JUNIPER NETWORKS

Junos® OS

L2TP Feature Guide for Subscriber Management

Release
13.2

Published: 2013-07-31

Juniper Networks, Inc.
1194 North Mathilda Avenue
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

Junos® OS L2TP Feature Guide for Subscriber Management
13.2

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

YEAR 2000 NOTICE

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

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at http://www.juniper.net/support/eula.html. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

List of Figures

List of Tables

About the Documentation

Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at http://www.juniper.net/techpubs/.

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

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at http://www.juniper.net/books.

Supported Platforms

For the features described in this document, the following platforms are supported:

- MX Series

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 the *CLI User Guide*.

Documentation Conventions

Table 1 on page xv 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.

Table 2 on page xv 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**
`Fixed-width text like this`	Represents output that appears on the terminal screen.	`user@host>` **show chassis alarms** `No alarms currently active`

Table 2: Text and Syntax Conventions *(continued)*

Convention	Description	Examples
Italic text like this	• Introduces or emphasizes important new terms. • Identifies book names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS System Basics Configuration 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)	Enclose 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)	Enclose a variable for which you can substitute one or more values.	**community name members [** ***community-ids*** **]**

Indention and braces ({ })	Identify 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**.
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to techpubs-comments@juniper.net, or fill out the documentation feedback form at https://www.juniper.net/cgi-bin/docbugreport/ . If you are using e-mail, be sure to include the following information with your comments:

- Document or topic name
- URL or page number
- Software release version (if applicable)

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/
- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/

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

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

Opening a Case with JTAC

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

- Use the Case Management tool in the CSC at http://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 http://www.juniper.net/support/requesting-support.html.

PART 1

Overview

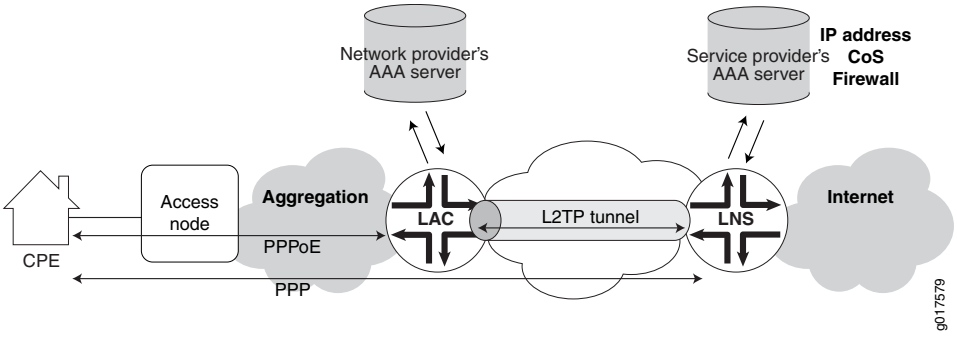
CHAPTER 1

L2TP in Subscriber Access Networks

L2TP for Subscriber Access Overview

The Layer 2 Tunneling Protocol (L2TP) is a client-server protocol that allows the Point-to-Point Protocol (PPP) to be tunneled across a network. L2TP encapsulates Layer 2 packets, such as PPP, for transmission across a network. An L2TP access concentrator (LAC), configured on an access device, receives packets from a remote client and forwards them to an L2TP network server (LNS) on a remote network. The LNS functions as the logical termination point of the PPP session tunneled by the LAC from the remote client. Figure 1 on page 3 shows a simple L2TP topology.

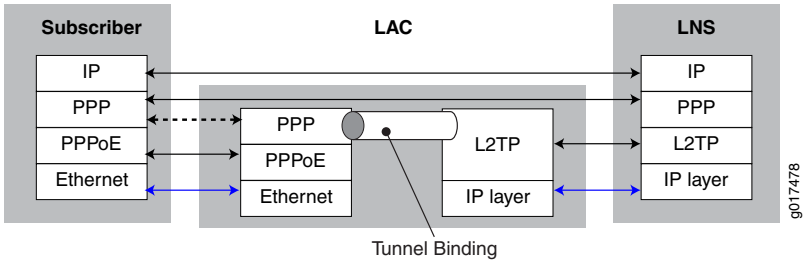
Figure 1: Typical L2TP Topology



L2TP separates the termination of access technologies, such as cable or xDSL, from the termination of PPP and subsequent access to a network. This separation enables public ISPs to outsource their access technologies to competitive local exchange carriers (CLECs). L2TP provides ISPs the capability to supply VPN service; private enterprises can reduce or avoid investment in access technologies for remote workers.

You can configure your router to act as the LAC in PPP pass-through mode in which the LAC receives packets from a remote client and then forwards them at Layer 2 directly to the LNS. The PPP session is terminated on the LNS. This LAC implementation supports only Point-to-Point Protocol over Ethernet (PPPoE) subscribers over dynamic or static logical interfaces. Figure 2 on page 4 shows the protocol layer stacking for an L2TP pass-through connection.

Figure 2: Protocol Stacking for L2TP Subscribers in Pass-Through Mode



NOTE: On MX Series routers, the LAC and LNS functions are supported only on MPCs; they are not supported on any services PIC or MS-DPC. For details about MPC support for L2TP, see the *MX Series Interface Module Reference*

Certain M Series routers support LNS functions on services PICs. For more information about the L2TP implementation on M Series routers, see the *Junos OS Services Interfaces Library for Routing Devices*.

The LAC dynamically creates tunnels based on AAA authentication parameters and transmits L2TP packets to the LNS by means of the IP/User Datagram Protocol (UDP). Traffic travels in an L2TP *session*; a tunnel is an aggregation of one or more sessions. You can also provision a domain map that is used by AAA to determine whether to tunnel or terminate the PPPoE subscriber on the LAC. A one-to-one mapping exists between each PPP subscriber tunneled to the LNS and an L2TP session.

When the LNS is an MX Series router, a LAC-facing peer interface on an MPC provides an IP address for the exchange of IP packets between the tunnel endpoints; the Routing Engine maintains the L2TP tunnels. The Packet Forwarding Engine hosts one or more inline services (**si**) interfaces. These interfaces function like a virtual physical interface and *anchor* the L2TP sessions on the LNS. The **si** interface enables L2TP services without requiring a special services PIC. Finally, another interface is used to transmit the subscriber data to and from the Internet.

The characteristics of the tunnel can originate either from a tunnel profile that you configure or from RADIUS tunnel attributes and vendor-specific attributes (VSAs) from the AAA server accessible at the LAC. You can include a tunnel profile in a domain map, which applies the tunnel profile before RADIUS authentication takes place. You can use RADIUS standard attributes and VSAs to override any or all characteristics configured by the tunnel profile in a domain map. Alternatively, RADIUS can itself apply a tunnel profile when the RADIUS Tunnel-Group VSA [26-64] is specified in the RADIUS login.

The Virtual-Router VSA [26-1] in the subscriber profile on the service provider AAA server (accessible from the LNS) determines the routing instance in which the L2TP session is brought up on the LNS. When this VSA is not present, the subscriber session comes up in the same routing instance as the tunnel, because the AAA server can be accessed only from the routing instance in which the tunnel terminates on the LNS.

This behavior is different than for DHCP and non-tunneled PPPoE subscribers, which come up in the default routing instance in the absence of the Virtual-Router VSA. For L2TP subscribers, you must include this VSA in the subscriber profile when you want the subscriber session to come up in a different routing instance than the tunnel routing instance.

The LAC supports RADIUS-initiated mirroring, which creates secure policies based on certain RADIUS VSAs, and uses RADIUS attributes to identify a subscriber whose traffic is to be mirrored. (This feature is not supported for an LNS configured on an MX Series router.)

The LAC supports unified ISSU. When an upgrade is initiated, the LAC completes any L2TP negotiations that are in progress but rejects any new negotiations until the upgrade has completed. No new tunnels or sessions are established during the upgrade. Subscriber logouts are recorded during the upgrade and are completed after the upgrade has completed. The LNS does not support unified ISSU. When LNS destinations exist, the LNS gracefully rejects the upgrade and the unified ISSU does not proceed.

Related Documentation

- *RADIUS IETF Attributes Supported by the AAA Service Framework*
- *Juniper Networks VSAs Supported by the AAA Service Framework*
- Configuring a Tunnel Profile for Subscriber Access on page 31
- *Domain Mapping Overview*
- Subscriber Secure Policy and L2TP LAC Subscribers on page 17
- *Unified ISSU Concepts*

L2TP Terminology

Table 3 on page 5 describes the basic terms for L2TP.

Table 3: L2TP Terms

Term	Description
AVP	Attribute value pair (AVP)—Combination of a unique attribute—represented by an integer—and a value containing the actual value identified by the attribute.
Call	A connection (or attempted connection) between a remote system and the LAC.
LAC	L2TP access concentrator (LAC)—A node that acts as one side of an L2TP tunnel endpoint and is a peer to the LNS. The LAC sits between an LNS and a remote system and forwards packets to and from each.

Table 3: L2TP Terms *(continued)*

Term	Description
LNS	L2TP network server (LNS)—A node that acts as one side of an L2TP tunnel endpoint and is a peer to the LAC. The LNS is the logical termination point of a PPP connection that is being tunneled from the remote system by the LAC.
Peer	In the L2TP context, either the LAC or LNS. The LAC's peer is an LNS, and vice versa.
Proxy authentication	PPP pre-authentication performed by the LAC on behalf of the LNS. The proxy data is sent by the LAC to the LNS containing attributes such as authentication type, authentication name, and authentication challenge. The LNS responds with the authentication results.
Proxy LCP	Link Control Protocol (LCP) negotiation that is performed by the LAC on behalf of the LNS. The proxy is sent by the LAC to the LNS containing attributes such as the last configuration attributes sent and received from the client.
Remote system	An end system or router attached to a remote access network, which is either the initiator or recipient of a call.
Session	A logical connection created between the LAC and the LNS when an end-to-end PPP connection is established between a remote system and the LNS. NOTE: There is a one-to-one relationship between established L2TP sessions and their associated PPP connections.
Tunnel	A connection between the LAC-LNS pair consisting of a control connection and 0 or more L2TP sessions.

