-methods*];

Hierarchy Level [edit access profile *profile-name*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
none option added in Junos OS Release 11.2.
nasreq option added in Junos OS Release 16.1.

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 do have external authentication and authorization servers, you can use local authentication as a backup authentication method. In this case, configure **password** anywhere other than first in the list of methods.

- **radius**—Verify the client using RADIUS authentication services.

Default: password

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Example: Configuring CHAP Authentication with RADIUS on page 9
- *Specifying the Authentication and Accounting Methods for Subscriber Access*
- Configuring Access Profiles for L2TP or PPP Parameters on page 20
- *Configuring Local Authentication and Authorization for Subscribers*

authentication-server

Syntax
authentication-server [*ip-address*];

Hierarchy Level
[edit access profile *profile-name* radius]

Release Information
Statement introduced in Junos OS Release 9.1.

Description
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.

Options
ip-address—IPv4 address.

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Configuring RADIUS Server Parameters for Subscriber Access*

boot-file

Syntax boot-file *filename*;

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes],
[edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description 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.

Options ***filename***—Location of the boot file on the boot server. The filename can include a pathname.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- boot-server on page 114
- *Address-Assignment Pool Configuration Overview*

boot-server

Syntax boot-server (*address* | *hostname*);

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes],
[edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description 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.

Options ***address***—IPv4 address of a boot server.

hostname—Fully qualified hostname of a boot server.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- boot-file on page 113
- *Address-Assignment Pool Configuration Overview*

cell-overhead

Syntax cell-overhead;

Hierarchy Level [edit access group-profile *profile-name* ppp],
[edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced in Junos OS Release 8.3.

Description Configure the session to use Asynchronous Transfer Mode (ATM)-aware egress shaping on the IQ2 PIC.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32

chap-secret

Syntax chap-secret *chap-secret*;

Hierarchy Level [edit access profile *profile-name* client *client-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description For interfaces with PPP encapsulation on which the PPP Challenge Handshake Authentication Protocol (CHAP) is configured, configure the shared secret (the CHAP secret key associated with a peer), as defined in RFC 1994.

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Options ***chap-secret***—The secret key associated with a peer.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring the CHAP Secret for an L2TP Profile on page 27
- Configuring PPP CHAP Authentication on page 40
- **pap-password on page 172**
- *Junos OS Administration Library*

circuit-id (Address-Assignment Pools)

Syntax circuit-id *value* range *named-range*;

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes option-match option-82],
[edit access protocol-attributes *attribute-set-name* option-match option-82]

Release Information Statement introduced in Junos OS Release 9.0.

Description Configure the address-assignment pool named-range to use for a particular option 82 Agent Circuit ID value.

Options ***value***—String for the Agent Circuit ID suboption (suboption 1) of the DHCP relay agent information option (option 82) in DHCP packets.

range *named-range*—Name of the address-assignment pool range to use.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pool Configuration Overview*

circuit-type (DHCP Local Server)

Syntax circuit-type;

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 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 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]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

Description Specify that the circuit type is concatenated with the username during the subscriber authentication or client authentication process.

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation

- *Using External AAA Authentication Services with DHCP*

client

Syntax

```
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;
        sessions-limit-group;
        service-profile profile-name(parameter)&profile-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;
}
```

Hierarchy Level [edit access profile *profile-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the peer identity.

NOTE: Subordinate statement support depends on the platform. See individual statement topics for more detailed support information.

Options

client-name—A peer identity. For L2TP clients, you can use a special name to configure a default client. This client enables the LNS to accept any LAC to establish the session. On M Series routers, use * for the default client configuration. On MX Series routers, use **default**.

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.

Related Documentation

- Configuring the L2TP Client on page 25
- Configuring Access Profiles for L2TP or PPP Parameters on page 20
- *Configuring an L2TP Access Profile on the LNS*

client-authentication-algorithm

Syntax client-authentication-algorithm (direct | round-robin);

Hierarchy Level [edit access profile *profile-name* radius options]

Release Information Statement introduced in Junos OS Release 10.0.
Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.

Description Configure the method that the authenticator uses to access RADIUS authentication servers when there are multiple servers configured. Initially, a RADIUS client sends a request to a RADIUS authentication or accounting server. The router or switch, acting as the authenticator, waits for a response from the server before sending another request.

When there are multiple RADIUS server connections configured for a client, the authenticator attempts to reach the different servers in the order that they are configured. If there is no response from the first RADIUS server, the authenticator attempts to reach the next RADIUS server. This process repeats until the client is either granted access or there are no more configured servers.

If the **direct** method is configured, the authenticator always treats the first server in the list as the primary server. The authenticator moves on to the second server only if the attempt to reach the first server fails. If the **round-robin** method is configured, the server chosen first will be rotated based on which server was used last. The first server in the list is treated as a primary for the first authentication request, but for the second request, the second server configured is treated as primary, and so on. With this method, all of the configured servers receive roughly the same number of requests on average so that no single server has to handle all of the requests.

NOTE: The round-robin access method is not recommended for use with EX Series switches.

Default The **direct** option is the default.

Options

direct—Use the direct access method. The authenticator contacts the first RADIUS server on the list for each request, the second server if the first one fails, and so on.

round-robin—Use the round-robin method. The authenticator contacts the first RADIUS server for the first request, the second server for the second request, and so on.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS Server Parameters for Subscriber Access*
- *Configuring RADIUS Server Options for Subscriber Access*

client-idle-timeout

Syntax client-idle-timeout *minutes*;

Hierarchy Level [edit access profile *profile-name* session-options]

Release Information Statement introduced in Junos OS Release 8.5.

Description Specify the grace period that begins after an authenticated user terminates all sessions and connections. Authentication is not required if a new connection is initiated during the grace period by the same user.

During this period, the router determines whether the subscriber is inactive by monitoring data traffic, both upstream from the user (ingress) and downstream to the user (egress). Control traffic is ignored. The subscriber is not considered idle as long as data traffic is detected in either direction. When no traffic is detected for the duration of the idle time out, non-DHCP subscribers (such as L2TP or PPP) are gracefully logged out, similarly to a RADIUS-initiated disconnect or a CLI-initiated logout; DHCP subscribers are disconnected.

When you additionally configure the related *client-idle-timeout-ingress-only* statement (MX Series only), the router monitors only ingress traffic to determine whether the subscriber is inactive; it does not monitor any egress traffic. The related client-session-timeout statement terminates the subscriber session when the session timeout expires regardless of user activity.

Client idle timeouts are most often used for residential services rather than business services. The most practical use case for this timeout is in a PPP access model. It is not practical for DHCP or DHCPv6 subscribers.

Although you can use the **client-idle-timeout** statement for dynamically configured subscriber VLANs, this configuration is useful only in limited circumstances (such as IP over Ethernet without DHCP and with fixed addresses) and is not typically used. If you do use the idle timeout for VLANs, the timeout period starts when the VLAN is instantiated. It resets when a client session is created or an existing session is reactivated. When no traffic is detected on an authenticated VLAN for the duration of the timeout, the VLAN is considered inactive and is deleted. If no client sessions are ever created on the VLAN, then the VLAN is removed when the timeout expires.

Default The timeout is not configured.

Options ***minutes***—Number of minutes of idle time that elapse before the session is terminated. The value that you specify must be determined locally with consideration of the services and policies that you offer.

Range: 10 through 1440 minutes

Required Privilege Level

access—To view this statement in the configuration.
access-control—To add this statement to the configuration.

Related Documentation

- Understanding Session Options for Subscriber Access on page 64
- Configuring Subscriber Session Timeout Options on page 69
- *Removing Inactive Dynamic Subscriber VLANs*

client-session-timeout

Syntax client-session-timeout *minutes*;

Hierarchy Level [edit access profile *profile-name* session-options]

Release Information Statement introduced in Junos OS Release 8.5.

Description Specify the amount of time after which user sessions are terminated, regardless of user activity (also known as a forced or hard authentication timeout).

Alternatively, when you want subscribers to be identified as inactive before they are terminated, use the related statements, client-idle-timeout and *client-idle-timeout-ingress-only*. Use client-idle-timeout alone to specify a period of time during which both ingress and egress subscriber data traffic is monitored; if no traffic is detected for the duration of the period, the subscriber is considered inactive and is terminated. Add the *client-idle-timeout-ingress-only* statement to monitor only ingress traffic for the duration of the timeout set with the client-idle-timeout statement.

BEST PRACTICE: **We recommend that you do not configure a session timeout for subscribers receiving voice services. Because the session timeout is a simple time-based timeout, it is likely to interrupt subscribers actively using a voice service and terminate their calls unexpectedly (from the subscriber viewpoint). This result is a particular concern for emergency services calls.**

Client session timeouts are most often used for residential services rather than business services. The most practical use case for this timeout is in a PPP access model when no voice services are offered. For DHCP or DHCPv6 subscribers, the session timeout is used as the DHCP lease timer if no other lease time configuration is present.

Although you can use the **client-session-timeout** statement for dynamically configured subscriber VLANs, this configuration is useful only in limited circumstances (such as IP over Ethernet without DHCP and with fixed addresses) and is not typically used. If you do use the session timeout for VLANs, the timeout period starts when the VLAN is instantiated.

Default The timeout is not configured.

Options ***minutes***—Number of minutes after which user sessions are terminated. The value that you specify must be determined locally with consideration of the services and policies that you offer.

Range: 1 through 527040 minutes

Required Privilege Level
access—To view this statement in the configuration.
access-control—To add this statement to the configuration.

Related Documentation
- Understanding Session Options for Subscriber Access on page 64
- Configuring Subscriber Session Timeout Options on page 69

dead-peer-detection

Syntax

```
dead-peer-detection {
  (always-send | optimized | probe-idle-tunnel);
  interval seconds;
  threshold number;
}
```

Hierarchy Level
[edit security ike gateway *gateway-name*]

Release Information
Statement introduced in Junos OS Release 8.5. Support for the **optimized** and **probe-idle-tunnel** options added in Junos OS Release 12.1X46-D10.

Description
Enable the device to use dead peer detection (DPD). DPD is a method used by devices to verify the current existence and availability of IPsec peers. A device performs this verification by sending encrypted IKE Phase 1 notification payloads (R-U-THERE messages) to a peer and waiting for DPD acknowledgements (R-U-THERE-ACK messages) from the peer.

Options
The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level
security—To view this statement in the configuration.
security-control—To add this statement to the configuration.

Related Documentation
- *Understanding AutoVPN*
- *IPsec VPN Overview*

dhcp-attributes (Address-Assignment Pools)

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*]

Release Information Statement introduced in Junos OS Release 9.0.
Statement introduced in Junos OS Release 12.3 for EX Series switches.
exclude-prefix-len statement introduced in Junos OS Release 17.3 for MX Series.

Description Configure DHCP attributes for the protocol family in a specific address pool. The attributes determine options and behaviors for the DHCP clients.

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

exclude-prefix-len *exclude-prefix-length*—Specify the length of the IPv6 prefix to be excluded from the delegated prefix.

Range: 1 through 128

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Address-Assignment Pools Overview*
- *DHCP Attributes for Address-Assignment Pools*
- *Address-Assignment Pool Configuration Overview*
- *Configuring DHCP Client-Specific Attributes Applied When Clients Obtain an Address*

domain-name (Address-Assignment Pools)

Syntax
domain-name *domain-name*;

Hierarchy Level
[edit access address-assignment pool *pool-name* family inet dhcp-attributes],
[edit access protocol-attributes *attribute-set-name*]

Release Information
Statement introduced in Junos OS Release 9.0.

Description
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.

Options
domain-name—Name of the domain.

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Address-Assignment Pool Configuration Overview*

drop-timeout

Syntax drop-timeout *milliseconds*;

Hierarchy Level [edit access profile *profile-name* client *client-name* l2tp multilink]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the drop timeout for a multilink bundle.

Options ***milliseconds***—Number of milliseconds for the timeout that is associated with the first fragment on the reassembly queue. If the timeout expires before all the fragments have been collected, the fragments at the beginning of the reassembly queue are dropped. If the drop timeout is not specified, the Junos OS holds on to the fragments. (Fragments may still be dropped if the multilink reassembly algorithm determines that another fragment belonging to the packet on a reassembly queue has been lost.)

Required Privilege Level interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP Properties for a Client-Specific Profile on page 28

dynamic-request-port

Syntax dynamic-request-port *port-number*;

Hierarchy Level [edit access radius-server *server-address*],
[edit access profile *profile-name* radius-server *server-address*]

Release Information Statement introduced in Junos OS Release 14.2R1 for MX Series routers.

Description 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.