Related Documentation

- L2TP for Subscriber Access Overview on page 3

L2TP Implementation

L2TP is implemented on four levels:

- Source—The local router acting as the LAC.
- Destination—The remote router acting as the LNS.
- Tunnel—A direct path between the LAC and the LNS.
- Session—A PPP connection in a tunnel.

When the router has established destinations, tunnels, and sessions, you can control the L2TP traffic. Making a change to a destination affects all tunnels and sessions to that destination; making a change to a tunnel affects all sessions in that tunnel. For example, closing a destination closes all tunnels and sessions to that destination.

Sequence of Events on the LAC

The router acting as the LAC creates destinations, tunnels, and sessions dynamically, as follows:

1. The client initiates a PPP connection with the router.
2. The router and the client exchange Link Control Protocol (LCP) packets. The LAC negotiates on behalf of the LNS; this is known as *proxy LCP*.
3. The LAC authenticates the client on behalf of the LNS; this is known as *proxy authentication*. By using either a local database related to the domain name or RADIUS authentication, the router determines either to terminate or to tunnel the PPP connection.
4. If the router discovers that it should tunnel the session, it does the following:
   a. Sets up a new destination or selects an existing destination.
   b. Sets up a new tunnel or selects an existing tunnel.

      When a shared secret is configured in either the tunnel profile or the RADIUS attribute Tunnel-Password [69]—depending on which method is used to configure the tunnel—the secret is used to authenticate the tunnel during the establishment phase. The LAC includes the Challenge AVP in the SCCRQ message sent to the LNS. The LNS returns the Challenge Response AVP in the SCCRP message. If the response from the LNS does not match the value expected by the LAC, then tunnel authentication fails and the tunnel is not established.

   c. Opens a new session.
5. The router forwards the results of the LCP negotiations and authentication to the LNS.

A PPP connection now exists between the client and the LNS.

NOTE: **The router discards received packets if the size of the variable-length, optional offset pad field in the L2TP header is too large. The router always supports packets that have an offset pad field of up to 16 bytes, and may support larger offset pad fields, depending on other information in the header. This restriction is a possible, although unlikely, cause of excessive discarding of L2TP packets.**

Sequence of Events on the LNS

A router acting as an LNS might be set up as follows:

1. The LAC initiates a tunnel with the router acting as the LNS.
2. The LNS verifies that a tunnel with this LAC is valid: the destination is configured, the hostname and the tunnel password are correct.
3. The LNS completes the tunnel setup with the LAC.

4. The LAC sets up a session and initiates a session request to the LNS.
5. The LNS uses a static interface or creates a dynamic interface to anchor the PPP session.
6. If they are enabled and present, the LNS accepts the proxy LCP and the proxy authentication data and passes them to PPP.
7. PPP processes the proxy LCP, if it is present, and, if the proxy LCP is acceptable, places LCP on the LNS in opened state without renegotiation of LCP.
8. PPP processes the proxy authentication data, if it is present, and passes the data to AAA for verification. (If the data is not present, PPP requests the data from the peer.)

   NOTE: When the proxy LCP is not present or not acceptable, the LNS negotiates LCP with the peer. When LCP renegotiation is enabled on the LNS, the LNS ignores any pre-negotiated LCP parameters and renegotiates both the LCP parameters and PPP authentication with the PPP client.

9. The LNS passes the authentication results to the peer.

Related Documentation

- L2TP for Subscriber Access Overview on page 3

L2TP and Graceful Routing Engine Switchover

Graceful Routing Engine switchover (GRES) is supported on MX Series routers acting as either the L2TP LAC or LNS. In the event that L2TP (the l2tp-universal-edge process) restarts or that the router fails over from the active routing engine (RE) to the standby RE, L2TP graceful Routing Engine switchover ensures that the following occurs:

- The LAC and the LNS recover destinations, tunnels, and sessions that were already established at the time of the failure or restart.
- The LAC and the LNS respond to tunnel keepalive requests received during the switchover for established tunnels, but do not generate any keepalives until the switchover is complete.
- The LAC and the LNS delete all the tunnels and sessions that are not in the Established state.
- The LAC and the LNS reject requests to create new tunnels and sessions.
- The LAC and the LNS send another disconnect notification to the peer for sessions and tunnels that are already in the Disconnecting state at the time of the failure or restart. For sessions and tunnels that were coming up at that time, the LAC and LNS send a disconnect notification to the peer.
- The LAC and the LNS restart timers for the full timeout period for recovered L2TP destinations, tunnels, and sessions.

NOTE: Graceful Routing Engine switchover is supported only by L2TP LAC and LNS on MX Series routers. It is not supported by L2TP LNS on M Series routers.

Related Documentation

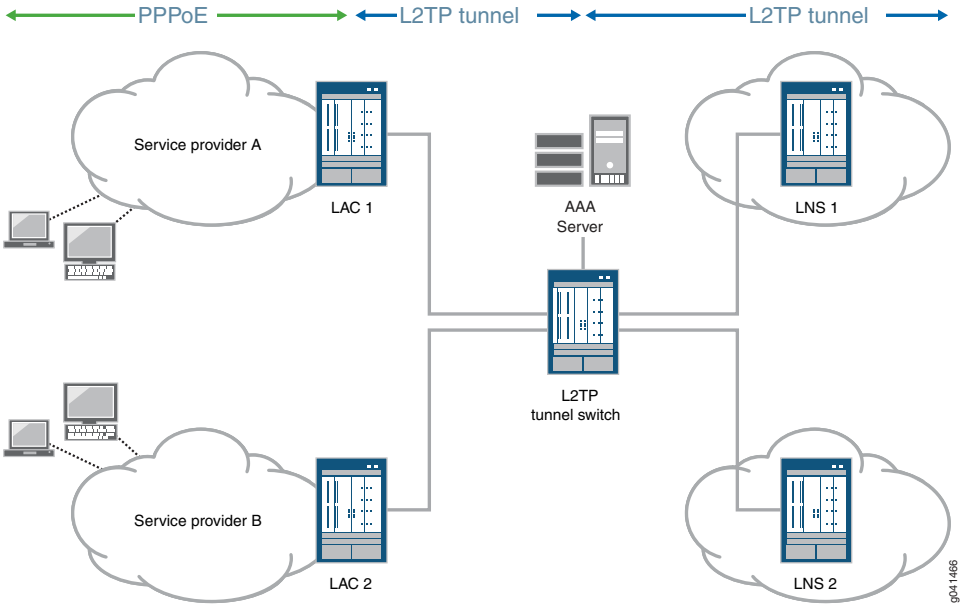
- L2TP Failover and Peer Resynchronization on page 21
- L2TP for Subscriber Access Overview on page 3

L2TP Tunnel Switching Overview

L2TP tunnel switching, also known as L2TP multihop, simplifies the deployment of an L2TP network across multiple domains. A router that lies between a LAC and an LNS is configured as an *L2TP tunnel switch* (LTS)—sometimes referred to simply as a *tunnel switch* or a *tunnel switching aggregator* (TSA)—as shown in Figure 3 on page 9. The LTS is configured as both an LNS and a LAC. When a remote LAC sends encapsulated PPP packets to the LNS configured on the LTS, the LTS can forward or redirect the packets through a different tunnel to a different LNS beyond the LTS. The logical termination point of the original L2TP session is switched to a different endpoint.

For example, in the network shown in Figure 3 on page 9, packets from the subscriber provisioned by service provider A are initially targeted at the LNS configured on the LTS. The LTS might redirect those packets to LNS1.

Figure 3: L2TP Tunnel Switching Network Topology



L2TP tunnel switching simplifies network configuration when the administrative domain of a LAC is different from that of the desired LNS. For example:

- The LTS acts as the LNS for multiple LACs. The individual LACs do not have to have the administrative control or capability required to identify the most appropriate LNS on which to terminate their sessions. The LTS performs that function is centralized in the LTS.
- The LTS acts as the LAC for multiple LNSs. When a new remote LAC is added to an ISP's network, the ISP does not have to reconfigure its LNS routers to accommodate the new LAC, because they connect to the LAC on the LTS.

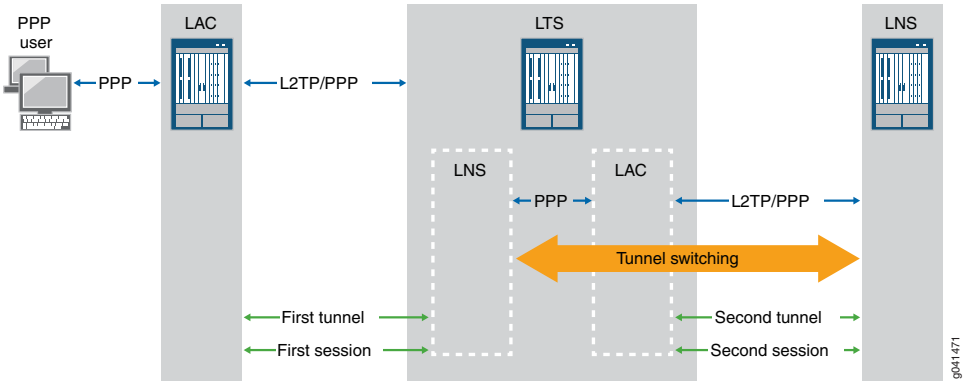
In a Layer 2 wholesale network, the wholesaler can use L2TP tunnel switching to create a flatter network configuration that is easier to manage. The wholesaler bundles Layer 2 sessions from a LAC that are destined for different ISPs—and therefore different LNSs—onto a single L2TP tunnel. This configuration enables a common L2TP control connection to be used for the LAC.