Options ***port-number***—Number of the monitored port.

Default: 3799 (as specified in RFC 5176)

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS-Initiated Dynamic Request Support*

encapsulation-overhead

Syntax encapsulation-overhead *bytes*;

Hierarchy Level [edit access group-profile *profile-name* ppp],
[edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced in Junos OS Release 8.3.

Description Configure the encapsulation overhead for class-of-service calculations.

Options ***bytes***—The number of bytes used as encapsulation overhead for the session.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32

ethernet-port-type-virtual

Syntax ethernet-port-type-virtual;

Hierarchy Level [edit access profile *profile-name* radius options]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Specify the physical port type the router or switch uses to authenticate clients. The router or switch passes a port type of **ethernet** in RADIUS attribute 61 (NAS-Port-Type) by default. This statement specifies a port type of **virtual**.

NOTE: This statement takes precedence over the nas-port-type statement if you include both statements in the same access profile.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Configuring RADIUS Server Options for Subscriber Access*
- *Configuring RADIUS Server Parameters for Subscriber Access*

exclude (RADIUS Attributes)

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]

Release Information

Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
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.

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.

Related Documentation

- *Filtering RADIUS Attributes and VSAs from RADIUS Messages*
- *Configuring RADIUS Server Parameters for Subscriber Access*
- *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*
- *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*

fragment-threshold (Access)

Syntax fragment-threshold *bytes*;

Hierarchy Level [edit access profile *profile-name* client *client-name* l2tp multilink]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the fragmentation threshold for a multilink bundle.

Options ***bytes***—The maximum number of bytes in a packet. If a packet exceeds the fragmentation threshold, the Junos OS fragments it into two or more multilink fragments.

Required Privilege Level interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation
- Configuring L2TP Properties for a Client-Specific Profile on page 28
- multilink on page 162

framed-ip-address

Syntax framed-ip-address *address*;

Hierarchy Level [edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Specify a framed IP address.

Options ***address***—The IP version 4 (IPv4) prefix.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring PPP Properties for a Client-Specific Profile on page 32

framed-pool

Syntax framed-pool *framed-pool*;

Hierarchy Level [edit access group-profile *profile-name* ppp],
[edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the address pool.

Options ***framed-pool***—References a configured address pool.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32

grace-period

Syntax grace-period *seconds*;

Hierarchy Level [edit access address-assignment pool *pool-name* family (inet | inet6) dhcp-attributes],
[edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description 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.

Options ***seconds***—Number of seconds the lease is retained.

Range: 0 through 4,294,967,295 seconds

Default: 0 (no grace period)

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Address-Assignment Pool Configuration Overview*

group-profile (Associating with Client)

Syntax group-profile *profile-name*;

Hierarchy Level [edit access profile *profile-name* client *client-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Associate a group profile with a client.

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Options ***profile-name***—Name assigned to the group profile.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Referencing the Group Profile from the L2TP Profile on page 28

group-profile (Group Profile)

Syntax

```
group-profile profile-name {
  l2tp {
    interface-id interface-id;
    lcp-renegotiation;
    local-chap;
    maximum-sessions-per-tunnel number;
  }
  ppp {
    cell-overhead;
    encapsulation-overhead bytes;
    framed-pool pool-id;
    idle-timeout seconds;
    interface-id interface-id;
    keepalive seconds;
    ppp-options {
      aaa-options aaa-options-name;
      chap;
      ignore-magic-number-mismatch;
      initiate-ncp (ip | ipv6 | dual-stack-passive)
      ipcp-suggest-dns-option;
      mru;
      mtu;
      pap;
      peer-ip-address-optional;
    }
    primary-dns primary-dns;
    primary-wins primary-wins;
    secondary-dns secondary-dns;
    secondary-wins secondary-wins;
  }
}
```

Hierarchy Level [edit access]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the group profile.

NOTE: Subordinate statement support depends on the platform. See individual statement topics for more detailed support information.

Options *profile-name*—Name assigned to the group 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
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the Group Profile for Defining L2TP Attributes on page 17
- *Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile*

hardware-address

Syntax
hardware-address *mac-address*;

Hierarchy Level
[edit access address-assignment pool *pool-name* family (inet | inet6) host *hostname*]

Release Information
Statement introduced in Junos OS Release 9.0.

Description
Specify the MAC address of the client. This is the hardware address that identifies the client on the network.

Options
mac-address—MAC address of the client.

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Address-Assignment Pool Configuration Overview*

host (Address-Assignment Pools)

Syntax

```
host hostname {
  hardware-address mac-address;
  ip-address ip-address;
}
```

Hierarchy Level [edit access address-assignment pool *pool-name* family (inet | inet6)]

Release Information Statement introduced in Junos OS Release 9.0.

Description Configure a static binding for the specified client.

Options ***hostname***—Name of 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.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pools Overview*
- *Address-Assignment Pool Configuration Overview*

idle-timeout (Access)

Syntax idle-timeout *seconds*;

Hierarchy Level [edit access group-profile *profile-name* ppp],
[edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 11.1 for the QFX Series.
Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.

Description Configure the idle timeout for a user. The router might consider a PPP session to be idle because of the following reasons:

- There is no ingress traffic on the PPP session.
- There is no egress traffic.
- There is neither ingress or egress traffic on the PPP session.
- There is no ingress or egress PPP control traffic. This is applicable only if keepalives are enabled.

Options ***seconds***—Number of seconds a user can remain idle before the session is terminated.

Range: 0 through 4,294,967,295 seconds

Default: 0

NOTE: **The [edit access] hierarchy is not available on QFabric systems.**

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32
- *Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile*

ignore (RADIUS Attributes)

Syntax

```
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;
  }
}
```

Hierarchy Level [edit access profile *profile-name* radius attributes]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
idle-timeout, **session-timeout**, **standard-attribute**, **vendor-attribute**, and **vendor-id** options added in Junos OS Release 18.1R1.

Description Configure the router or switch to ignore the specified attributes in RADIUS Access-Accept messages. Standard attributes and VSAs received in RADIUS messages take precedence over internally provisioned attribute values. Ignoring the attributes enables your internally provisioned values to be used instead. Contrast this behavior with that provided by the exclude statement.

Starting in Junos OS Release 18.1R1, you can specify RADIUS standard attributes with the attribute number. You can specify vendor-specific attributes (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 ignored. The configuration has no effect if you can 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 ignore only a subset of all attributes that can be received in Access-Accept messages.

Options **dynamic-iflset-name**—Ignore Juniper Networks VSA 26-130, Qos-Set-Name.

framed-ip-netmask—Ignore RADIUS attribute 9, Framed-IP-Netmask.

idle-timeout—Ignore RADIUS attribute 28, Idle-Timeout.

input-filter—Ignore Juniper Networks VSA 26-10, Ingress-Policy-Name.

logical-system-routing-instance—Ignore Juniper Networks VSA 26-1.

output-filter—Ignore Juniper Networks VSA 26-11, Egress-Policy-Name.

session-timeout—Ignore RADIUS attribute 27, Session-Timeout.

standard-attribute *number*—RADIUS standard attribute number supported by your platform. You can enclose multiple values in square brackets to specify a list of attributes. If you configure an unsupported attribute, that configuration has no effect.

Range: 1 through 255

vendor-attribute *vsa-number*—Number identifying a VSA belonging to the specified vendor; both must be supported by your platform. You can enclose multiple values in square brackets to specify a list of VSAs. If you configure an unsupported VSA, that configuration has no effect.

Range: 1 through 255

vendor-id *id-number*—IANA vendor ID supported by your platform. If you configure an unsupported vendor ID, that configuration has no effect.

Range: 1 through 16777215

Required Privilege Level

admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Filtering RADIUS Attributes and VSAs from RADIUS Messages*
- *Configuring RADIUS Server Parameters for Subscriber Access*
- *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*

ike (Access Profile)

Syntax

```
ike {
  allowed-proxy-pair {
    remote remote-proxy-address local local-proxy-address;
  }
  dead-peer-detection{
    interval seconds
    threshold number
  }
  ike-policy policy-name;
  initiate-dead-peer-detection;
  interface-id string-value;
  ipsec-policy ipsec-policy;
  pre-shared-key (ascii-text character-string | hexadecimal hexadecimal-digits);
  reverse-route
}
```

Hierarchy Level [edit access profile *profile-name* client *client-name*]

Release Information Statement introduced in Junos OS Release 7.4.
ike-policy statement introduced in Junos OS Release 8.2.

Description Configure an IKE access profile.

The remaining statements are explained separately.

NOTE: This statement is not supported on MX Series routers.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring an IKE Access Profile on page 23

ike-policy

Syntax ike-policy *policy-name*;

Hierarchy Level [edit access profile *profile-name* client *client-name* ike]

Release Information Statement introduced in Junos OS Release 8.2.

Description Specify the IKE policy used to authenticate dynamic peers during IKE negotiation.

Options ***policy-name***—The name of an IKE policy configured at the **[edit services ipsec-vpn ike policy *policy-name*]** hierarchy level. The IKE policy defines either the local digital certificate or the pre-shared key used for IKE authentication with dynamic peers. For more information about how to configure the IKE policy, see the *Junos OS Services Interfaces Library for Routing Devices*.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring an IKE Access Profile on page 23
- *Junos IPsec Feature Guide*
- *Junos OS Services Interfaces Library for Routing Devices*

immediate-update

Syntax immediate-update;

Hierarchy Level [edit access profile *profile-name* accounting]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure the router or switch to send an Acct-Update message to the RADIUS accounting server on receipt of a response (for example, an ACK or timeout) to the Acct-Start message.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS Server Parameters for Subscriber Access*
- *Configuring Per-Subscriber Session Accounting*

initiate-dead-peer-detection (IPsec)

Syntax initiate-dead-peer-detection;

Hierarchy Level [edit access profile *profile-name* client *client-name* ike]

Release Information Statement introduced in Junos OS Release 8.3.

Description Detect inactive peers on dynamic IPsec tunnels.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring an IKE Access Profile on page 23

interface-description-format

Syntax

```
interface-description-format {
  exclude-adapter;
  exclude-channel;
  exclude-sub-interface;
}
```

Hierarchy Level [edit access profile *profile-name* radius options]

Release Information

Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
exclude-adapter and **exclude-sub-interface** options added in Junos OS Release 10.4.
exclude-channel option added in Junos OS Release 17.3R1.

Description

Specify the information that is excluded from the interface description that the device passes to RADIUS for inclusion in the RADIUS attributes such as NAS-Port-ID (87) or Calling-Station-ID (31).

The default format for nonchannelized interfaces is as follows:

***interface-type-slot/adapter/port.subinterface*[:*svlan-vlan*]**

For example, consider physical interface ge-1/2/0, with a subinterface of 100 and SVLAN identifier of 100. The interface description used in the NAS-Port-ID is ge-1/2/0.100:100. If you exclude the subinterface, the description becomes ge-1/2/0:100.

The default format for channelized interfaces is as follows:

***interface-type-slot/adapter/channel.subinterface*[:*svlan-vlan*]**

The channel information (logical port number) is determined by this formula:

Logical port number = 100 + (*actual-port-number* x 20) + *channel-number*.

For example, consider a channelized interface 3 on port 2 where the:

- Physical interface is xe-0/1/2:3.
- Subinterface is 4.
- SVLAN is 5.
- VLAN is 6.

Using the formula, the logical port number = 100 + (2 x 20) + 3 = 143. Consequently, the default interface description is xe-0/1/143.4-5.6. If you exclude the channel information, the description becomes xe-0/1/2.4-5.6.

Options

exclude-adapter——(Optional) Exclude the adapter from the interface description.

exclude-channel—(Optional) Exclude the channel information from the interface description.

exclude-sub-interface——(Optional) Exclude the subinterface from the interface description.

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Interface Text Descriptions for Inclusion in RADIUS Attributes*
- *Configuring RADIUS Server Options for Subscriber Access*
- *RADIUS Server Options for Subscriber Access*

interface-id

Syntax
interface-id *interface-id*;

Hierarchy Level
[edit access group-profile *profile-name* l2tp],
[edit access group-profile *profile-name* ppp],
[edit access profile *profile-name* client *client-name* ike],
[edit access profile *profile-name* client *client-name* l2tp],
[edit access profile *profile-name* client *client-name* ppp]

Release Information
Statement introduced before Junos OS Release 7.4.

Description
Configure the interface identifier.

Options
interface-id—Identifier for the interface representing a Layer 2 Tunneling Protocol (L2TP) session configured at the **[edit interfaces *interface-name* unit *local-unit-number* dial-options]** hierarchy level. For more information about the interface ID, see *Services Interface Naming Overview*.