Figure 4 on page 10 shows an example of L2TP tunnel switching for incoming calls with the following sequence of events:

1. The subscriber opens a PPP session to the LAC.
2. The LAC creates the first L2TP tunnel to the LNS configured on the LTS and the first L2TP session to carry the encapsulated PPP packets.
3. During authentication of this first session, the LTS determines whether to retunnel the session to an LNS beyond the LTS, based on the presence or absence of a tunnel switch profile configured on the LTS.

   The tunnel switch profile can be a default profile or it can be applied by the RADIUS server, a domain map configuration, or a tunnel group configuration.
4. If a tunnel switch profile is configured, the LTS creates a second tunnel (if it does not already exist) to the LNS beyond the LTS as specified in the profile and creates the second session in this tunnel.

Figure 4: L2TP Tunnel Switching for Incoming Calls



Application of Tunnel Switch Profiles

You can configure a tunnel switch profile to be applied in several ways:

- As a default profile applied globally to traffic received from all LACs
- With a domain map applied to a subscriber session
- With a tunnel group applied to a subscriber session
- In your RADIUS server configuration

You can configure more than one of these methods of application. When multiple tunnel switch profiles are present, the following order of precedence establishes which profile the LTS uses; the order is from highest (RADIUS) to lowest (default profile):

RADIUS > domain map > tunnel group > default tunnel switch profile

The tunnel switch profile must also reference a tunnel profile. This tunnel profile specifies the characteristics of the second tunnel, to which the subscriber packets are switched.

Termination of Tunnel-Switched Sessions on the LTS

Tunnel switched sessions are terminated on the LTS when any of the following happens:

- Either the LAC or LNS interface on the LTS receives a Call-Disconnect-Notify (CDN) message (Table 4 on page 11).

Table 4: Cause of CDN Message

CDN Message Is Received On	When
LAC interface	Either of the following occurs: • The second session cannot be established. • The remote LNS terminates the second session.
LNS interface	Either of the following occurs: • The PPPoE client initiates a logout. • The originating LAC initiates termination of the tunnel

Both the first and second sessions are terminated because the LTS relays the CDN to the interface that did not receive the CDN. The disconnect cause is the same for both sessions.

- Either the LAC or LNS interface on the LTS receives a Stop-Control-Connection-Notification (StopCCN) message (Table 5 on page 12).

Table 5: Cause of StopCCN Message

StopCCN Message Is Received On	When
LAC interface	Either of the following occurs: • The second session cannot be established. • The remote LNS terminates the second tunnel.
LNS interface	The originating LAC initiates termination of the tunnel.

The LTS does not relay the StopCCN message, because a given tunnel can contain both switched and nonswitched sessions. Another reason in a wholesale scenario is that the tunnel ending on the LNS on the LTS can contain sessions from LACs from different providers. Instead, the LTS sends a CDN message to the interface that did not receive the StopCCN to terminate the tunnel-switched session. This CDN relays the error code carried in the StopCCN.

- An administrative **clear** command is issued on the LTS.

Table 6 on page 12 lists the actions taken when an administrative **clear** command is issued on the LTS.

Table 6: LAC, LNS, and LTS Actions Taken for Switched Tunnels in Response to Administrative clear Commands

Command	LAC or LNS Action	LTS Action
clear services l2tp destination	Clear the destination and all associated tunnels and sessions.	For each switched session in a tunnel to the destination, clear the corresponding mapped switched session by sending it a CDN message with the cause set to Administrative.
clear services l2tp destination all	Clear all destinations and all associated tunnels and sessions.	None.
clear services l2tp session	Clear the session.	Clear the corresponding mapped switched session for this session by sending it a CDN message with the cause set to Administrative.
clear services l2tp session all	Clear all sessions.	None.
clear services l2tp tunnel	Clear the tunnel and all its sessions.	For each switched session in the tunnel, clear the corresponding mapped switched session by sending it a CDN message with the cause set to Administrative.
clear services l2tp tunnel all	Clear all tunnels.	None.

Related Documentation

- Configuring L2TP Tunnel Switching on page 58
- Tunnel Switching Actions for L2TP AVPs at the Switching Boundary on page 13
- L2TP for Subscriber Access Overview on page 3

Tunnel Switching Actions for L2TP AVPs at the Switching Boundary

When L2TP tunnel switching redirects packets to a different LNS, it performs one of the following default actions at the switching boundary for each AVP carried in the L2TP messages:

- **regenerate**—L2TP regenerates the AVP based on the local policy at the LTS and sent in the switched packet. The local policy may or may not use the value for the AVP received during negotiation for the first session.
- **relay**—L2TP transparently forwards the AVP in the switched packet with no alteration.

Table 7 on page 13 lists the default action for each AVP. Mandatory AVPs are always included in the L2TP messages from the LAC; optional AVPs might be included in the messages.

You can optionally override the default action taken at the switching boundary for the Bearer Type AVP (18), Calling Number AVP (22), or Cisco NAS Port Info AVP (100). You can configure any of these three AVPs to be dropped from the switched packets or regenerated, or you can restore the default relay action.

NOTE: L2TP AVPs that have their attribute values hidden are always regenerated at the switching boundary. The value is decoded and sent in clear text when the packet is forwarded to the remote LNS.

Table 7: Default Action for Handling L2TP AVPs at the Switching Boundary

AVP Name	AVP Type	L2TP Message Type	Default Action
Assigned Session Id	Mandatory	ICRQ, CDN	Regenerate
Assigned Tunnel Id	Mandatory	SCCRQ, CDN	Regenerate
Bearer Capabilities	Optional	SCCRQ	Regenerate
Bearer Type	Optional	ICRQ	Relay
Call Serial Number	Mandatory	ICRQ	Relay
Called Number	Optional	ICRQ	Relay
Calling Number	Optional	ICRQ	Relay
Challenge	Optional	SCCRQ	Regenerate
Challenge Response	Optional	SCCCN	Regenerate
Cisco NAS Port	Optional	ICRQ	Relay

Table 7: Default Action for Handling L2TP AVPs at the Switching Boundary *(continued)*

AVP Name	AVP Type	L2TP Message Type	Default Action
Failover Capability	Optional	SCCRQ	Regenerate
Firmware Revision	Optional	SCCRQ	Regenerate
Framing Capabilities	Mandatory	SCCRQ	Regenerate
Framing Type	Mandatory	ICCN	Relay
Host Name	Mandatory	SCCRQ	Regenerate
Message Type	Mandatory	All	Regenerate
Physical Channel Id	Optional	ICRQ	Regenerate
Private Group Id	Optional	ICCN	Relay
Protocol Version	Mandatory	SCCRQ	Regenerate
Proxy Authentication	Optional	ICCN	Relay if acceptable; otherwise regenerate
Proxy LCP	Optional	ICCN	Relay if acceptable; otherwise regenerate
Receive Window Size	Optional	SCCRQ	Regenerate
Rx Connect Speed	Optional	ICCN	Relay
Sequencing Required	Optional	ICCN	Regenerate
Sub-Address	Optional	ICRQ	Relay
Tie Breaker	Optional	SCCRQ	Regenerate
Tunnel Recovery	Optional	SCCRQ	Regenerate
Tx Connect Speed	Mandatory	ICCN	Relay
Vendor Name	Optional	SCCRQ	Regenerate

Related Documentation

- L2TP Tunnel Switching Overview on page 9
- Configuring L2TP Tunnel Switching on page 58

LAC Interoperation with Third-Party LNS Devices

In some network environments, the LAC may need to interoperate with an LNS configured on a device from another vendor that does not run Junos OS. Interoperation with Cisco Systems devices requires the LAC to communicate a NAS port type, but the LAC does not provide this information by default. You can enable interoperation with Cisco devices by configuring the LAC to send information to the LNS about the NAS port and port type.

You can use either of the following ways to specify the LAC's NAS port method, which controls whether the LAC sends the NAS port information to the LNS:

- Include the **nas-port-method** statement in the tunnel profile configured on the LAC at the **[edit access tunnel-profile]** hierarchy level. Specify **cisco-avp** as the method.
- Include the Tunnel-Nas-Port-Method VSA [26–30] in your RADIUS server configuration with the value set to 1 to indicate Cisco CLID.

The value configured in RADIUS has precedence over the value configured in the CLI when both are configured.

Both methods cause the LAC to include the Cisco Nas Port Info AVP (100) when it sends an incoming call request (ICRQ) to the LNS. The AVP includes information that identifies the NAS port and indicates whether the port type is ATM or Ethernet.

When the LNS is a Cisco device, it uses the AVP to facilitate interoperation. When the LNS is an MX Series router, the LNS simply ignores this AVP, unless the LNS is configured for L2TP tunnel switching. In that case, the LNS preserves the value of the AVP and passes it along when it switches tunnels for the LAC.

Related Documentation

- L2TP for Subscriber Access Overview on page 3
- *Juniper Networks VSAs Supported by the AAA Service Framework*
- Configuring an L2TP LAC on page 29

CHAPTER 2

L2TP LAC

Subscriber Secure Policy and L2TP LAC Subscribers

RADIUS-initiated per-subscriber traffic mirroring can be applied to subscribers whose traffic is tunneled with L2TP. Both subscriber ingress traffic (from the subscriber into the tunnel) and subscriber egress traffic (from the tunnel to the subscriber) are mirrored at the subscriber-facing ingress interface on the LAC. The ingress traffic is mirrored after PPPoE decapsulation and before L2TP encapsulation. The egress traffic is mirrored after L2TP decapsulation. The mirrored packet includes the complete HDLC frame sent to the LNS rather than only the IP datagram.

Related Documentation

- *Subscriber Secure Policy Overview*
- *Configuring RADIUS-Initiated Subscriber Secure Policy Mirroring Overview*
- *RADIUS Attributes Used for Subscriber Secure Policy*

LAC Tunnel Selection Overview

L2TP enables you to specify:

- Up to 31 destinations for a domain.
- Up to eight levels of preference. Preference indicates the order in which the router attempts to connect to the destinations specified for a domain. Zero (0) is the highest level of preference.
- Up to 31 destinations for a single preference level.