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring L2TP for a Group Profile on page 17
- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring L2TP Properties for a Client-Specific Profile on page 28
- Configuring PPP Properties for a Client-Specific Profile on page 32
- Configuring an IKE Access Profile on page 23
- *Configuring an L2TP Access Profile on the LNS*

ip-address

Syntax ip-address *ip-address*;

Hierarchy Level [edit access address-assignment pool *pool-name* family inet host *hostname*]

Release Information Statement introduced in Junos OS Release 9.0.

Description Specify the reserved IP address assigned to the client.

Options ***ip-address***—IP version 4 (IPv4) address.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pool Configuration Overview*
- *Configuring Static Address Assignment*

keepalive

Syntax keepalive *seconds*;

Hierarchy Level [edit access group-profile *profile-name* ppp],
[edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the keepalive interval for an L2TP tunnel.

Options ***seconds***—Time period that must elapse before the Junos OS checks the status of the Point-to-Point Protocol (PPP) session by sending an echo request to the peer.

For L2TP on MX Series routers, the minimum recommended interval is 30 seconds. A value of 0 disables generation of keepalive messages from the LNS.

Range: 0 through 32,767 seconds

Default: 30 seconds

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32
- *Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile*

keepalive-retries

Syntax keepalive-retries *number-of-retries*;

Hierarchy Level [edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced in Junos OS Release 10.4.

Description Configure the number of retry attempts for checking the keepalive status of a Point-to-Point (PPP) protocol session. Configure this setting to reduce the detection time for PPP client session timeouts or failures if you have configured the keepalive timeout interval (using the **keepalive** statement).

Options ***number-of-retries***—The maximum number of retries the L2TP network server (LNS) attempts by sending LCP echo requests to the peer to check the keepalive status of the PPP session. If there is no response from the PPP client within the specified number of retries, the PPP session is considered to have timed out.

Range: 3 through 32,767 times

Default: 10 times

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring PPP Properties for a Client-Specific Profile on page 32
- keepalive on page 154

l2tp (Group Profile)

Syntax

```
l2tp {
  interface-id interface-id;
  lcp-renegotiation;
  local-chap;
  maximum-sessions-per-tunnel number;
}
```

Hierarchy Level [edit access group-profile *profile-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the Layer 2 Tunneling Protocol for a group profile.

The remaining statements are explained separately.

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP for a Group Profile on page 17

l2tp (Profile)

Syntax

```
l2tp {
  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;
  sessions-limit-group;
  service-profile profile-name(parameter)&profile-name;
  shared-secret shared-secret;
}
```

Hierarchy Level [edit access profile *profile-name* client *client-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the L2TP properties for a 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.

NOTE: Only the **interface-id**, **lcp-renegotiation**, **maximum-sessions**, **maximum-sessions-per-tunnel**, **sessions-limit-group** and **shared-secret** statements are supported for L2TP LNS on MX Series routers.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP Properties for a Client-Specific Profile on page 28
- *Configuring an L2TP Access Profile on the LNS*

lcp-renegotiation

Syntax lcp-renegotiation;

Hierarchy Level [edit access group-profile *profile-name* l2tp],
[edit access profile *profile-name* client *client-name* l2tp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the L2TP network server (LNS) so it renegotiates the link control protocol (LCP) with the PPP client. When LCP renegotiation is disabled, LNS uses the pre-negotiated LCP parameters between the L2TP access concentrator (LAC) and PPP client to set up the session. When LCP renegotiation is enabled, authentication is also renegotiated.

NOTE: **This statement is not supported at the [edit access group-profile l2tp] hierarchy level for L2TP LNS on MX Series routers.**

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP for a Group Profile on page 17
- Configuring L2TP Properties for a Client-Specific Profile on page 28
- *Configuring an L2TP Access Profile on the LNS*

local-chap

Syntax local-chap;

Hierarchy Level [edit access group-profile *profile-name* l2tp],
[edit access profile *profile-name* client *client-name* l2tp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the Junos OS so that the LNS ignores proxy authentication attribute-value pairs (AVPs) from the L2TP access concentrator (LAC) and reauthenticates the PPP client using a Challenge Handshake Authentication Protocol (CHAP) challenge. When you do this, the LNS directly authenticates the PPP client.

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP for a Group Profile on page 17
- Configuring L2TP Properties for a Client-Specific Profile on page 28

maximum-lease-time

Syntax maximum-lease-time *seconds*;

Hierarchy Level [edit access address-assignment pool *pool-name* family (inet | inet6) dhcp-attributes], [edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description 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.

Options ***seconds***—Maximum number of seconds the lease can be held.

Range: 30 through 4,294,967,295 seconds

Default: 86,400 (24 hours)

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pool Configuration Overview*
- *DHCP Attributes for Address-Assignment Pools*
- *preferred-lifetime (Address-Assignment Pools)*
- *valid-lifetime (Address-Assignment Pools)*

maximum-sessions-per-tunnel

Syntax maximum-sessions-per-tunnel *number*;

Hierarchy Level [edit access group-profile l2tp],
[edit access profile *profile-name* client *client-name* l2tp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the maximum sessions for a Layer 2 tunnel.

NOTE: This statement is not supported at the **[edit access group-profile l2tp]** hierarchy level for L2TP LNS on MX Series routers.

Options ***number***—Maximum number of sessions for a Layer 2 tunnel.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP for a Group Profile on page 17
- Configuring L2TP Properties for a Client-Specific Profile on page 28
- *Configuring an L2TP Access Profile on the LNS*

multilink

Syntax

```
multilink {
  drop-timeout milliseconds;
  fragment-threshold bytes;
}
```

Hierarchy Level [edit access profile *profile-name* client *client-name* l2tp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure Multilink PPP for Layer 2 Tunneling Protocol (L2TP).

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Options The statements are explained separately.

Required Privilege Level interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP Properties for a Client-Specific Profile on page 28

name-server

Syntax name-server [*server-names*];

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes],
[edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description 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.

Options ***server-names***—IP addresses of the domain name servers, listed in order of preference.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pool Configuration Overview*

nas-identifier

Syntax nas-identifier *identifier-value*;

Hierarchy Level [edit access profile *profile-name* radius options]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
Statement introduced in Junos OS Release 15.1X49-D110 for SRX300, SRX320, SRX340, SRX345, and SRX550M Series devices.

Description Configure the value for the client RADIUS attribute 32 (NAS-Identifier). This attribute is used for authentication and accounting requests.

Options ***identifier-value***—String to use for authentication and accounting requests.

Range: 1 through 64 characters

Required Privilege Level admin—To view this statement in the configuration.
admin–control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS Server Options for Subscriber Access*
- *Configuring RADIUS Server Parameters for Subscriber Access*

nas-port-extended-format

Syntax

```
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;
  }
}
```

Hierarchy Level [edit access profile *profile-name* radius options]

Release Information

Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
ae-width option added in Junos OS Release 12.1.
atm option added in Junos OS Release 12.3R3 and supported in later 12.3R*x* releases.
atm option supported in Junos OS Release 13.2 and later releases. (Not supported in Junos OS Release 13.1.)
pw-width option added in Junos OS Release 15.1.

Description Configure the RADIUS client to use the extended format for RADIUS attribute 5 (NAS-Port) and specify the width of the fields in the NAS-Port attribute.

Options

adapter-width *width*—Number of bits in the adapter field.

ae-width *width*—Number of bits in the aggregated Ethernet identifier field.

port-width *width*—Number of bits in the port field.

pw-width *width*—Number of bits in the pseudowire field. Appears in the Cisco NAS-Port-Info AVP (100).

slot-width *width*—Number of bits in the slot field.

stacked-vlan-width *width*—Number of bits in the SVLAN ID field.

vlan-width *width*—Number of bits in the VLAN ID field.

NOTE: **The total of the widths must not exceed 32 bits, or the configuration will fail.**

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Configuring RADIUS Server Options for Subscriber Access*
- *Configuring RADIUS Server Parameters for Subscriber Access*

netbios-node-type

Syntax
netbios-node-type *node-type*;

Hierarchy Level
[edit access address-assignment pool *pool-name* family inet dhcp-attributes],
[edit access protocol-attributes *attribute-set-name*]

Release Information
Statement introduced in Junos OS Release 9.0.

Description
Specify the NetBIOS node type. This is equivalent to DHCP option 46.

Options
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

Required Privilege Level
admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Address-Assignment Pool Configuration Overview*

network

Syntax network *ip-prefix</prefix-length>*;

Hierarchy Level [edit access address-assignment pool *pool-name* family inet]

Release Information Statement introduced in Junos OS Release 9.0.

Description Configure subnet information for an IPv4 address-assignment pool.

Options ***ip-prefix***—IP version 4 address or prefix value.

prefix-length—(Optional) Subnet mask.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pool Configuration Overview*

option

Syntax

```
option {
  [ (id-number option-type option-value)
  (id-number array option-type option-value) ];
}
```

Hierarchy Level [edit access address-assignment pool *pool-name* family (inet | inet6) dhcp-attributes], [edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.
hex-string option type introduced in Junos OS Release 13.3.

Description Specify user-defined options that are added to client packets.

Options

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).

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pool Configuration Overview*

option-82 (Address-Assignment Pools)

Syntax

```
option-82 {
  circuit-id value range named-range;
  remote-id value range named-range;
}
```

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes option-match], [edit access protocol-attributes *attribute-set-name* option-match]

Release Information Statement introduced in Junos OS Release 9.0.

Description Specify the list of option 82 suboption match criteria used to select the named address range used for the client. The server matches the option 82 value in the user PDU to the specified option 82 match criteria and uses the named address range associated with the string.

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.

Related Documentation

- *Address-Assignment Pool Configuration Overview*

option-match

Syntax

```
option-match {
  option-82 {
    circuit-id value range named-range;
    remote-id value range named-range;
  }
}
```

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes], [edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description Specify a list of match criteria used to determine which named address range in the address-assignment pool to use. The extended DHCP local server matches this information to the match criteria specified in the client PDUs. For example, for option 82 match criteria, the server matches the option 82 value in the user PDU to the specified option 82 string and uses the named range associated with the string.

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.

Related Documentation

- *Address-Assignment Pool Configuration Overview*

options (Access Profile)

Syntax

```
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;
  access-loop-id-local;
  interface-description-format {
    exclude-adapter;
    exclude-channel;
    exclude-sub-interface;
  }
  ip-address-change-notify message;
  juniper-dsl-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;
      pw-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;
}
```

Hierarchy Level [edit access profile *profile-name* radius]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure the options used by RADIUS authentication and accounting servers.

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.

Related Documentation

- *Configuring RADIUS Server Options for Subscriber Access*
- *RADIUS Server Options for Subscriber Access*

order

Syntax order [*accounting-method*];

Hierarchy Level [edit access profile *profile-name* accounting]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Set the order in which the Junos OS tries different accounting methods for client activity. When a client logs in, the software tries the accounting methods in the specified order.

Options ***accounting-method***—One or more accounting methods. When a client logs in, the software tries the accounting methods in the following order, from first to last. The only valid value is **radius** for RADIUS accounting.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

pap-password

Syntax pap-password *password*;

Hierarchy Level [edit access profile *profile-name* client *client-name*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure the Password Authentication Protocol (PAP) password.

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Options ***password***—PAP password.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the PAP Password for an L2TP Profile on page 31

pool (Address-Assignment Pools)

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-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 address-assignment]

Release Information Statement introduced in Junos OS Release 9.0.
Statement introduced in Junos OS Release 12.1 for EX Series switches.

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.

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.

Related Documentation

- *Address-Assignment Pools Overview*
- *Address-Assignment Pool Configuration Overview*

port

Syntax port *port-number*;

Hierarchy Level [edit access radius-server *server-address*],
[edit access profile *profile-name* radius-server *server-address*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure the port number on which to contact the RADIUS server.

Options ***port-number***—Port number on which to contact the RADIUS server.

Default: 1812 (as specified in RFC 2865)

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation

- *Configuring Router or Switch Interaction with RADIUS Servers*
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

ppp (Group Profile)

Syntax

```
ppp {
  cell-overhead;
  encapsulation-overhead bytes;
  framed-pool framed-pool;
  idle-timeout seconds;
  interface-id interface-id;
  keepalive seconds;
  ppp-options {
    aaa-options aaa-options-name;
    chap;
    ignore-magic-number-mismatch;
    initiate-ncp (ip | ipv6 | dual-stack-passive)
    ipcp-suggest-dns-option;
    mru;
    mtu;
    pap;
    peer-ip-address-optional;
  }
  primary-dns primary-dns;
  primary-wins primary-wins;
  secondary-dns secondary-dns;
  secondary-wins secondary-wins;
}
```

Hierarchy Level [edit access group-profile *profile-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure PPP properties for a group 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.