When the LAC determines that a PPP session should be tunneled, it selects a tunnel from a set of tunnels associated with either the PPP user or the PPP user's domain. The router provides the following methods for selecting tunnels:

- Tunnel selection failover between preference levels (the default behavior)
- Tunnel selection failover within a preference level
- Maximum sessions per tunnel
- Weighted load balancing

Tunnel Selection Failover Between Preference Levels

When a user tries to log in to a domain, in the default method, the router attempts to connect to a destination in that domain by means of the associated tunnel with the highest preference level. If more than one destination is considered reachable by a tunnel in the preference level, the router randomly selects a destination and attempts to contact it through its associated tunnel at that level. If the router is unsuccessful, it marks the destination as unreachable and does not try to connect to that destination for a period of time called the *destination lockout timeout*. The default timeout is 5 minutes. The router then moves to the next lower preference level and repeats the process.

For example, suppose that there are three destinations for a domain and a tunnel has been defined for each destination: A, B, and C. All destinations are considered reachable, and the preference levels for the tunnels are assigned as follows:

- A at preference 0
- B at preference 1
- C at preference 2

When a PPP user tries to connect to the domain, the router acts as follows:

1. The router initially attempts to reach a destination by a tunnel at preference level 0, destination A in this example.
2. If this connection attempt fails, the router excludes destination A from consideration for the length of the destination lockout timeout.
3. The router goes to the next level, preference level 1, to reach a destination for the domain. At preference level 1, it attempts to connect to destination B.
4. If the connection attempt to destination B fails, the router excludes destination B from consideration for the length of the destination lockout timeout.
5. The router goes to the next level, preference level 2, and attempts to connect to destination C, the only destination in the domain that is still available.
6. If that attempt also fails, the router excludes destination C from consideration for the length of the destination lockout timeout.
7. At this point, the router has attempted to connect to every destination through every tunnel available for the domain and cycles back to preference level 0. When the

destination lockout timeout for destination A expires, the router can attempt again to connect to destination A, and so on.

Although the destination lockout timeout typically prevents an unreachable destination from being tried until the period expires, the timeout is ignored in some circumstances. For example, If all destinations at a preference level are marked as unreachable when a user tries to log in to a domain, the router chooses and attempts to connect to the destination that failed first and therefore has the shortest time remaining until the destination lockout timeout expires. The key is to understand that the router always chooses a single destination at each level of preference, even if all destinations have recently failed.

If more than one destination for the domain is present at a preference level, the router randomly selects among them. If the router fails to connect to a destination at all preference levels with destinations for the domain, it cycles back to the highest level that still has a destination not excluded by an attempt.

For example, suppose that again there are three destinations for a domain and a tunnel has been defined for each destination: A, B, and C. All destinations are considered reachable, but the tunnels are distributed among the preference levels as follows:

- A and B at preference 0
- C at preference 1

In this example, when a PPP user tries to connect to the domain, the router randomly selects between A and B at preference level 0 and chooses destination B.

1. If the connection attempt to destination B fails, the router excludes destination B from consideration for the length of the destination lockout timeout.
2. The router goes to the next level, preference level 1, to reach a destination for the domain. At preference level 1, it attempts to connect to destination C.
3. If the connection attempt to destination C also fails, the router excludes destination C from consideration for the length of the destination lockout timeout.
4. The router cycles back to preference level 0.
   - If destination B is still locked out, the router attempts to connect to destination A.
   - If the lockout for destination B has expired, then the selection process starts over and the router again randomly selects between A and B to attempt a connection.

Tunnel Selection Failover Within a Preference Level

When tunnel selection failover within a preference level is configured, if the router tries to connect to a destination and is unsuccessful, it selects a new destination at the same preference level. If all destinations at a preference level are marked as unreachable, the router does not attempt to connect to a destination at that level. It drops to the next lower preference level to select a destination.

If all destinations at all preference levels are marked as unreachable, the router chooses the destination that failed first and tries to make a connection. If the connection fails, the router rejects the PPP user session without attempting to contact the remote router.

For example, suppose that there are four destinations for a domain and a tunnel has been defined for each destination: A, B, C, and D. All destinations are considered reachable, and the preference levels for the tunnels are assigned as follows:

- A and B at preference 0
- C and D at preference 1

In this example, when a PPP user tries to connect to the domain, the router randomly selects between A and B at preference level 0 and chooses destination B.

1. If the connection attempt to destination B fails, the router excludes tunnel B from consideration for the length of the destination lockout timeout.
2. The router attempts to connect to destination A at preference level 0.
3. If the connection attempt to destination A fails, the router excludes destination A from consideration for the length of the destination lockout timeout.
4. The router goes to the next level, preference level 1, to reach a destination for the domain. At preference level 1, the router randomly selects tunnel C.
5. If the connection attempt to destination C fails, the router excludes destination C from consideration for the length of the destination lockout timeout.
6. The router attempts to connect to destination D at preference level 1.
7. If the connection attempt to destination D fails, the router attempts again to connect to destination B again, its original selection.
8. If this second connection attempt to destination B fails, the user session is rejected.

Tunnel Selection and Maximum Sessions per Tunnel

When the maximum number of sessions allowed per tunnel is configured, the router takes that setting into consideration during the tunnel selection process. The maximum number of sessions per tunnel can be configured through a RADIUS Tunnel-Max-Sessions VSA [26-64] or by including the **max-sessions** statement in a tunnel profile.

If a randomly selected tunnel has a current session count equal to its maximum session count, the router does not attempt to connect to a destination with that tunnel. Instead, it selects an alternate tunnel from the set of reachable tunnels at the same preference level. If no additional reachable tunnels exist at the current preference level, the router drops to the next lower preference level to make the selection. This process is consistent, regardless of which failover scheme is currently running on the router.

If the maximum number of sessions is not configured for a tunnel, then that tunnel has no upper limit on the number of sessions it can support. By default, the maximum sessions value is 0 (zero), which allows unlimited sessions in the tunnel.

Tunnel Selection with Weighted Load Balancing

The maximum sessions value for a tunnel is used for weighted load balancing to select among multiple tunnels with the same preference level.

The weight of a tunnel is determined by the tunnel's maximum session limit and the maximum session limits of the other tunnels at the same preference level. The tunnel with the largest maximum session value has the largest weight. The tunnel with the next largest maximum session value has the next largest weight, and so on. The tunnel with the smallest maximum session value has the smallest weight.

Related Documentation

- Configuring the L2TP LAC Tunnel Selection Parameters on page 34
- Configuring the L2TP Destination Lockout Timeout on page 57

L2TP Failover and Peer Resynchronization

L2TP failover enables a failed L2TP endpoint to resynchronize with its nonfailed peer during recovery and restart of the L2TP protocol on the failed endpoint. L2TP failover is enabled by default.

The failover and L2TP peer resynchronization process does all of the following:

- Prevents the nonfailed endpoint from prematurely terminating a tunnel while the failed endpoint is recovering.
- Reestablishes the sequence numbers required for the operation of the L2TP control protocol.
- Resolves inconsistencies in the tunnel and session databases of the failed endpoint and the nonfailed endpoint.

The router supports both the L2TP failover protocol method (described in *RFC 4951, Fail Over Extensions for Layer 2 Tunneling Protocol (L2TP) "failover"*) and the L2TP silent failover method. The differences between these two methods are as follows:

- With the L2TP failover protocol method, both endpoints must support the method or recovery always fails. The L2TP failover protocol method also requires a nonfailed endpoint to wait an additional recovery time period while the failed endpoint is recovering to prevent the nonfailed endpoint from prematurely disconnecting the tunnel. The additional recovery period delays the detection of tunnel keepalive failures.
- Silent failover operates entirely within the failed endpoint and does not require nonfailed endpoint support—this improves interoperability between peers. Silent failover does not require additional recovery time by the nonfailed endpoint, which also eliminates the potential for degraded responsiveness to the loss of tunnel connectivity.

The default resynchronization method in Junos OS is *failover-protocol-fall-back-to-silent-failover*. The recovery method used depends on the results of the failover capability negotiation that takes place between L2TP peers when they establish a tunnel, which works as follows:

- L2TP on the LAC by default attempts to negotiate the L2TP failover protocol first. When L2TP determines that the remote peer supports the L2TP failover protocol, then the L2TP failover protocol method is used.
- When L2TP determines that the remote peer does not support the L2TP failover protocol, then the L2TP silent failover method is used. Falling back on this secondary method prevents the failover from forcing a disconnection of the tunnel to the peer and all its sessions.

You can change the default behavior by including the disable-failover-protocol statement at the **[edit services l2tp]** hierarchy level. This statement forces the LAC to operate only in silent failover mode. This configuration can be useful when routers that act as the LNS either are configured for silent failover or incorrectly negotiate use of the failover protocol even though they do not support it. However, when you issue this statement and the LNS supports only failover protocol, then the LAC cannot negotiate failover protocol, and recovery (failover protocol recovery initiated by the LNS) always fails.

Related Documentation

- L2TP and Graceful Routing Engine Switchover on page 8
- L2TP for Subscriber Access Overview on page 3

IP Packet Fragment Reassembly for L2TP Overview

You can configure the service interfaces on the MX Series routers with modular port concentrators (MPCs) to support reassemble fragmented IP packets for an L2TP connection. When packets are transmitted over an L2TP connection, the packets may be fragmented during transmission and need to be reassembled before they are processed further. Efficient reassembly is important for network throughput, scalability, and graceful response to congestion.

Fragmentation of IP packets for transmission and the need to reassemble the IP packets at a destination is a feature of how Layer 2 (the frame layer) and Layer 3 (the packet layer) operate. The maximum size of a frame, set by the Maximum Transmission Unit (MTU) value, and the maximum size of a packet are determined independently. Typically the packet size can far exceed the MTU size defined for the outgoing connection. If the packet size (data plus IP and other headers) exceeds the configured frame size (usually set by the transport medium limits), the packet must be fragmented and split across multiple frames for transmission. Frames are always processed immediately, when they arrive (if error-free), but packet fragments cannot be processed until the whole packet has been reassembled. Each packet fragment inside a frame series, except the last packet fragment, has the more fragments (MF) IP header bit set, indicating that this packet is part of a whole. The last packet fragment inside a frame does not have this MF bit set and therefore ends the fragment sequence. After all of the fragments of a packet have arrived, the entire packet can be reassembled.

In an L2TP connection, packets are transmitted between the L2TP Access Concentrator (LAC) and the L2TP Network Server (LNS). For an IP packet being transmitted over an L2TP connection, the packet is fragmented at the LAC, at an LNS, or at any intermediate router. IP reassembly parameters configured on the service interfaces of the LAC and the LNS determine how the fragments are reassembled at the service interfaces to ensure efficient reassembly over an L2TP connection.

Related Documentation

- Configuring IP Inline Reassembly for L2TP on page 51
- *Protocols and Applications Supported by MX240, MX480, MX960, and MX2020 Enhanced MPCs (MPCEs)*
- ip-reassembly on page 105

Transmission of Tx Connect-Speed and Rx Connect-Speed AVPs from LAC to LNS

An L2TP access concentrator (LAC) uses Incoming-Call-Connected (ICCN) messages to send the attribute-value pair (AVP) 24 (which represents the transmit connect speed) and the AVP 38 (which represents the receive connect speed) to the L2TP network server (LNS).

The value of speed in AVP 24 and AVP 38 is typically not greater than the value that is enforced by CoS on the LAC side of the network. Any difference between the speed reported in these AVPs and that enforced by CoS can occur because of differences between the CoS configuration (of the source that is used to enforce a downstream speed) and the transmit connect speed method used to establish these AVPs.

When you include the **tx-connect-speed-method** statement at the **[edit services l2tp]** hierarchy level, the transmit connect speed method selected for the downstream speed, AVP 24, also applies to the selection of the upstream speed , AVP 38. You can configure the transmit and receive connect speeds to be derived from Point-to-Point Protocol over Ethernet (PPPoE) intermediate agent tags that are sent from the digital subscriber line access multiplexer (DSLAM) to the LAC, the Access Node Control Protocol (ANCP) settings of the underlying interface, or the recommended (advisory) shaping rate. When the method you specify as ANCP, PPPoE intermediate agent tags (PPPoE IA tags), or advisory shaping rate does not support an upstream speed, the static or advisory speed is used.

A fallback method is adopted to derive the transmit and receive connect speed values when these values cannot be determined from any of the configured methods, such as from the ANCP settings, the PPPoE IA tags, or the advisory shaping rate, or if the speed value is determined to be 0 from any of the configured methods.

If you configure the ANCP method to calculate the connect speed, the following sequence of events takes place:

1. The upstream and downstream connect speed values are derived from ANCP.
2. If the values cannot be derived from ANCP, the PPPoE IA tags are used to determine the values. If the PPPoE IA tags are present for either or both transmit and receive connect speeds, these values are used.

3. If the values cannot be derived from the PPPoE IA tags, the recommended (advisory) shaping rate configured on the PPPoE logical interface is used. If the advisory shaping rate is present for either or both transmit and receive connect speeds, these values are used.
4. If the values cannot be derived from the advisory shaping rate, the configured or default port speed is used for transmit and receive connect speeds.

If you configure the PPPoE IA tags method to calculate the connect speed, the following sequence of events takes place:

1. The upstream and downstream connect speed values are derived from PPPoE IA tags.
2. If the values cannot be derived from the PPPoE IA tags, the recommended (advisory) shaping rate configured on the PPPoE logical interface is used. If the advisory shaping rate is present for either or both transmit and receive connect speeds, these values are used.
3. If the values cannot be derived from the advisory shaping rate, the configured or default port speed is used for transmit and receive connect speeds.

If you configure the static or advisory downstream shaping rate method to calculate the connect speed, the following sequence of events takes place:

1. The upstream and downstream connect speed values are derived from the advisory shaping rate.
2. If the values cannot be derived from the advisory shaping rate, the default port speed is used for transmit and receive connect speeds.

The transmit connect speed, AVP 24, is set in the ICCN messages on the basis of the method for determining the transmit connect speed configured using the **tx-connect-speed-method** statement at the **[edit services l2tp]** hierarchy level. You can configure the method for determining the transmit connect speed in the following order of precedence:

1. **ancp**—The speed is derived from the configured ANCP value for the underlying interface. You can change this speed after a subscriber has logged in, but those changes do not affect the actual speed used by the LNS.
2. **pppoe-ia-tags**—PPPoE IA tags sent from the DSLAM to the LAC. This speed value is transmitted when a subscriber logs in and it cannot be subsequently changed. This value is used when the **ancp** value is not available. This speed does not apply to the subscribers that are already logged in; it is effective only for subscribers that log in after this setting has been saved.
3. **static**—The speed is derived from the recommended (advisory) shaping rate configured on the PPPoE logical interface underlying the subscriber interface. If the advisory shaping rate is not configured on the underlying interface, then the actual port speed is used.

If you do not configure the transmit connect speed using the CLI interface, and if the advisory speed is also not available, then the actual port speed is used. For ge and xe

interfaces, the speed value is set to 10,000,000 and for ae interfaces, the speed value is set to 0 and sent in both AVP 24 and AVP 38.

Related Documentation

- Transmission of the Receive Connect Speed AVP When Transmit and Receive Connect Speeds are Equal on page 37
- Configuring an L2TP LAC on page 29

PART 2

Configuration

CHAPTER 3

Configuration Overview

Configuring an L2TP LAC

To configure an L2TP LAC:

1. Configure a tunnel profile to apply to subscribers.

   See "Configuring a Tunnel Profile for Subscriber Access" on page 31.

2. (Optional) Configure the method used for selecting among multiple tunnels.

   - See "Configuring the L2TP LAC Tunnel Selection Parameters" on page 34.
   - See "Configuring Weighted Load Balancing for LAC Tunnel Sessions" on page 35.
   - See "Configuring LAC Tunnel Selection Failover Within a Preference Level" on page 34.

3. (Optional) Configure the LAC to not send Calling Number AVP 22 to the LNS.

   See "Preventing the LAC from Sending Calling Number AVP 22 to the LNS" on page 35.

4. (Optional) Specify the method for setting the transmit and receive connect speeds.

   See "Configuring the Method to Set the LAC Connection Speeds to the LNS" on page 36.

5. (Optional) Disable negotiation of the L2TP failover protocol to force use of only the silent failover resynchronization mechanism.

   See "Preventing the LAC From Negotiating L2TP Failover Protocol" on page 37.

6. (Optional) Specify the format for the tunnel name.

   "Setting the Format for the Tunnel Name" on page 38.

7. (Optional) Specify how many times L2TP retransmits unacknowledged control messages.

   See "Configuring the Number of L2TP Control Message Retransmissions" on page 61.

8. (Optional) Specify how long a tunnel can remain idle before being torn down.

   See "Setting the L2TP Tunnel Idle Timeout" on page 62.

9. (Optional) Specify the L2TP receive window size for the L2TP tunnel. The receive window size specifies the number of packets a peer can send before waiting for an acknowledgment from the router.

   See "Setting the L2TP Receive Window Size" on page 63

10. (Optional) Specify how long the L2TP retains information about terminated dynamic tunnels, sessions, and destinations.

    See "Setting the L2TP Destruct Timeout" on page 63.

11. (Optional) Specify how the LAC handles IP address or UDP port change requests.

    See "Configuring the LAC to Ignore Address and Port Changes Requested by the LNS" on page 39

12. (Optional) Enable SNMP statistics counters.

    See "Enabling Tunnel and Global Counters for SNMP Statistics Collection" on page 64

13. (Optional) Configure trace options for troubleshooting the configuration.

    See "Tracing L2TP Operations for Subscriber Access" on page 261

CHAPTER 4

Configuration Tasks for L2TP LAC

Configuring a Tunnel Profile for Subscriber Access

The tunnel profile specifies a set of attributes to characterize the tunnel. The profile can be applied by a domain map or automatically when the tunnel is created.

NOTE: RADIUS attributes and VSAs can override the values you configured by a tunnel profile in a domain map. In the absence of a domain map, RADIUS can supply all the characteristics of a tunnel. The steps in the following procedure list the corresponding standard RADIUS attribute or VSA that you can configure on your RADIUS server to modify or configure the tunnel profile.

RADIUS-supplied attributes are associated with a tunnel by a tag carried in the attribute, which matches the tunnel identifier. A tag of 0 indicates the tag is not used. If L2TP receives a RADIUS attribute with a tag of 0, the attribute cannot be merged with the tunnel profile configuration corresponding to the subscriber domain because a tunnel profile cannot provide a tunnel tag (tunnel identifier) of 0. Only tags in the range of 1 through 31 are supported.