NOTE: Subordinate statement support depends on the platform. See individual statement topics for more detailed support information.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring the PPP Attributes for a Group Profile on page 18
- *Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile*

ppp (Profile)

Syntax

```
ppp {
  cell-overhead;
  encapsulation-overhead bytes;
  framed-ip-address 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;
}
```

Hierarchy Level [edit access profile *profile-name* client *client-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure PPP properties for a client profile.

The remaining statements are explained separately.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring PPP Properties for a Client-Specific Profile on page 32

ppp-authentication

Syntax ppp-authentication (chap | pap);

Hierarchy Level [edit access profile *profile-name* client *client-name* l2tp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure PPP authentication.

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Options

- **chap**—Challenge Handshake Authentication Protocol.
- **pap**—Password Authentication Protocol.

Required Privilege Level

admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP Properties for a Client-Specific Profile on page 28

ppp-profile

Syntax ppp-profile *profile-name*;

Hierarchy Level [edit access profile *profile-name* client *client-name* l2tp]

Release Information Statement introduced in Junos OS Release 7.4.

Description Specify the profile used to validate PPP session requests through L2TP tunnels.

NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Options ***profile-name***—Identifier for the PPP profile.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring RADIUS Authentication for an L2TP Client and Profile on page 61

pre-shared-key (Access Profile)

Syntax pre-shared-key (ascii-text *character-string* | hexadecimal *hexadecimal-digits*);

Hierarchy Level [edit access profile *profile-name* client *client-name* ike]

Release Information Statement introduced in Junos OS Release 7.4.

Description Configure the key used to authenticate a dynamic peer during IKE phase 1 negotiation. Specify the key in either ASCII or hexadecimal format.

Options **ascii-text *character-string***—Authentication key in ASCII format.

hexadecimal *hexadecimal-digits*—Authentication key in hexadecimal format.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring an IKE Access Profile on page 23

primary-dns

Syntax primary-dns *primary-dns*;

Hierarchy Level [edit access group-profile *profile-name* client *client-name* ppp],
[edit access profile *profile-name* ppp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the primary Domain Name System (DNS) server.

Options ***primary-dns***—An IPv4 address.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32

primary-wins

Syntax primary-wins *primary-wins*;

Hierarchy Level [edit access group-profile *profile-name* client *client-name* ppp],
[edit access profile *profile-name* ppp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the primary Windows Internet name server.

Options ***primary-wins***—An IPv4 address.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32

profile (Access)

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-dsl-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-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]

Release Information Statement introduced before Junos OS Release 7.4.

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.

Related Documentation

- Configuring the PPP Authentication Protocol on page 8
- Configuring Access Profiles for L2TP or PPP Parameters on page 20
- Configuring L2TP Properties for a Client-Specific Profile on page 28
- *Configuring an L2TP Access Profile on the LNS*
- *Configuring an L2TP LNS with Inline Service Interfaces*
- Configuring PPP Properties for a Client-Specific Profile on page 32
- *Configuring Service Accounting with JSRC*
- *Configuring Service Accounting in Local Flat Files*
- *AAA Service Framework Overview*
- *Enabling Direct PCC Rule Activation by a PCRF for Subscriber Management*

radius (Access Profile)

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-dsl-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*]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure the RADIUS parameters that the router uses for AAA authentication and accounting for subscribers.

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.

Related Documentation
- *Configuring RADIUS Server Parameters for Subscriber Access*
- *RADIUS Server Options for Subscriber Access*

radius-disconnect

Syntax

```
radius-disconnect {
  client-address {
    secret password;
  }
}
```

Hierarchy Level [edit access]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure a disconnect server that listens on a configured User Datagram Protocol (UDP) port for disconnect messages from a configured client and processes these disconnect messages.

Options ***client-address***—A valid IP address configured on one of the router interfaces.

The remaining statements are explained separately.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the RADIUS Disconnect Server for L2TP on page 60

radius-disconnect-port

Syntax radius-disconnect-port *port-number*;

Hierarchy Level [edit access]

Release Information Statement introduced before Junos OS Release 7.4.

Description Specify a port number on which to contact the RADIUS disconnect server. Most RADIUS servers use port number 1700.

Options ***port-number***—The server port to which disconnect requests from the RADIUS client are sent. The L2TP network server, which accepts these disconnect requests, is the server.

NOTE: The Junos OS accepts disconnect requests only from the client address configured at the **[edit access radius-disconnect client *client-address*]** hierarchy level.

The remaining statements are explained separately.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- Configuring the RADIUS Disconnect Server for L2TP on page 60

radius-server

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*]

Release Information

Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
dynamic-request-port option added in Junos OS Release 14.2 for MX Series routers.
preauthentication-port and **preauthentication-secret** options added in Junos OS Release 15.1 for MX Series routers.
Support for IPv6 ***server-address*** introduced in Junos OS Release 16.1.

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.

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.

Related Documentation

- Configuring RADIUS Authentication for L2TP on page 53
- Configuring the PPP Authentication Protocol on page 8
- *Configuring Router or Switch Interaction with RADIUS Servers*
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

- *show network-access aaa statistics*
- clear network-access aaa statistics on page 210

range (Address-Assignment Pools)

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)]

Release Information Statement introduced in Junos OS Release 9.0.
IPv6 support introduced in Junos OS Release 10.0.
Statement introduced in Junos OS Release 12.3 for EX Series switches.

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.

Related Documentation

- *Configuring a Named Address Range for Dynamic Address Assignment*
- *Address-Assignment Pools Overview*
- *Address-Assignment Pool Configuration Overview*

remote-id

Syntax remote-id *value* range *named-range*;

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes option-match option-82],
[edit access protocol-attributes *attribute-set-name* option-match option-82]

Release Information Statement introduced in Junos OS Release 9.0.

Description Specify the address-assignment pool named range to use based on the particular option 82 Agent Remote ID value.

Options range ***named-range***—Name of the address-assignment pool range to use.

value—String for Agent Remote ID suboption (suboption 2) of the DHCP relay agent information option (option 82) in DHCP packets.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pool Configuration Overview*

retry

Syntax retry *attempts*;

Hierarchy Level [edit access radius-server *server-address*];
[edit access profile *profile-name* radius-server *server-address*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Specify the number of times that the router or switch 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.

Options ***attempts***—Number of times that the router is allowed to attempt to contact a RADIUS server.

Range: 1 through 100

Default: 3

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *Configuring Router or Switch Interaction with RADIUS Servers*
- Example: Configuring CHAP Authentication with RADIUS on page 9
- Configuring RADIUS Authentication for L2TP on page 53
- **timeout on page 202**

reverse-route

Syntax

```
reverse-route {
  preference metric-value;
}
```

Hierarchy Level [edit access profile *profile-name* client *client-name* ike]

Release Information Statement introduced in Junos OS Release 10.4.

Description (M Series and MX Series routers with an AS or MultiServices PIC only) Configure a reverse route for dynamic endpoint IPsec tunnels.

The remaining statements are explained separately.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

revert-interval

Syntax revert-interval *interval*;

Hierarchy Level [edit access profile *profile-name* radius options];
[edit access radius-options]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure the amount of time the router or switch waits after a server has become unreachable. The router or switch rechecks the connection to the server when the specified interval expires. If the server is then reachable, it is used in accordance with the order of the server list.

Options ***interval***—Amount of time to wait.

Range: 0 through 604,800 seconds

Default: 60 seconds

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS Server Options for Subscriber Access*
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

router (Address-Assignment Pools)

Syntax router [*router-address*];

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes],
[edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description Specify one or more routers located on the client's subnet. This statement is the equivalent of DHCP option 3.

Options ***router-address***—IP address of one or more routers.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Address-Assignment Pool Configuration Overview*

routing-instance

Syntax routing-instance *routing-instance-name*;

Hierarchy Level [edit access radius-server *server-address*],
[edit access profile *profile-name* radius-server *server-address*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure the routing instance used to send RADIUS packets to the RADIUS server.

Options ***routing-instance-name***—Routing instance name.

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation
- Configuring the PPP Authentication Protocol on page 8
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

secondary-dns

Syntax secondary-dns *secondary-dns*;

Hierarchy Level [edit access group-profile *profile-name* ppp],
[edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the secondary DNS server.

Options ***secondary-dns***—An IPv4 address.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32

secondary-wins

Syntax secondary-wins *secondary-wins*;

Hierarchy Level [edit access group-profile *profile-name* ppp],
[edit access profile *profile-name* client *client-name* ppp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure the secondary Windows Internet name server.

Options ***secondary-wins***—An IPv4 address.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Configuring the PPP Attributes for a Group Profile on page 18
- Configuring PPP Properties for a Client-Specific Profile on page 32

secret

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*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

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.

Related Documentation

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *Configuring Router or Switch Interaction with RADIUS Servers*
- Example: Configuring CHAP Authentication with RADIUS on page 9
- Configuring RADIUS Authentication for L2TP on page 53
- Configuring the RADIUS Disconnect Server for L2TP on page 60

session-options

Syntax

```
session-options {
  client-group [ group-names ];
  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);
  }
}
```

Hierarchy Level [edit access profile *profile-name*]

Release Information Statement introduced in Junos OS Release 8.5.

Description (MX Series and SRX Series devices) Define options to place limits on subscriber access based on how long the session has been up, how long the user has been inactive, or both.

(MX Series) Define options to modify a subscriber username at login based on the subscriber's access 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 access—To view this statement in the configuration.
access-control—To add this statement to the configuration.

Related Documentation

- Understanding Session Options for Subscriber Access on page 64
- Configuring Subscriber Session Timeout Options on page 69
- *Configuring Username Modification for Subscriber Sessions*
- *Removing Inactive Dynamic Subscriber VLANs*
- *Enabling Direct PCC Rule Activation by a PCRF for Subscriber Management*

shared-secret

Syntax shared-secret *shared-secret*;

Hierarchy Level [edit access profile *profile-name* client *client-name* l2tp]

Release Information Statement introduced in Junos OS Release 7.4.

Description Configure the shared secret.

Options ***shared-secret***—Shared secret key for authenticating the peer.

Required Privilege Level admin—To view this statement in the configuration.
admin–control—To add this statement to the configuration.

Related Documentation

- Configuring L2TP Properties for a Client-Specific Profile on page 28
- *Configuring an L2TP Access Profile on the LNS*

source-address

Syntax source-address *source-address*;

Hierarchy Level [edit access radius-server *server-address*];
[edit access profile *profile-name* radius-server *server-address*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Support for IPv6 ***source-address*** introduced in Junos OS Release 16.1.

Description Configure a source address for each configured RADIUS server. Each RADIUS request sent to a RADIUS server uses the specified source address.

Options ***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.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring Router or Switch Interaction with RADIUS Servers*
- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- Example: Configuring CHAP Authentication with RADIUS on page 9
- Configuring RADIUS Authentication for L2TP on page 53

statistics (Access Profile)

Syntax statistics (time | volume-time);

Hierarchy Level [edit access profile *profile-name* accounting]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
volume-time option added in Junos OS Release 9.4.

Description Configure the router or switch to collect time statistics, or both volume and time statistics, for the sessions being managed by AAA.

Options **time**—Collect uptime statistics only.

volume-time—Collect both volume and uptime statistics.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

tftp-server

Syntax tftp-server *ip-address*;

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes],
[edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description 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.

Options ***ip-address***—IP address of the TFTP server.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Address-Assignment Pool Configuration Overview*

timeout (RADIUS)

Syntax timeout *seconds*;

Hierarchy Level [edit access radius-server *server-address*],
[edit access profile *profile-name* radius-server *server-address*]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure the amount of time that the local router or switch 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.

Options ***seconds***—Amount of time to wait.
Range: 1 through 1000 seconds
Default: 3 seconds

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation

- *Configuring Router or Switch Interaction with RADIUS Servers*
- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- Example: Configuring CHAP Authentication with RADIUS on page 9
- Configuring RADIUS Authentication for L2TP on page 53

update-interval

Syntax update-interval *minutes*;

Hierarchy Level [edit access profile *profile-name* accounting]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Enable interim accounting updates and configure the amount of time that the router or switch waits before sending a new accounting update.