To configure a tunnel definition for a tunnel profile:

1. Specify the tunnel profile for which you are defining a tunnel. (Tunnel-Group [26-64])

   [edit access]
   user@host# set tunnel-profile *profile-name*

2. Specify an identifier (name) for the L2TP control connection for the tunnel.

   [edit access tunnel-profile *profile-name*]
   user@host# set tunnel *tunnel-id*

3. Configure the IP address of the local L2TP tunnel endpoint, the LAC. (Tunnel-Client-Endpoint [66])

   [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
   user@host# set source-gateway address *client-ip-address*

4. Configure the IP address of the remote L2TP tunnel endpoint, the LNS. (Tunnel-Server-Endpoint [67])

   [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
   user@host# set remote-gateway address *server-ip-address*

5. (Optional) Configure the preference level for the tunnel. (Tunnel-Preference [83])

   [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
   user@host# set preference *number*

6. (Optional) Configure the hostname of the local client (LAC). (Tunnel-Client-Auth-Id [90])

   [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
   user@host# set source-gateway gateway-name *client-name*

7. (Optional) Configure the hostname of the remote server (LNS). (Tunnel-Server-Auth-Id [91])

   [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
   user@host# set remote-gateway gateway-name *server-name*

8. (Optional) Specify the medium (network) type for the tunnel. (Tunnel-Medium-Type [65])

   [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
   user@host# set medium *type*

9. (Optional) Specify the protocol type for the tunnel. (Tunnel-Type [64])

   [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
   user@host# set type *tunnel-type*

10. (Optional) Configure the assignment ID for the tunnel. (Tunnel-Assignment-Id [82])

    [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
    user@host# set identification *name*

11. (Optional) Configure the maximum number of sessions allowed in the tunnel. (Tunnel-Max-Sessions [26-33])

    [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
    user@host# set max-sessions *number*

12. (Optional) Configure the password for remote server authentication. (Standard RADIUS attribute Tunnel-Password [69] or VSA Tunnel-Password [26-9])

    [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
    user@host# set secret ***password***

13. (Optional) Configure the logical system to use for the tunnel.

    If you configure a logical system, you must also configure a routing instance.

    [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
    user@host# set logical-system ***logical-system-name***

14. (Optional) Configure the routing instance to use for the tunnel. (Tunnel-Virtual-Router [26-8])

    If you configure a routing instance, configuring a logical system is optional.

    [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
    user@host# set routing-instance ***routing-instance-name***

15. (Optional) Enable the LAC to interoperate with Cisco LNS devices.

    [edit access tunnel-profile *profile-name* tunnel *tunnel-id*]
    user@host# set nas-port-method **cisco-avp**

The following example shows a complete configuration for a tunnel profile:

```
tunnel-profile marketing {
  tunnel 1 {
    preference 5;
    remote-gateway {
      address 172.16.98.4;
      gateway-name work;
    }
    source-gateway {
      address 192.168.4.10;
      gateway-name local;
    }
    secret mk5Sn$3k%V;
    logical-system bos-metro-5;
    routing-instance rox-12-32;
    medium ipv4;
    type l2tp;
    identification tunnel_to_work;
    max-sessions 32;
    nas-port-method cisco avp;
  }
}
```

Related Documentation

- Configuring an L2TP LAC on page 29
- *Domain Mapping Overview*
- LAC Interoperation with Third-Party LNS Devices on page 15

Configuring the L2TP LAC Tunnel Selection Parameters

When the LAC determines that a PPP session should be tunneled, it selects a tunnel from the set of tunnels associated with either the PPP user or the PPP user's domain. You can configure how a tunnel is selected and whether certain information is sent by the LAC to the LNS.

To configure tunnel selection parameters:

1. (Optional) Configure how a tunnel is selected when a connection attempt fails.

   See "Configuring LAC Tunnel Selection Failover Within a Preference Level" on page 34.

2. (Optional) Configure how sessions are load-balanced among tunnels.

   See "Configuring Weighted Load Balancing for LAC Tunnel Sessions" on page 35.

Related Documentation

- LAC Tunnel Selection Overview on page 17

Configuring LAC Tunnel Selection Failover Within a Preference Level

You can configure how LAC tunnel selection continues in the event of a failure to connect. By default, when the router is unable to connect to a destination at a given preference level, it attempts to connect at the next lower level. You can specify that the router instead attempt to connect to another destination at the same level as the failed attempt.

If all destinations at a preference level are marked as unreachable, the router does not attempt to connect to a destination at that level. It drops to the next lower preference level to select a destination.

If all destinations at all preference levels are marked as unreachable, the router chooses the destination that failed first and tries to make a connection. If the connection fails, the router rejects the PPP user session without attempting to contact the remote router.

For example, suppose there are four tunnels for a domain: A, B, C, and D. All tunnels are considered reachable, and the preference levels are assigned as follows:

- A and B at preference 0
- C and D at preference 1

When the router attempts to connect to the domain, suppose it randomly selects tunnel B from preference 0. If it fails to connect to tunnel B, the router excludes tunnel B for five minutes and attempts to connect to tunnel A. If this attempt also fails, the router drops to preference 1. Then suppose the router selects tunnel C. If it also fails to connect to tunnel C, the router excludes tunnel C for five minutes and attempts to connect to tunnel D.

You configure the preference level used for this tunnel selection method in the tunnel profile or the RADIUS Tunnel-Preference [83] attribute.

To enable tunnel selection failover within a preference level:

- Specify failover within preference.

```
[edit services l2tp]
user@host# set fail-over-within-preference
```

Related Documentation

- LAC Tunnel Selection Overview on page 17
- Configuring the L2TP LAC Tunnel Selection Parameters on page 34
- Configuring a Tunnel Profile for Subscriber Access on page 31
- *Configuring How RADIUS Attributes Are Used for Subscriber Access*

Configuring Weighted Load Balancing for LAC Tunnel Sessions

You can configure how L2TP LAC sessions are distributed across tunnels. You can specify that the router uses the maximum sessions per tunnel to choose among multiple tunnels that share the same preference level.

The weight of a tunnel is proportional to its maximum session limit and the maximum session limits of the other tunnels at the same preference level. The tunnel with the largest maximum session value has the highest weight. The tunnel with the next larger maximum session value has the next higher weight, and so on. The tunnel with the smallest maximum session value has the lowest weight.

When you configure weighted load balancing, the tunnel with the highest weight in the preference level is selected until the maximum number of sessions for the tunnel is reached. Then the router selects the tunnel with the next higher weight to establish connections until that tunnel's maximum session limit is reached, and so on.

To configure weighted load balancing:

- Specify load balancing.

```
[edit services l2tp]
user@host# set weighted-load-balancing
```

Related Documentation

- LAC Tunnel Selection Overview on page 17
- Configuring the L2TP LAC Tunnel Selection Parameters on page 34

Preventing the LAC from Sending Calling Number AVP 22 to the LNS

Calling Number AVP 22 typically identifies the interface that is connected to the customer in the access network. When RADIUS includes the Calling-Station-Id in the Access-Accept message, that value is used for the Calling Number AVP. Otherwise, the underlying interface (for example, the S-VLAN IFL) on which the PPPoE session is established is used for the Calling Number AVP value.

By default, the LAC includes this AVP in the incoming-call request (ICRQ) packets that it sends to the LNS. However, you may wish to hide your network access interface information. To do so, you can configure the tunnel so that the LAC does not send the Calling Number AVP to the LNS.

To disable sending the Calling Number AVP:

- Configure disabling.

```
[edit services l2tp]
user@host# set disable-calling-number-avp
```

Related Documentation

- LAC Tunnel Selection Overview on page 17

Configuring the Method to Set the LAC Connection Speeds to the LNS

During the establishment of an L2TP tunnel session, the LAC sends the L2TP transmit connect speed in bits per second (BPS) using AVP 24 to the LNS in Incoming-Call-Connected (ICCN) messages. AVP 24 conveys the transmit connect speed of the subscriber's access interface; that is, it represents the speed of the connection from the LAC to the LNS, from the perspective of the LAC. The L2TP receive connect speed, which is represented by AVP 38, is included in the message when the receive connect speed is different from the transmit connect speed. AVP 38 conveys the receive connect speed of the connection from the LNS to the LAC, again from the perspective of the LAC. When AVP 38 is not sent, it means that the connection speed is the same in both directions; the LNS uses the value in AVP 24 for both transmit and receive connect speeds.

You can configure what the LAC uses as a resource for setting these speeds. To use the recommended (advisory) downstream shaping rate for AVP 24 and the recommended upstream shaping rate for AVP 38, include the **tx-connect-speed-method static** statement at the **[edit services l2tp]** hierarchy level. You configure the advisory rates under the PPPoE logical interface underlying the subscriber interface with the **advisory-options** statement at the **[edit interfaces** *interface-name* **unit** *logical-unit-number***]** hierarchy level. When the advisory speed is not configured on the underlying interface, the **tx-connect-speed-method advisory** statement automatically sets the speed to 1 Gbps and sends this value in both AVP 24 and AVP 38.

To derive the speeds from the PPPoE IA tags, use the **tx-connect-speed-method pppoe-ia-tags** statement. In this case, AVP 24 is the value of Actual-Data-Rate-Downstream (VSA 26-129). AVP 38 is the value of Actual-Data-Rate-Upstream (VSA 26-130), and is sent only when the VSA values differ.

To derive the speeds from the ANCP value configured on the PPPoE interface underlying the subscriber interface, use the **tx-connect-speed-method ancp** statement.

To set the method for calculating the transmit connect speed:

- Configure the ANCP method to use the values derived from the configured ANCP value for the underlying interface.

```
[edit services l2tp]
user@host# set tx-connect-speed-method ancp
```

- Configure the PPPoE IA tags method to use the values provided in the PPPoE IA tags.

```
[edit services l2tp]
user@host# set tx-connect-speed-method pppoe-ia-tags
```

- Configure the static (advisory downstream shaping rate) method to use the underlying interface's recommended shaping rates.

```
[edit services l2tp]
user@host# set tx-connect-speed-method static
```

Related Documentation

- Configuring an L2TP LAC on page 29

Transmission of the Receive Connect Speed AVP When Transmit and Receive Connect Speeds are Equal

The L2TP Rx Connect Speed (in bits per second) AVP, which is represented by AVP 38, is included in the ICCN message when the receive connect speed is different from the transmit connect speed. By default, when the connection speed is the same in both directions, AVP 38 is not sent; the LNS uses the value in AVP 24 for both transmit and receive connect speeds.

AVP 38 is generated when the receive connect speed of the access interface is set equal to the calculated transmit connect speed by issuing the **rx-connect-speed-when-equal** statement at the **[edit services l2tp]** hierarchy level. In this scenario, the LAC transmits the same value for transmit and receive connect speeds that are sent to the LNS through the AVP 24 and AVP 38 in the ICCN message.

To configure the sending of AVP 38 when the connection speeds are the same in both the downstream and upstream directions:

- Configure the transmission of the receive connect speed, AVP 38, when the receive connect speed is set equal to the calculated transmit connect speed.

```
[edit services l2tp]
user@host# set rx-connect-speed-when-equal
```

Related Documentation

- Transmission of Tx Connect-Speed and Rx Connect-Speed AVPs from LAC to LNS on page 23
- Configuring an L2TP LAC on page 29
- **rx-connect-speed-when-equal on page 133**

Preventing the LAC From Negotiating L2TP Failover Protocol

The L2TP LAC implementation on MX Series routers supports L2TP failover and peer resynchronization with a failed remote endpoint. The LAC supports both the L2TP failover protocol method and the L2TP silent failover method. By default, L2TP on the LAC

attempts to negotiate the L2TP failover protocol with the LNS. When negotiation determines that the LNS supports this method, then the LAC uses L2TP failover protocol if the LNS fails. When the LNS does not support L2TP failover protocol, then the LAC uses silent failover in the event of an LNS failure. The ability to fall back on silent failover prevents the failover from forcing a disconnection of the tunnel to the peer and all the associated sessions.

You can disable the default behavior to force the LAC to operate only in silent failover mode. This configuration can be useful when routers that act as the LNS either are configured for silent failover or incorrectly negotiate use of the failover protocol even though they do not support it. However, when you issue this statement and the LNS supports only failover protocol, then the LAC cannot negotiate failover protocol, and recovery (failover protocol recovery initiated by the LNS) always fails.

To disable negotiation of the L2TP failover protocol:

- Configure disabling.

```
[edit services l2tp]
user@host# set disable-failover-protocol
```

Related Documentation

- Configuring an L2TP LAC on page 29

Setting the Format for the Tunnel Name

By default, the name of a tunnel corresponds to the Tunnel-Assignment-Id [82] returned by the AAA server. You can optionally configure the LAC to use more elements in the construction of a tunnel name by including the **assignment-id-format client-server-id** statement at the **[edit services l2tp tunnel]** hierarchy level. This format uses three attributes: Tunnel-Client-Auth-Id [90], Tunnel-Server-Endpoint [67], and Tunnel-Assignment-Id [82]. These attributes correspond, respectively, to the values configured in the tunnel profile for the LAC (source gateway) name, the tunnel endpoint (remote gateway) address on the LNS, and the tunnel ID.

A consequence of the **client-server-id** format is that the LAC automatically creates a new tunnel when the AAA server returns a different Tunnel-Client-Auth-Id than previously returned.

NOTE: **Before you downgrade to a Junos OS Release that does not support this statement, we recommend that you explicitly unconfigure the feature by including the no assignment-id-format assignment-id statement at the [edit services l2tp tunnel] hierarchy level.**

To change how the tunnel name is formatted:

- Configure the format.

```
[edit services l2tp tunnel]
user@host# set assignment-id-format client-server-id
```

Related Documentation
- Configuring an L2TP LAC on page 29

Configuring the LAC to Ignore Address and Port Changes Requested by the LNS

By default, when the LAC receives a request from the LNS in an SCCRP message to change the destination IP address or the UDP port, the LAC accepts the request and makes the change. If this is not the desired behavior, you can use the **tx-address-change** statement to configure how the LAC handles these change requests.

To configure how the LAC handles change requests for the IP address, the UDP port, or both:

- (Optional) Specify the LAC to ignore all change requests.

  ```
  [edit services l2tp tunnel]
  user@host# set tx-address-change ignore
  ```

- (Optional) Specify the LAC to ignore only change requests for the IP address.

  ```
  [edit services l2tp tunnel]
  user@host# set tx-address-change ignore-ip-address
  ```

- (Optional) Specify the LAC to ignore only change requests for the UDP port.

  ```
  [edit services l2tp tunnel]
  user@host# set tx-address-change ignore-udp-port
  ```

- (Optional) Specify the LAC to accept all change requests.

  ```
  [edit services l2tp tunnel]
  user@host# set tx-address-change accept
  ```

Use the **show services l2tp summary** command to display the current behavior of the LAC:

```
show services l2tp summary
  Failover within a preference level is Disabled
  Weighted load balancing is Disabled
  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 Disabled
  Tunnel assignment id format is assignment-id
  Tunnel Tx Address Change is Ignore IP Address Change
  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: 0, Sessions: 0
```

Related Documentation
- Configuring an L2TP LAC on page 29

CHAPTER 5

Configuration Tasks for L2TP LNS

Configuring an L2TP LNS with Inline Service Interfaces

The L2TP LNS feature license must be installed before you begin the configuration. Otherwise, a warning message is displayed when the configuration is committed.

To configure an L2TP LNS with inline service interfaces:

1. (Optional) Configure a user group profile that defines the PPP configuration for tunnel subscribers.

   See "Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile" on page 43.

2. (Optional) Configure PPP attributes for subscribers on inline service interfaces.

See “Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface” on page 44.

3. Configure an L2TP access profile that defines the L2TP parameters for each LNS client (LAC).

   See “Configuring an L2TP Access Profile on the LNS” on page 46.

4. (Optional) Configure a AAA access profile to override the access profile configured under the routing instance.

   See “Configuring a AAA Local Access Profile on the LNS” on page 47.

5. Configure a pool of addresses to be dynamically assigned to tunneled PPP subscribers.

   See “Configuring an Address-Assignment Pool for L2TP LNS with Inline Services” on page 48.

6. Configure the peer interface to terminate the tunnel and the PPP server-side IPCP address.

   See “Configuring the L2TP LNS Peer Interface” on page 49.

7. Enable inline service interfaces on an MPC.

   See “Enabling Inline Service Interfaces” on page 50.

8. Configure a service interface.

   See “Configuring an Inline Service Interface for L2TP LNS” on page 52.

9. Configure options for each inline service logical interface.

   See “Configuring Options for the LNS Inline Services Logical Interface” on page 53.

10. Configure the L2TP tunnel group.

    See “Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces” on page 53.

11. (Optional) Configure a dynamic profile that dynamically creates L2TP logical interfaces.

    See “Configuring a Dynamic Profile for Dynamic LNS Sessions” on page 56

12. (Optional) Configure a service interface pool for dynamic LNS sessions.

    See “Configuring a Pool of Inline Services Interfaces for Dynamic LNS Sessions” on page 55.

13. (Optional) Specify how many times L2TP retransmits unacknowledged control messages.

    See “Configuring the Number of L2TP Control Message Retransmissions” on page 61.

14. (Optional) Specify how long a tunnel can remain idle before being torn down.

    See “Setting the L2TP Tunnel Idle Timeout” on page 62.

15. (Optional) Specify the L2TP receive window size for the L2TP tunnel. The receive window size specifies the number of packets a peer can send before waiting for an acknowledgment from the router.

See "Setting the L2TP Receive Window Size" on page 63

16. (Optional) Specify how long the L2TP retains information about terminated dynamic tunnels, sessions, and destinations.

    See "Setting the L2TP Destruct Timeout" on page 63.

17. (Optional) Configure the L2TP destination lockout timeout.

    See "Configuring the L2TP Destination Lockout Timeout" on page 57.

18. (Optional) Configure L2TP tunnel switching.

    See "Configuring L2TP Tunnel Switching" on page 58

19. (Optional) Enable SNMP statistics counters.

    See "Enabling Tunnel and Global Counters for SNMP Statistics Collection" on page 64

20. (Optional) Configure trace options for troubleshooting the configuration.

    See "Tracing L2TP Operations for Subscriber Access" on page 261

You also need to configure CoS for LNS sessions. For more information, see *Configuring Dynamic CoS for an L2TP LNS Inline Service*.

Related Documentation

- L2TP for Subscriber Access Overview on page 3
- *Junos OS Feature Licenses*
- *Software Feature Licenses*

Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile

You can configure a user group profile that enables the LNS to apply PPP attributes to the PPP subscribers tunneled from the LAC. The user group profile is associated with clients (LACs) in the L2TP access profile. Consequently all subscribers handled by a given client share the same PPP attributes.

To configure a user group profile:

1. Create the profile.

   ```
   [edit access]
   user@host# edit group-profile profile-name
   ```

2. Configure the interval between PPP keepalive messages for the L2TP tunnel terminating on the LNS.

   ```
   [edit access group-profile  profile-name]
   user@host# set ppp keepalive seconds
   ```

NOTE: Changes to the keepalive interval in a user group profile affect only new L2TP sessions that come up after the change. Existing sessions are not affected.

3. Configure PPP authentication methods that apply to tunneled PPP subscribers at the LNS.

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

4. Configure how long the PPP subscriber session can be idle before it is considered to have timed out.

   ```
   [edit access group-profile profile-name]
   user@host# set ppp idle-timeout 200
   ```

NOTE: You can also configure PPP attributes on a per-interface basis. See "Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface" on page 44 for more information. When you configure the PPP attributes for L2TP LNS subscribers both on the si interface and in user group profiles, the inline service interface configuration takes precedence over the user group profile configuration.

Related Documentation

- Configuring an L2TP Access Profile on the LNS on page 46
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface

You can configure PPP attributes that are applied by the LNS on the inline service (si) interface to the PPP subscribers tunneled from the LAC. Because you are configuring the attributes per interface rather than with a user group profile, the attributes for subscribers can be varied with a finer granularity. This configuration matches that used for terminated PPPoE subscribers.