Interim accounting updates are included in the exchange of messages between the client and the accounting server. In RADIUS accounting, the client is the network access server (NAS), which can be the router or switch. The NAS sends Accounting-Request messages to the server, which acknowledges receipt of the requests with Accounting-Response messages. Interim accounting updates are sent in Accounting-Request packets with the Acct-Status-Type attribute set to Interim-Update.

When a user is authenticated, the authentication server issues an Access-Accept message in response to a successful Access-Request message. The interval between interim updates can be configured directly on the server using the Acct-Interim-Interval attribute of the Access-Accept message. However, if the update interval is configured on the NAS using **update-interval**, then the locally configured value overrides the value found in an Access-Accept message from the server.

NOTE: **All information in an interim update message is cumulative from the beginning of the session, not from the last interim update message.**

Default No interim updates are sent from the client to the accounting server.

Options ***minutes***—Amount of time between updates, in minutes. All values are rounded to the next higher multiple of 10. For example, the values 811 through 819 are all accepted by the CLI, but are all rounded up to 820.

Range: 10 through 1440 minutes

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *Configuring Immediate Interim Accounting Updates to RADIUS in Response to ANCP Notifications*

user-group-profile

Syntax user-group-profile *profile-name*;

Hierarchy Level [edit access profile *profile-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Apply a configured PPP group profile to PPP users.

NOTE: If **user-group-profile** is modified or deleted, the existing LNS subscribers, which were using this Layer 2 Tunneling Protocol client configuration, go down.

Options ***profile-name***—Name of a PPP group profile configured at the **[edit access group-profile *profile-name*]** hierarchy level.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- Applying a Configured PPP Group Profile to a Tunnel on page 34
- *Configuring an L2TP Access Profile on the LNS*

vlan-nas-port-stacked-format

Syntax vlan-nas-port-stacked-format;

Hierarchy Level [edit access profile *profile-name* radius options]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure RADIUS attribute 5 (NAS-Port) to include the S-VLAN ID, in addition to the VLAN ID, for subscribers on Ethernet interfaces.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation
- *Configuring RADIUS Server Options for Subscriber Access*
- *Configuring Authentication and Accounting Parameters for Subscriber Access*

wins-server (Access)

Syntax

```
wins-server {
  ipv4-address;
}
```

Hierarchy Level [edit access address-assignment pool *pool-name* family inet dhcp-attributes], [edit access protocol-attributes *attribute-set-name*]

Release Information Statement introduced in Junos OS Release 9.0.

Description Specify one or more NetBIOS name servers (NBNS) that the client uses to resolve NetBIOS names. This is equivalent to DHCP option 44.

Options ***ipv4-address***—IP address of each NetBIOS name server; add them to the configuration in order of preference.

Required Privilege Level admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pool Configuration Overview*

PART 3

Administration

CHAPTER 6

Administrative Commands

clear network-access aaa statistics

Syntax

clear network-access aaa statistics
<accounting>
<address-assignment (client | pool *pool-name*)>
<authentication>
<dynamic-requests>
<radius>
<re-authentication>
<terminate-code>

Release Information

Command introduced in Junos OS Release 10.0.
Option **radius** introduced in Junos OS Release 11.4
Option **terminate-code** introduced in Junos OS Release 11.4.

Description

Clear AAA statistics.

Options

accounting—(Optional) Clear AAA accounting statistics.

address-assignment client—(Optional) Clear AAA address-assignment statistics for the client.

address-assignment pool *pool-name*—(Optional) Clear AAA address-assignment pool statistics.

authentication—(Optional) Clear AAA authentication statistics.

dynamic-requests—(Optional) Clear AAA dynamic-request statistics.

radius—(Optional) Clears the values in the **Peak** and **Exceeded** columns only.

re-authentication—(Optional) Clear AAA reauthentication statistics.

terminate-code—(Optional) Clear AAA termination code statistics.

Required Privilege Level

maintenance

Related Documentation

- *Verifying and Managing Subscriber AAA Information*

List of Sample Output

clear network-access aaa statistics accounting on page 211
clear network-access aaa statistics address-assignment pool on page 211
clear network-access aaa statistics radius on page 211

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear network-access aaa statistics accounting

```
user@host> clear network-access aaa statistics accounting
```

clear network-access aaa statistics address-assignment pool

```
user@host> clear network-access aaa statistics address-assignment pool isp_1
```

clear network-access aaa statistics radius

```
user@host> clear network-access aaa statistics radius
```

clear network-access aaa subscriber

Syntax

clear network-access aaa subscriber
<session-id *identifier* <reconnect>>
<statistics username *username*>
<username *username* <reconnect>>

Release Information

Command introduced in Junos OS Release 9.1.
reconnect and **session-id** options added in Junos OS Release 16.1R4.

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

Related Documentation

- *Verifying and Managing Subscriber AAA Information*

List of Sample Output

clear network-access aaa subscriber statistics username on page 213
clear network-access aaa subscriber username on page 213
clear network-access aaa subscriber username on page 213

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 username

```
user@host> clear network-access aaa subscriber username user22@example.com
```

clear network-access aaa subscriber username

```
user@host> clear network-access aaa subscriber session-id 18367425
```

clear services l2tp session

Syntax clear services l2tp session (all | interface *interface-name* | local-gateway *gateway-address* | local-gateway-name *gateway-name* | local-session-id *session-id* | local-tunnel-id *tunnel-id* | peer-gateway *gateway-address* | peer-gateway-name *gateway-name* | tunnel-group *group-name* | user *username*)

Release Information Command introduced before Junos OS Release 7.4.

Description (M10i and M7i routers only) Clear Layer 2 Tunneling Protocol (L2TP) sessions on LNS.

(MX Series routers only) Clear L2TP sessions on LAC and LNS.

NOTE: On MX Series routers, you cannot issue the clear services l2tp session command in parallel with statistics-related show services l2tp commands from separate terminals. If this clear command is running, then you must press Ctrl+c to make the command run in the background before issuing any of the show commands listed in the following table:

show services l2tp destination extensive	show services l2tp summary statistics
show services l2tp destination statistics	show services l2tp tunnel extensive
show services l2tp session extensive	show services l2tp tunnel statistics
show services l2tp session statistics	

Options **all**—Close all L2TP sessions.

BEST PRACTICE: The all option is not intended to be used as a means to perform a bulk logout of L2TP subscribers. We recommend that you do not use the all option in a production environment. Instead of clearing all subscribers at once, consider clearing subscribers in smaller group, based on interface, tunnel, or destination end point.

interface *interface-name*—Clear only the L2TP sessions using the specified adaptive services or inline services interface. The interface type depends on the line card as follows:

- **si-*fpc/pic/port***—MPCs on MX Series routers only. This option is not available for L2TP on M Series routers.

- **sp-*fpc/pic/port***—AS or Multiservices PICs on M7i, M10i, and M120 routers only. This option is not available for L2TP on MX Series routers.

local-gateway *gateway-address*—Clear only the L2TP sessions associated with the specified local gateway address.

local-gateway-name *gateway-name*—Clear only the L2TP sessions associated with the specified local gateway name.

local-session-id *session-id* —Clear only the L2TP sessions with this identifier for the local endpoint of the L2TP session.

local-tunnel-id *tunnel-id*—Clear only the L2TP sessions associated with the specified local tunnel identifier.

peer-gateway *gateway-address*—Clear only the L2TP sessions associated with the peer gateway with the specified address.

peer-gateway-name *gateway-name*—Clear only the L2TP sessions associated with the peer gateway with the specified name.

tunnel-group *group-name*—Clear only the L2TP sessions associated with the specified tunnel group. This option is not available for L2TP LAC on MX Series routers.

user *username* —(M Series routers only) Clear only the L2TP sessions for the specified username.

Required Privilege Level clear

Related Documentation
- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*
- *clear services l2tp session statistics*
- show services l2tp session on page 224

List of Sample Output
clear services l2tp session on page 215
clear services l2tp session interface on page 216

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear services l2tp session

```
user@host> clear services l2tp session 31694

  Session 31694 closed
```

Sample Output

clear services l2tp session interface

```
user@host> show services l2tp session Tunnel local ID: 17185
Local  Remote   State                Interface         Interface
  ID     ID                           unit              Name
  5117   1        Established         1073741828        si-2/0/0
  34915  2        Established         1073741829        si-2/1/0
  6454   3        Established         1073741830        si-2/0/0
  46142  4        Established         1073741831        si-2/1/0

user@host> clear services l2tp session interface si-2/0/0
  Session  5117 closed
  Session  6454 closed

user@host> show services l2tp session Tunnel local ID: 17185
  Local  Remote   State                Interface         Interface
  ID     ID                           unit              Name
  34915  2        Established         1073741829        si-2/1/0
  46142  4        Established         1073741831        si-2/1/0
```

clear services l2tp tunnel statistics

Syntax clear services l2tp tunnel statistics (all | interface sp-*fpc/pic/port* | local-gateway *gateway-address* | local-gateway-name *gateway-name* | local-tunnel-id *tunnel-id* | peer-gateway *gateway-address* | peer-gateway-name *gateway-name* | tunnel-group *group-name*)

Release Information Command introduced before Junos OS Release 7.4.
Support for MX Series routers added in Junos OS Release 10.4.

Description (M10i and M7i routers: LNS only. MX Series routers: LAC only.) Clear statistics for Layer 2 Tunneling Protocol (L2TP) tunnels.

Options

all—Clear statistics for all L2TP tunnels.

interface sp-*fpc/pic/port*—Clear statistics for only the L2TP tunnels using the specified adaptive services interface. This option is not available for L2TP LAC on MX Series routers.

local-gateway *gateway-address*—Clear statistics for only the L2TP tunnels associated with the local gateway with the specified address.

local-gateway-name *gateway-name*—Clear statistics for only the L2TP tunnels associated with the local gateway with the specified name.

local-tunnel-id *tunnel-id*—Clear statistics for only the L2TP tunnels that have the specified local tunnel identifier.

peer-gateway *gateway-address*—Clear statistics for only the L2TP tunnels associated with the peer gateway with the specified address.

peer-gateway-name *gateway-name*—Clear statistics for only the L2TP tunnels associated with the peer gateway with the specified name.

tunnel-group *group-name*—Clear statistics for only the L2TP tunnels in the specified tunnel group. This option is not available for L2TP LAC on MX Series routers.

Required Privilege Level clear

Related Documentation

- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*
- *clear services l2tp tunnel*
- *show services l2tp tunnel*

List of Sample Output clear services l2tp tunnel statistics all on page 218

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear services l2tp tunnel statistics all

```
user@host> clear services l2tp tunnel statistics all
  Tunnel  9933 statistics cleared
```

show services l2tp radius

Syntax

show services l2tp radius
<accounting (servers | statistics)>
<authentication (servers | statistics)>
<servers>
<statistics>

Release Information

Command introduced in Junos OS Release 9.0.

Description

(M7i, M10i, and M120 routers only) Display RADIUS servers and statistics information for the RADIUS servers configured on the router.

Options

You must include one of the following keywords to provide a valid completion for the command:

accounting (servers | statistics)—(Optional) Display RADIUS servers or statistical accounting information only.

authentication (servers | statistics)—(Optional) Display RADIUS servers or statistical authentication information only.

servers—(Optional) Display RADIUS authentication and accounting server information only.

statistics—(Optional) Display RADIUS authentication and accounting statistics information only.

Required Privilege Level

view

Related Documentation

- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*

List of Sample Output

show services l2tp radius servers on page 221
show services l2tp radius statistics on page 222

Output Fields

Table 8 on page 219 lists the output fields for the **show services l2tp radius** command. Output fields are listed in the approximate order in which they appear.

Table 8: show services l2tp radius Output Fields

Field Name	Field Description
IP Address	IP address of the server.
State	(**servers** keyword only) Present state of the server.

Table 8: show services l2tp radius Output Fields (continued)

Field Name	Field Description
UDP Port	Number of the UDP port used to send authentication or accounting messages to the server.
Retry Count	(**servers** keyword only) Number of times the RADIUS client resends a packet if no ACK is received.
Timeout	(**servers** keyword only) Length of time the client waits for an ACK before retransmission.
Pending Requests	(**servers** keyword only) Number of client pending authentication or accounting requests.
Maximum Sessions	(**servers** keyword only) Maximum number of pending requests on each RADIUS client before the server moves to the next RADIUS client, which is 200 times the maximum number of clients that can be created on a server (which is 12).
Dead Time	(**servers** keyword only) Interval to wait before retrying a server after it fails to send a response to an authentication or accounting request.
Secret Type	(**servers** keyword only) Secret type configured on the RADIUS server.
Profile	(**servers** keyword only) Name of profile configured for the RADIUS server.
Access requests	(**statistics** keyword only) Number of access requests sent to the server.
Rollover requests	(**statistics** keyword only) Number of requests coming into the server as a result of the previous server timing out.
Retransmissions	(**statistics** keyword only) Number of retransmissions.
Access accepts	(**statistics** keyword only) Number of access accept messages received from the server.
Access rejects	(**statistics** keyword only) Number of access reject messages received from the server.
Access challenges	(**statistics** keyword only) Number of access challenges received from the server.
Malformed responses	(**statistics** keyword only) Number of responses with attributes having an invalid length or unexpected attributes (such as two attributes when the response is required to have at most one).
Bad authenticators	(**statistics** keyword only) Number of responses in which the authenticator is incorrect for the matching request. This can occur if the RADIUS secrets for the client and server do not match.
Requests pending	(**statistics** keyword only) Number of requests waiting for a response.
Request timeouts	(**statistics** keyword only) Number of requests that timed out.
Unknown responses	(**statistics** keyword only) Number of unknown responses. The RADIUS response type in the header is invalid or unsupported.

Table 8: show services l2tp radius Output Fields (continued)

Field Name	Field Description
Packets dropped	(**statistics** keyword only) Number of packets dropped because they are too short or because the router receives a response for which there is no corresponding request. For example, if the router sends a request that times out, the router removes the request from the list and sends a new request. If the server is slow and sends a response to the first request after the router removes the request, the packet is dropped.

Sample Output

show services l2tp radius servers

```
user@host> show services l2tp radius servers
                        RADIUS Authentication Servers

                              UDP  Retry         Pending  Maximum  Dead   Secret
    IP Address      State     Port Count Timeout Requests Sessions Time   Type
  192.0.2.1         Active    1812 2     25      0        2400     300  radius-key

  198.51.100.1      Active    1812 5     35      0        2400     300  radius-key

  203.0.113.1       Active    1812 2     25      0        2400     300  radius-key

  172.28.30.174     Active    1812 7     75      0        2400     300  radius-key

  172.28.30.175     Active    1812 7     75      0        2400     300  radius-key

  172.28.30.176     Active    1812 4     55      0        2400     300  radius-key

  172.31.30.176   Active    1812 3     3       0        2400     300  none-set
  172.31.130.174  Active    1812 7     75      0        2400     300  radius-key

                        RADIUS Accounting Servers

                              UDP  Retry         Pending  Maximum  Dead   Secret
    IP Address      State     Port Count Timeout Requests Sessions Time   Type
  192.0.2.1         Active    1813 2     25      0        2400     300  radius-key

  198.51.100.1      Active    1813 5     35      0        2400     300  radius-key

  203.0.113.1       Active    1813 2     25      0        2400     300  radius-key

  172.28.30.174     Active    1813 7     75      0        2400     300  radius-key

  172.28.30.175     Active    1813 7     75      0        2400     300  radius-key

  172.28.30.176     Active    1813 4     55      0        2400     300  radius-key

  172.31.30.176   Active    1813 3     3       0        2400     300  none-set
  172.31.130.174  Active    1813 7     75      0        2400     300  radius-key

                        RADIUS Accounting Servers

 Profile: user1
```

show services l2tp radius statistics

```
user@host> show services l2tp radius statistics
     RADIUS Authentication Statistics

Authentication statistics:
  Server 192.0.2.1, UDP port: 1812
    Access requests     : 40
    Rollover requests   : 5
    Retransmissions     : 2
    Access accepts      : 39
    Access rejects      : 1
    Access challenges   : 3
    Malformed responses : 0
    Bad authenticators  : 0
    Requests pending    : 1
    Request timeouts    : 0
    Unknown responses   : 0
    Packets dropped     : 0

     RADIUS Accounting Statistics

 Accounting statistics:
  Server 172.31.130.174, UDP port: 1813
    Total requests      : 9
    Start requests      : 6
    Interim requests    : 1
    Stop requests       : 2
    Rollover requests   : 0
    Retransmissions     : 1
    Total response      : 9
    Start responses     : 6
    Interim responses   : 1
    Stop responses      : 2
    Malformed responses : 0
    Bad authenticators  : 0
    Requests pending    : 1
    Request timeouts    : 0
    Unknown responses   : 0
    Packets dropped     : 0
```

CHAPTER 7

Monitoring Commands

- show services l2tp session
- show services l2tp radius
- show services l2tp summary

show services l2tp session

Syntax

show services l2tp session
<brief | detail | extensive>
<interface *interface-name*>
<local-gateway *gateway-address*>
<local-gateway-name *gateway-name*>
<local-session-id *session-id*>
<local-tunnel-id *tunnel-id*>
<peer-gateway *gateway-address*>
<peer-gateway-name *gateway-name*>
<statistics>
<tunnel-group *group-name*>
<user *username*>

Release Information

Command introduced before Junos OS Release 7.4.
Support for LAC on MX Series routers introduced in Junos OS Release 10.4.
Support for LNS on MX Series routers introduced in Junos OS Release 11.4.

Description

(M10i and M7i routers only) Display information about active L2TP sessions for LNS.

(MX Series routers only) Display information about active L2TP sessions for LAC and LNS.

Options

none—Display standard information about all active L2TP sessions.

brief | detail | extensive—(Optional) Display the specified level of output.

interface *interface-name*—(Optional) Display L2TP session information for only the specified adaptive services or inline services interface. The interface type depends on the line card as follows:

- **si-*fpc/pic/port***— MPCs on MX Series routers only. This option is not available for L2TP on M Series routers.
- **sp-*fpc/pic/port***—AS or Multiservices PICs on M7i, M10i, and M120 routers only. This option is not available for L2TP on MX Series routers.

local-gateway *gateway-address*—(Optional) Display L2TP session information for only the specified local gateway address.

local-gateway-name *gateway-name*—(Optional) Display L2TP session information for only the specified local gateway name.

local-session-id *session-id*—(Optional) Display L2TP session information for only the specified local session identifier.

local-tunnel-id *tunnel-id*—(Optional) Display L2TP session information for only the specified local tunnel identifier.

peer-gateway *gateway-address*—(Optional) Display L2TP session information for only the specified peer gateway address.

peer-gateway-name *gateway-name*—(Optional) Display L2TP session information for only the specified peer gateway name.

statistics—(Optional) Display the number of control packets and bytes transmitted and received for the session. You cannot include this option with any of the level options, **brief**, **detail**, or **extensive**.

tunnel-group *group-name*—(Optional) Display L2TP session information for only the specified tunnel group. To display information about L2TP CPU and memory usage, you can include the tunnel group name in the **show services service-sets memory-usage *group-name*** and **show services service-sets cpu-usage *group-name*** commands. This option is not available for L2TP LAC on MX Series routers.

user *username*—(M Series routers only) (Optional) Display L2TP session information for only the specified username.

Required Privilege Level view

Related Documentation

- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*
- clear services l2tp session on page 214

List of Sample Output

show services l2tp session (LNS on M Series Routers) on page 229
show services l2tp session (LNS on MX Series Routers) on page 229
show services l2tp session (LAC) on page 229
show services l2tp session detail (LAC) on page 229
show services l2tp session extensive (LAC) on page 230
show services l2tp session extensive (LAC on MX Series Routers) on page 230
show services l2tp session extensive (LNS on M Series Routers) on page 230
show services l2tp session extensive (LNS on MX Series Routers) on page 231
show services l2tp session statistics (MX Series Routers) on page 231

Output Fields Table 9 on page 225 lists the output fields for the **show services l2tp session** command. Output fields are listed in the approximate order in which they appear.

Table 9: show services l2tp session Output Fields

Field Name	Field Description	Level of Output
Interface	(LNS only) Name of an adaptive services interface.	All levels
Tunnel group	(LNS only) Name of a tunnel group.	All levels
Tunnel local ID	Identifier of the local endpoint of the tunnel, as assigned by the L2TP network server (LNS).	All levels

Table 9: show services l2tp session Output Fields (continued)

Field Name	Field Description	Level of Output
Session local ID	Identifier of the local endpoint of the L2TP session, as assigned by the LNS.	All levels
Session remote ID	Identifier of the remote endpoint of the L2TP session, as assigned by the L2TP access concentrator (LAC).	All levels
State	State of the L2TP session: • **Established**—Session is operating. This is the only state supported for the LAC. • **closed**—Session is being closed. • **destroyed**—Session is being destroyed. • **clean-up**—Session is being cleaned up. • **lns-ic-accept-new**—New session is being accepted. • **lns-ic-idle**—Session has been created and is idle. • **lns-ic-reject-new**—New session is being rejected. • **lns-ic-wait-connect**—Session is waiting for the peer's incoming call connected (ICCN) message.	All levels
Bundle ID	(LNS only) Bundle identifier. Indicates the session is part of a multilink bundle. Sessions that have a blank **Bundle** field are not participating in the Multilink Protocol. Sessions in a multilink bundle might belong to different L2TP tunnels. For L2TP output organized by bundle ID, issue the **show services l2tp multilink extensive** command.	All levels
Mode	(LNS) Mode of the interface representing the session: **shared** or **exclusive**. (LAC) Mode of the interface representing the session: **shared** or **dedicated**. Only **dedicated** is currently supported for the LAC.	**extensive**
Local IP	IP address of local endpoint of the Point-to-Point Protocol (PPP) session.	**extensive**
Remote IP	IP address of remote endpoint of the PPP session.	**extensive**
Username	(LNS only) Name of the user logged in to the session.	All levels
Assigned IP address	(LNS only) IP address assigned to remote client.	**extensive**
Local name	For LNS, name of the LNS instance in which the session was created. For LAC, name of the LAC.	**extensive**
Remote name	For LNS, name of the LAC from which the session was created. For LAC, name of the LAC instance.	**extensive**
Local MRU	(LNS only) Maximum receive unit (MRU) setting of the local device, in bytes.	**extensive**
Remote MRU	(LNS only) MRU setting of the remote device, in bytes.	**extensive**

Table 9: show services l2tp session Output Fields (continued)

Field Name	Field Description	Level of Output
Tx speed	Transmit speed of the session conveyed from the LAC to the LNS, in bits per second (bps) and the source method from which the speed is derived. Starting in Junos OS Release 14.1, either the initial (**initial**) line speed or both the initial and current (**update**) line speeds can be displayed on MX Series routers: • When connection speed updates are not enabled, then only the initial line speed is displayed. • When connection speed updates are enabled, then both the initial and the current speeds are displayed. For Junos OS Release 17.2 and Release 17.3, only the current (**update**) line speed can be displayed on MX Series routers. Starting in Junos OS Release 17.4R1, once again either the initial (**initial**) line speed or both the initial and current (**update**) line speeds can be displayed on MX Series routers. Starting in Junos OS Release 15.1, when the Tx connect speed method is set to none, the value of zero (0) is displayed.	**extensive**
Rx speed	Receive speed of the session conveyed from the LAC to the LNS, in bits per second (bps) and the source method from which the speed is derived. Starting in Junos OS Release 14.1, either the initial (**initial**) line speed or both the initial and current (**update**) line speeds can be displayed on MX Series routers: • When connection speed updates are not enabled, then only the initial line speed is displayed. • When connection speed updates are enabled, then both the initial and the current speeds are displayed. For Junos OS Release 17.2 and Release 17.3, only the current (**update**) line speed can be displayed on MX Series routers. Starting in Junos OS Release 17.4R1, once again either the initial (**initial**) line speed or both the initial and current (**update**) line speeds can be displayed on MX Series routers. Starting in Junos OS Release 15.1, when the Tx connect speed method is set to none, the value of zero (0) is displayed.	**extensive**
Bearer type	Type of bearer enabled: • **0**—Might indicate that the call was not received over a physical link (for example, when the LAC and PPP are located in the same subsystem). • **1**—Digital access requested. • **2**—Analog access requested. • **4**—Asynchronous Transfer Mode (ATM) bearer support.	**extensive**
Framing type	Type of framing enabled: • **1**—Synchronous framing • **2**—Asynchronous framing	**extensive**

Table 9: show services l2tp session Output Fields (continued)

Field Name	Field Description	Level of Output
LCP renegotiation	(LNS only) Whether Link Control Protocol (LCP) renegotiation is configured: **On** or **Off**.	**extensive**
Authentication	Type of authentication algorithm used: Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP).	**extensive**
Interface ID	(LNS only) Identifier used to look up the logical interface for this session.	**extensive**
Interface unit	Logical interface for this session.	All levels
Call serial number	Unique serial number assigned to the call.	**extensive**
Policer bandwidth	Maximum policer bandwidth configured for this session.	**extensive**
Policer burst size	Maximum policer burst size configured for this session.	**extensive**
Firewall filter	Configured firewall filter name.	**extensive**
Session encapsulation overhead	Overhead allowance configured for this session, in bytes.	**extensive**
Session cell overhead	Cell overhead activation (**On** or **Off**).	**extensive**
Create time	Date and time when the call was created.	**extensive**
Up time	Length of time elapsed since the call became active, in hours, minutes, and seconds.	**extensive**
Idle time	Length of time elapsed since the call became idle, in hours, minutes, and seconds.	**extensive**

Table 9: show services l2tp session Output Fields (continued)

Field Name	Field Description	Level of Output
Statistics since	Date and time when collection of the following statistics began: • **Control Tx**—Amount of control information transmitted, in packets and bytes. • **Control Rx**—Amount of control information received, in packets and bytes. • **Data Tx**—Amount of data transmitted, in packets and bytes. • **Data Rx**—Amount of data received, in packets and bytes. • **Errors Tx**—Number of errors transmitted, in packets. • **Errors Rx**—Number of errors received, in packets. • **LCP echo req Tx**—Number of LCP echo requests transmitted, in packets. • **LCP echo req Rx**—Number of LCP echo requests received, in packets. • **LCP echo rep Tx**—Number of LCP echo responses transmitted, in packets. • **LCP echo rep Rx**—Number of LCP echo responses received, in packets. • **LCP echo Req timout**—Number of LCP echo requests that timed out. • **LCP echo Req error**—Number of errors received for LCP echo packets. • **LCP echo Rep error** —Number of errors transmitted for LCP echo packets.	**extensive**

Sample Output

show services l2tp session (LNS on M Series Routers)

```
user@host> show services l2tp session
Interface: sp-1/2/0, Tunnel group: group1, Tunnel local ID:  8802
  Local Remote Interface State              Bundle Username
  ID    ID     unit
  37966      5         2 Established
```

show services l2tp session (LNS on MX Series Routers)

```
user@host> show services l2tp session
Tunnel local ID: 40553
  Local  Remote   State               Interface         Interface
  ID     ID                           unit              Name
  17967  1        Established         1073749824        si-5/2/0
```

show services l2tp session (LAC)

```
user@host> show services l2tp session
Tunnel local ID: 31889
  Local  Remote   State               Interface         Interface
  ID     ID                           unit              Name
   31694      1   Established               311         pp0
```

show services l2tp session detail (LAC)

```
user@host> show services l2tp session detail
Tunnel local ID: 31889
  Session local ID: 31694, Session remote ID:     1, Interface unit: 311
    State: Established, Interface: pp0, Mode: Dedicated
    Local IP: 203.0.113.2:1701, Remote IP: 203.0.113.1:1701
    Local name: ce-lac, Remote name: ce-lns
```

show services l2tp session extensive (LAC)

```
user@host> show services l2tp session extensive
Tunnel local ID: 31889
  Session local ID: 31694, Session remote ID:     1
    Interface unit: 311
    State: Established, Mode: Dedicated
    Local IP: 203.0.113.2:1701, Remote IP: 203.0.113.1:1701
    Local name: ce-lac, Remote name: ce-lns
    Tx speed: 0, Rx speed: 0
    Bearer type: 1, Framing type: 1
    LCP renegotiation: N/A, Authentication: None, Interface ID: N/A
    Interface unit: 311, Call serial number: 0
    Policer bandwidth: 0, Policer burst size: 0
    Policer exclude bandwidth: 0, Firewall filter: 0
    Session encapsulation overhead: 0, Session cell overhead: 0
    Create time: Tue Aug 24 14:38:23 2010, Up time: 01:06:25
    Idle time: N/A
```

show services l2tp session extensive (LAC on MX Series Routers)

```
user@host> show services l2tp session extensive
Tunnel local ID: 31889
  Session local ID: 31694, Session remote ID:     1
    Interface unit: 311
    State: Established, Mode: Dedicated
    Local IP: 203.0.113.102:1701, Remote IP: 203.0.113.101:1701
    Local name: ce-lac, Remote name: ce-lns
    Tx speed: 256000, source service-profile
    Rx speed: 128000, source ancp
    Bearer type: 1, Framing type: 1
    LCP renegotiation: N/A, Authentication: None, Interface ID: N/A
    Interface unit: 311, Call serial number: 0
    Policer bandwidth: 0, Policer burst size: 0
    Policer exclude bandwidth: 0, Firewall filter: 0
    Session encapsulation overhead: 0, Session cell overhead: 0
    Create time: Tue Aug 24 14:38:23 2010, Up time: 01:06:25
    Idle time: N/A
```

show services l2tp session extensive (LNS on M Series Routers)

```
user@host> show services l2tp session extensive
Interface: sp-1/2/0, Tunnel group: group1, Tunnel local ID: 62746
  Session local ID: 56793, Session remote ID: 53304
    State: Established, Bundle ID: 5, Mode: shared
    Local IP: 203.0.113.121:1701, Remote IP: 203.0.113.202:1701
    Username: user@example.com, Assigned IP address: 203.0.113.51/32
    Local MRU: 4000, Remote MRU: 1500, Tx speed: 64000, Rx speed: 64000
    Bearer type: 2, Framing type: 1
    LCP renegotiation: Off, Authentication: CHAP, Interface ID: unit_20
    Interface unit: 20, Call serial number: 4137941434
    Policer bandwidth: 64000, Policer burst size: 51200
    Firewall filter: f1
    Session encapsulation overhead: 16, Session cell overhead: On
    Create time: Tue Mar 23 14:13:15 2004, Up time: 01:16:41
    Idle time: 00:00:00
    Statistics since: Tue Mar 23 14:13:13 2004
                        Packets        Bytes
      Control Tx              4           88
      Control Rx              2           28
```

```
      Data Tx                 0           0
      Data Rx               461       29.0k
      Errors Tx               0
      Errors Rx               0

Interface: sp-1/2/0, Tunnel group: group_company_dns, Tunnel local ID: 37266
  Session local ID: 39962, Session remote ID: 53303
    State: Established, Bundle ID: 5, Mode: shared
    Local IP: 203.0.113.121:1701, Remote IP: 203.0.113.222:1701
    Username: usr1@company.example.com, Assigned IP address: 203.0.113.3/24
    Local name: router-1, Remote name: router-2
    Local MRU: 4470, Remote MRU: 4470, Tx speed: 155000000, Rx speed: 155000000
    Bearer type: 2, Framing type: 1
    LCP renegotiation: Off, Authentication: CHAP, Interface ID: unit_31
    Interface unit: 31, Call serial number: 4137941433
    Policer bandwidth: 64000, Policer burst size: 51200
    Firewall filter: f1
    Create time: Tue Mar 23 14:13:17 2004, Up time: 01:16:39
    Idle time: 01:16:36
    Statistics since: Tue Mar 23 14:13:15 2004
                          Packets        Bytes
      Control Tx              6          196
      Control Rx              4          150
      Data Tx                 0            0
      Data Rx                 1           80
      Errors Tx               0
      Errors Rx               0
```

show services l2tp session extensive (LNS on MX Series Routers)

```
user@host> show services l2tp session extensive
Tunnel local ID: 40553
  Session local ID: 17967, Session remote ID: 1
    Interface unit: 1073749824
    State: Established
    Interface: si-5/2/0
    Mode: Dedicated
    Local IP: 192.0.2.2:1701, Remote IP: 192.0.2.3:1701
    Local name: lns-mx960, Remote name: testlac
    Tx speed: initial 64000, Update 256000
    Rx speed: initial 64000, Update 256000
    Bearer type: 2, Framing type: 1
    LCP renegotiation: Off, Authentication: None
    Call serial number: 1
    Create time: Mon Apr 25 20:27:50 2011, Up time: 00:01:48
    Idle time: N/A
    Statistics since: Mon Apr 25 20:27:50 2011
                          Packets        Bytes
      Control Tx              4          219
      Control Rx              4          221
      Data Tx                 0            0
      Data Rx                10          228
      Errors Tx               0
      Errors Rx               0
```

show services l2tp session statistics (MX Series Routers)

```
user@host>show services l2tp session statistics local session-id 1
Tunnel local ID: 17185
Session local ID: 1, Session remote ID: 14444, Interface unit: 1073788352
```

```
State: Established
Statistics since: Mon Aug 1 13:27:47 2011
    Packets   Bytes
Data Tx   4    51
Data Rx   3    36
```

show services l2tp radius

Syntax

show services l2tp radius
<accounting (servers | statistics)>
<authentication (servers | statistics)>
<servers>
<statistics>

Release Information

Command introduced in Junos OS Release 9.0.

Description

(M7i, M10i, and M120 routers only) Display RADIUS servers and statistics information for the RADIUS servers configured on the router.

Options

You must include one of the following keywords to provide a valid completion for the command:

accounting (servers | statistics)—(Optional) Display RADIUS servers or statistical accounting information only.

authentication (servers | statistics)—(Optional) Display RADIUS servers or statistical authentication information only.

servers—(Optional) Display RADIUS authentication and accounting server information only.

statistics—(Optional) Display RADIUS authentication and accounting statistics information only.

Required Privilege Level

view

Related Documentation

- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*

List of Sample Output

show services l2tp radius servers on page 235
show services l2tp radius statistics on page 236

Output Fields

Table 8 on page 219 lists the output fields for the **show services l2tp radius** command. Output fields are listed in the approximate order in which they appear.

Table 10: show services l2tp radius Output Fields

Field Name	Field Description
IP Address	IP address of the server.
State	(**servers** keyword only) Present state of the server.

Table 10: show services l2tp radius Output Fields (continued)

Field Name	Field Description
UDP Port	Number of the UDP port used to send authentication or accounting messages to the server.
Retry Count	(**servers** keyword only) Number of times the RADIUS client resends a packet if no ACK is received.
Timeout	(**servers** keyword only) Length of time the client waits for an ACK before retransmission.
Pending Requests	(**servers** keyword only) Number of client pending authentication or accounting requests.
Maximum Sessions	(**servers** keyword only) Maximum number of pending requests on each RADIUS client before the server moves to the next RADIUS client, which is 200 times the maximum number of clients that can be created on a server (which is 12).
Dead Time	(**servers** keyword only) Interval to wait before retrying a server after it fails to send a response to an authentication or accounting request.
Secret Type	(**servers** keyword only) Secret type configured on the RADIUS server.
Profile	(**servers** keyword only) Name of profile configured for the RADIUS server.
Access requests	(**statistics** keyword only) Number of access requests sent to the server.
Rollover requests	(**statistics** keyword only) Number of requests coming into the server as a result of the previous server timing out.
Retransmissions	(**statistics** keyword only) Number of retransmissions.
Access accepts	(**statistics** keyword only) Number of access accept messages received from the server.
Access rejects	(**statistics** keyword only) Number of access reject messages received from the server.
Access challenges	(**statistics** keyword only) Number of access challenges received from the server.
Malformed responses	(**statistics** keyword only) Number of responses with attributes having an invalid length or unexpected attributes (such as two attributes when the response is required to have at most one).
Bad authenticators	(**statistics** keyword only) Number of responses in which the authenticator is incorrect for the matching request. This can occur if the RADIUS secrets for the client and server do not match.
Requests pending	(**statistics** keyword only) Number of requests waiting for a response.
Request timeouts	(**statistics** keyword only) Number of requests that timed out.
Unknown responses	(**statistics** keyword only) Number of unknown responses. The RADIUS response type in the header is invalid or unsupported.

Table 10: show services l2tp radius Output Fields (continued)

Field Name	Field Description
Packets dropped	(**statistics** keyword only) Number of packets dropped because they are too short or because the router receives a response for which there is no corresponding request. For example, if the router sends a request that times out, the router removes the request from the list and sends a new request. If the server is slow and sends a response to the first request after the router removes the request, the packet is dropped.

Sample Output

show services l2tp radius servers

```
user@host> show services l2tp radius servers
                        RADIUS Authentication Servers

                              UDP  Retry         Pending  Maximum  Dead   Secret
    IP Address      State     Port Count Timeout Requests Sessions Time   Type
  192.0.2.1         Active    1812 2     25      0        2400     300  radius-key

  198.51.100.1      Active    1812 5     35      0        2400     300  radius-key

  203.0.113.1       Active    1812 2     25      0        2400     300  radius-key

  172.28.30.174     Active    1812 7     75      0        2400     300  radius-key

  172.28.30.175     Active    1812 7     75      0        2400     300  radius-key

  172.28.30.176     Active    1812 4     55      0        2400     300  radius-key

  172.31.30.176   Active    1812 3     3       0        2400     300  none-set
  172.31.130.174  Active    1812 7     75      0        2400     300  radius-key

                        RADIUS Accounting Servers

                              UDP  Retry         Pending  Maximum  Dead   Secret
    IP Address      State     Port Count Timeout Requests Sessions Time   Type
  192.0.2.1         Active    1813 2     25      0        2400     300  radius-key

  198.51.100.1      Active    1813 5     35      0        2400     300  radius-key

  203.0.113.1       Active    1813 2     25      0        2400     300  radius-key

  172.28.30.174     Active    1813 7     75      0        2400     300  radius-key

  172.28.30.175     Active    1813 7     75      0        2400     300  radius-key

  172.28.30.176     Active    1813 4     55      0        2400     300  radius-key

  172.31.30.176   Active    1813 3     3       0        2400     300  none-set
  172.31.130.174  Active    1813 7     75      0        2400     300  radius-key

                        RADIUS Accounting Servers

 Profile: user1
```

show services l2tp radius statistics

```
user@host> show services l2tp radius statistics
     RADIUS Authentication Statistics

Authentication statistics:
  Server 192.0.2.1, UDP port: 1812
    Access requests     : 40
    Rollover requests   : 5
    Retransmissions     : 2
    Access accepts      : 39
    Access rejects      : 1
    Access challenges   : 3
    Malformed responses : 0
    Bad authenticators  : 0
    Requests pending    : 1
    Request timeouts    : 0
    Unknown responses   : 0
    Packets dropped     : 0

     RADIUS Accounting Statistics

 Accounting statistics:
  Server 172.31.130.174, UDP port: 1813
    Total requests      : 9
    Start requests      : 6
    Interim requests    : 1
    Stop requests       : 2
    Rollover requests   : 0
    Retransmissions     : 1
    Total response      : 9
    Start responses     : 6
    Interim responses   : 1
    Stop responses      : 2
    Malformed responses : 0
    Bad authenticators  : 0
    Requests pending    : 1
    Request timeouts    : 0
    Unknown responses   : 0
    Packets dropped     : 0
```

show services l2tp summary

Syntax

show services l2tp summary
<interface sp-*fpc/pic/port*>
<statistics>

Release Information

Command introduced before Junos OS Release 7.4.
Support for LAC on MX Series routers introduced in Junos OS Release 10.4.
Support for LNS on MX Series routers introduced in Junos OS Release 11.4.
Support for **statistics** option introduced in Junos OS Release 13.1.

Description

(M10i and M7i routers: LNS only. MX Series routers: LAC and LNS.) Display Layer 2 Tunneling Protocol (L2TP) summary information.

Options

none—Display complete L2TP summary information. For LNS on M Series routers, display L2TP summary information for all adaptive services interfaces. For LNS on MX Series routers, display L2TP summary information for all inline services interfaces.

interface sp-*fpc/pic/port*—(Optional) Display L2TP summary information for only the specified adaptive services interface. This option is not available for L2TP on MX Series routers.

statistics—(Optional) Display a summary of control packets and bytes transmitted and received.

Required Privilege Level

view

Related Documentation

- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*

List of Sample Output

show services l2tp summary (LAC on M Series routers) on page 240
show services l2tp summary (LAC on MX Series routers) on page 241
show services l2tp summary (LNS on MX Series routers) on page 241
show services l2tp summary (LNS on M Series routers) on page 241
show services l2tp summary statistics (MX Series routers) on page 241

Output Fields

Table 11 on page 237 lists the output fields for the **show services l2tp summary** command. Output fields are listed in the approximate order in which they appear.

Table 11: show services l2tp summary Output Fields

Field Name	Field Description
Administrative state	Administrative state of the tunnel is drain. In this state you cannot configure new sessions, destinations, or tunnels at the LAC or LNS.

Table 11: show services l2tp summary Output Fields (continued)

Field Name	Field Description
Failover within a preference level	State of this tunnel selection method on the LAC. When enabled, tunnel selection fails over within a preference level. When disabled, tunnel selection drops to the next lower preference level. Not displayed for LNS on M Series routers.
Weighted load balancing	State of this tunnel selection method on the LAC. When enabled, the maximum session limit of a tunnel determines its weight within a preference level. Tunnel selection proceeds from greatest to least weight. When disabled, selection defaults to a round robin method. Not displayed for LNS on M Series routers.
Destination equal load balancing	State of this tunnel selection method on the LAC. When enabled, the LAC selects tunnels based on the session count for destinations and the tunnel session count. Not displayed for LNS on M Series routers.
Tunnel authentication challenge	State of tunnel authentication, indicating whether the LAC and LNS exchange an authentication challenge and response during the establishment of the tunnel. The state is **Enabled** when a secret is configured in the tunnel profile or on the RADIUS server in the Tunnel-Password attribute [69]. The state is **Disabled** when the secret is not present. Not displayed for LNS on M Series routers.
Calling number avp	When the state is **Enabled**, the LAC includes the value of the Calling Number AVP 22 in ICRQ packets sent to the LNS. When the state is **Disabled**, the attribute is not sent to the LNS. Not displayed for LNS on M Series routers.
Failover Protocol	When the state is enabled, the LAC operates in the default *failover-protocol-fall-back-to-silent-failover* manner. When the state is disabled, the **disable-failover-protocol** statement has been issued and the LAC operates only in silent failover mode. Not displayed for LNS on M Series routers.
Tx connect speed method	The connection speed method configured to send the speed values in the L2TP Tx Connect Speed (AVP 24) and L2TP Rx Connect Speed (AVP 38). Possible values are: • **actual** This is the default value in Junos OS Releases 15.1, 16.1, 16.2, and 17.1. It is deprecated in Junos Releases 17.2 and higher. • **ancp** • **none** • **pppoe-ia-tag** • **service-profile** • **static** This is the default value in Junos Releases 13.3, 14.1, 14.2, 17.2 and higher. It is deprecated in Junos OS Releases 15.1, 16.1, 16.2, and 17.1.
Rx speed avp when equal	Indicates if the Rx connect speed when equal configuration is **enabled** or **disabled**.

Table 11: show services l2tp summary Output Fields (continued)

Field Name	Field Description
Tunnel assignment id	Format of the tunnel name. Format of the tunnel name, based on RADIUS attributes returned from the AAA server: • **authentication-id**—Name consists of only Tunnel Assignment-Id [82]. This is the default value. • **client-server-id**—Name is a combination of Tunnel-Client-Auth-Id [90], Tunnel-Server-Endpoint [67], and Tunnel-Assignment-Id [82]. This format is available only on MX Series routers.
Tunnel Tx Address Change	Action taken by LAC when it receives a request from a peer to change the destination IP address, UDP port, or both: • **accept**—Accepts change requests for the IP address or UDP port. This is the default action. • **ignore**—Ignores all change requests. • **ignore-ip-address**—Ignores change requests for the IP address but accepts them for the UDP port. • **ignore-udp-port**—Ignores change requests for the UDP port but accepts them for the IP address.
Min Retransmission Timeout for control packets	Minimum number of seconds that the local peer waits for the initial response after transmitting an L2TP control packet. If no response has been received by the time the period expires, the local peer retransmits the packet.
Min Retransmission Timeout for control packets	Minimum number of seconds that the local peer waits for the initial response after transmitting an L2TP control packet. If no response has been received by the time the period expires, the local peer retransmits the packet.
Max Retransmissions for Established Tunnel	Maximum number of times control messages are retransmitted for established tunnels.
Max Retransmissions for Not Established Tunnel	Maximum number of times control messages are retransmitted for tunnels that are not established.
Tunnel Idle Timeout	Period that a tunnel can be inactive—that is, carrying no traffic—before it times out and is torn down.
Destruct Timeout	Period that the router attempts to maintain dynamic destinations, tunnels, and sessions after they have been destroyed.
Reassembly Service Set	Indicates active IP reassembly configured for the interface.
Destination Lockout Timeout	Timeout period for which all future destinations are locked out, meaning that they are not considered for selection when a new tunnel is created.

Table 11: show services l2tp summary Output Fields (continued)

Field Name	Field Description
Access Line Information	State of LAC global configuration for forwarding subscriber line information to the LNS, **Enabled** or **Disabled**. Indicates active IP reassembly configured for the interface. Starting in Junos OS Release 17.4R1, this information can also be displayed on the LNS for information it receives from the LAC.
IPv6 Services for LAC Sessions	State of LAC IPv6 service configuration for creating the IPv6 (inet6) address family for LAC subscribers, allowing the application of IPv6 firewall filters, **Enabled** or **Disabled**.
Speed Updates	State of LAC global configuration for including connection speed updates when it forwards subscriber line information to the LNS, **Enabled** or **Disabled**. Starting in Junos OS Release 17.4R1, this information can also be displayed on the LNS for updates it receives from the LAC.
Destinations	Number of L2TP destinations for the LAC. Not displayed for LNS on M Series routers.
Tunnels	Number of L2TP tunnels established on the router.
Sessions	Number of L2TP sessions established on the router.
Switched sessions	Number of L2TP tunnel-switched sessions established on the router.
Control	Count of L2TP control packets and bytes sent and received.
Data	Count of L2TP data packets and bytes sent and received.
Errors	Count of L2TP error packets and bytes sent and received.

Sample Output

show services l2tp summary (LAC on M Series routers)

```
user@host> show services l2tp summary
Administrative state is Drain
Failover within a preference level is Disabled
Weighted load balancing is Enabled
Destination equal load balancing is Disabled
Tunnel authentication challenge is Enabled
Calling number avp is Enabled
Failover Protocol is Disabled
Tunnel assignment id format is authentication-id
Destinations: 1 Tunnels: 1, Sessions: 1
   Tx packets     Rx packets  Memory (bytes)
Control    260            144             11513856
```

```
Data        7.5k            16.9k             8.3k
Errors         0               0
```

show services l2tp summary (LAC on MX Series routers)

```
user@host> show services l2tp summary
Administrative state is Drain
   Failover within a preference level is Disabled
  Weighted load balancing is Disabled
  Destination equal load balancing is Enabled
  Tunnel authentication challenge is Enabled
  Calling number avp is Enabled
  Failover Protocol is Disabled
  Tx Connect speed method is static
  Rx speed avp when equal is enabled
  Tunnel Tx Address Change is Accept
  Min Retransmissions Timeout for control packets is 2 seconds
  Max Retransmissions for Established Tunnel is 7
  Max Retransmissions for Not Established Tunnel is 5
  Tunnel Idle Timeout is 60 seconds
  Destruct Timeout is 300 seconds
  Destination Lockout Timeout is 300 seconds
  Reassembly Service Set is ssnr3
  Access Line Information is Enabled, Speed Updates is Enabled
  IPv6 Services For LAC Sessions is Enabled
  Destinations: 0, Tunnels: 0, Sessions: 0, Switched sessions: 0
```

show services l2tp summary (LNS on MX Series routers)

```
user@host show services l2tp summary
 Administrative state is Drain
  Failover within a preference level is Disabled
  Weighted load balancing is Disabled
  Destination equal load balancing is Disabled
  Tunnel authentication challenge is Enabled
  Calling number avp is Enabled
  Failover Protocol is Enabled
  Tx Connect speed method is static
  reassembly Service Set is ssnr3
  Destinations: 4, Tunnels: 19, Sessions: 65, Switched sessions: 2
  Access Line Information is Enabled, Speed Updates is Enabled
```

show services l2tp summary (LNS on M Series routers)

```
user@host> show services l2tp summary
Tunnels: 2, Sessions: 2, Errors: 0
    Tx packets   Rx packets    Memory (bytes)
Control     6k           9k                688k
Data       70k          70k                3054
```

show services l2tp summary statistics (MX Series routers)

```
user@host>show services l2tp summary statistics
Administrative state is Drain
Failover within a preference level is Disabled
Weighted load balancing is Disabled
Destination equal load balancing is Disabled
Tunnel authentication challenge is Enabled
Calling number avp is Enabled
Failover Protocol is Enabled
```

```
Tx Connect speed method is advisory
Tunnel assignment id format is assignment-id
Tunnel Tx Address Change is Accept
Min Retransmissions Timeout for control packets is 4 seconds
Max Retransmissions for Established Tunnel is 7
Max Retransmissions for Not Established Tunnel is 5
Tunnel Idle Timeout is 60 seconds
Destruct Timeout is 300 seconds
Destination Lockout Timeout is 300 seconds
Destinations: 1, Tunnels: 1, Sessions: 31815, Switched sessions: 0
     Tx packets    Rx packets  Memory (bytes)
  Control          90.4k           32.0k       245678080
  Data             127.3k          100.8kk          0
  Errors              0               0
```