To configure the PPP attributes for dynamically created si interfaces:

1. Specify the predefined dynamic interface and logical interface variables in the dynamic profile.

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

2. Configure the interval between PPP keepalive messages for the L2TP tunnel terminating on the LNS.

   ```
   [edit dynamic-profiles profile-name interfaces "$junos-interface-ifd-name" unit
     "$junos-interface-unit"]
   user@host# set keepalives interval seconds
   ```

3. Configure PPP authentication methods that apply to tunneled PPP subscribers at the LNS.

   ```
   [edit dynamic-profiles profile-name interfaces "$junos-interface-ifd-name" unit
     "$junos-interface-unit"]
   user@host# set ppp-options chap
   ```

```
user@host# set ppp-options pap
```

To configure the PPP attributes for statically created si interfaces:

1. Specify the logical inline service interface.

   ```
   [edit interfaces si-slot/pic/port]
   user@host# edit unit logical-unit-number
   ```

2. Configure the interval between PPP keepalive messages for the L2TP tunnel terminating on the LNS.

   ```
   [edit interfaces si-slot/pic/port unit logical-unit-number]
   user@host# set keepalives interval seconds
   ```

3. Configure the number of keepalive packets a destination must fail to receive before the network takes down a link.

   ```
   [edit interfaces si-slot/pic/port unit logical-unit-number]
   user@host# set keepalives down-count number
   ```

   NOTE: The keepalives up-count option is typically not used for subscriber management.

4. Configure PPP authentication methods that apply to tunneled PPP subscribers at the LNS.

   ```
   [edit interfaces si-slot/pic/port unit logical-unit-number]
   user@host# set ppp-options chap
   user@host# set ppp-options pap
   ```

BEST PRACTICE: Although all other statements subordinate to ppp-options—including those subordinate to chap and pap—are supported, they are typically not used for subscriber management. We recommend that you leave these other statements at their default values.

NOTE: You can also configure PPP attributes with a user group profile that applies the attributes to all subscribers with that profile on a LAC client. See "Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile" on page 43 for more information. When you configure the PPP attributes for L2TP LNS subscribers both on the si interface and in user group profiles, the inline service interface configuration takes precedence over the user group profile configuration.

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Configuring an L2TP Access Profile on the LNS

Access profiles define how to validate Layer 2 Tunneling Protocol (L2TP) connections and session requests. Within each L2TP access profile, you configure one or more clients (LACs). The client characteristics are used to authenticate LACs with matching passwords, and to establish attributes of the client tunnel and session. You can configure multiple access profiles and multiple clients within each profile.

To configure an L2TP access profile:

1. Create the access profile.

   [edit access]
   user@host# **edit profile** ***access-profile-name***

2. Configure characteristics for one or more clients (LACs).

   [edit access profile *access-profile-name*]
   user@host# client ***client-name***

   NOTE: Except for the special case of the **default** client, the LAC client name that you configure in the access profile must match the hostname of the LAC. In the case of a Juniper Networks router acting as the LAC, the hostname is configured in the LAC tunnel profile with the gateway gateway-name statement at the **[edit access tunnel-profile** ***profile-name*** **tunnel** ***tunnel-id*** **source-gateway]** hierarchy level. Alternatively, the client name can be returned from RADIUS in the attribute, Tunnel-Client-Auth-Id [90].

   NOTE: Use **default** as the client name when you want to define a default tunnel client. The default client enables the authentication of multiple LACs with the same secret and L2TP attributes. This behavior is useful when, for example, many new LACs are added to the network, because it enables the LACs to be used without additional LNS profile configuration.

   Use **default** only on MX Series routers. The equivalent client name on M Series routers is *.

3. (Optional) Specify a local access profile that overrides the global access profile and the tunnel group AAA access profile to configure RADIUS server settings for the client.

   [edit access profile *access-profile-name* client *client-name*]
   user@host# **set l2tp** aaa-access-profile

4. Configure the LNS to renegotiate the link control protocol (LCP) with the PPP client. tunneled from the client.

   [edit access profile *access-profile-name* client *client-name*]
   user@host# **set l2tp** lcp-renegotiation

5. Configure the maximum number of sessions allowed in a tunnel from the client (LAC).

```
[edit access profile access-profile-name client client-name]
user@host# set l2tp maximum-sessions-per-tunnel number
```

6. Configure the tunnel password used to authenticate the client (LAC).

```
[edit access profile access-profile-name client client-name]
user@host# set l2tp shared-secret shared-secret
```

7. (Optional) Associate a group profile containing PPP attributes to apply for the PPP sessions being tunneled from this LAC client.

```
[edit access profile access-profile-name client client-name]
user@host# set user-group-profile group-profile-name
```

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

Configuring a AAA Local Access Profile on the LNS

For some LNS tunnels, you might wish to override the access profile configured at the routing instance that hosts the tunnel with a particular RADIUS server configuration. You can configure a local access profile to do so. You can subsequently use the **aaa-access-profile** statement to apply the local access profile to a tunnel group or LAC client.

A local access profile applied to a client overrides a local access profile applied to a tunnel group, which in turn overrides the access profile for the routing instance.

To configure a AAA local access profile:

1. Create the access profile.

```
[edit access]
user@host# edit profile local-aaa-profile-name
```

2. Configure the order of AAA authentication methods.

```
[edit access profile local-aaa-profile-name]
user@host# set authentication-order radius
```

3. Configure the RADIUS server attributes, such as the authentication password.

```
[edit access profile local-aaa-profile-name]
user@host# set radius-server server-address secret password
```

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53
- Configuring an L2TP Access Profile on the LNS on page 46

Configuring an Address-Assignment Pool for L2TP LNS with Inline Services

You can configure pools of addresses that can be dynamically assigned to the tunneled PPP subscribers. The pools must be local to the routing instance where the subscriber comes up. The configured pools are supplied in the RADIUS Framed-Pool and Framed-IPv6-Pool attributes. Pools are optional when Framed-IP-Address is sent by RADIUS.

To configure an address-assignment pool, you must specify the name of the pool and configure the addresses for the pool.

You can optionally configure multiple named ranges, or subsets, of addresses within an address-assignment pool. During dynamic address assignment, a client can be assigned an address from a specific named range. To create a named range, you specify a name for the range and define the address range.

NOTE: Be sure to use the address-assignment pools (**address-assignment**) statement rather than the address pools (**address-pool**) statement.

To configure an IPv4 address-assignment pool for L2TP LNS:

1. Configure the name of the pool and specify the IPv4 family.

   [edit access]
   user@host# **edit address-assignment pool** ***pool-name*** **family inet**

2. Configure the network address and the prefix length of the addresses in the pool.

   [edit access address-assignment pool *pool-name* family inet]
   user@host# **set network** ***ip-prefix/<prefix-length***

3. Configure the name of the range and the lower and upper boundaries of the addresses in the range.

   [edit access address-assignment pool *pool-name* family inet]
   user@host# **set range** ***range-name*** **low** ***lower-limit*** **high** ***upper-limit***

For example, to configure an IPv4 address-assignment pool:

```
[edit access]
user@host# edit address-assignment pool lns-v4-pool family inet
[edit access address-assignment pool lns-v4-pool family inet]
user@host# set network 192.168.1.1/16
[edit access address-assignment pool lns-v4-pool family inet]
user@host# set range lns-v4-pool-range low 192.168.1.1 high 192.168.255.255
```

NOTE: Dual-stack (IPv4/IPv6) LNS is supported, but IPv6-only subscribers are not supported.

To configure an IPv6 address-assignment pool for L2TP LNS:

1. Configure the name of the pool and specify the IPv6 family.

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

2. Configure the IPv6 network prefix for the address pool. The prefix specification is required when you configure an IPv6 address-assignment pool.

   ```
   [edit access address-assignment pool pool-name family inet6]
   user@host# set prefix ipv6-prefix
   ```

3. Configure the name of the range and define the range. You can define the range based on the lower and upper boundaries of the prefixes in the range, or based on the length of the prefixes in the range.

   ```
   [edit access address-assignment pool pool-name family inet6]
   user@host# set range range-name low lower-limit high upper-limit
   ```

For example, to configure an IPv6 address-assignment pool:

```
[edit access]
user@host# edit address-assignment pool lns-v6-pool family inet6
[edit access address-assignment pool lns-v6-pool family inet6]
user@host# set prefix 2010:9999::/32
[edit access address-assignment pool lns-v6-pool family inet6]
user@host# set range lns-v6-pool-range low 2010:9999:1::/48 high 2010:9999::ffff::/48
```

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- *Address-Assignment Pools Overview*
- *Configuring Address-Assignment Pools*

Configuring the L2TP LNS Peer Interface

The peer interface connects the LNS to the cloud towards the LACs so that IP packets can be exchanged between the tunnel endpoints. MPLS and aggregated Ethernet can also be used to reach the LACs.

NOTE: On MX Series routers, you must configure the peer interface on an MPC.

To configure the LNS peer interface:

1. Specify the interface name.

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

2. Enable VLANs.

   ```
   [edit interfaces interface-name]
   user@host# set vlan-tagging
   ```

3. Specify the logical interface, bind a VLAN tag ID to the interface, and configure the address family and the IP address for the logical interface.

   [edit interfaces *interface-name*]
   user@host# **edit unit *logical-unit-number***
   [edit interfaces *interface-name* unit *logical-unit-number*]
   user@host# **set vlan-id *number***
   user@host# **set family *family* address *ip-address***

NOTE: The IPv6 address family is not supported as a tunnel endpoint.

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Enabling Inline Service Interfaces

The inline service interface is a virtual physical interface that resides on the Packet Forwarding Engine. This **si** interface, referred to as an *anchor* interface, makes it possible to provide L2TP services without a special services PIC. The inline service interface is supported only by MPCs on MX Series routers. Four inline service interfaces are configurable per MPC-occupied chassis slot.

NOTE: On MX80 routers, you can configure only four inline services physical interfaces as anchor interfaces for L2TP LNS sessions: si-1/0/0, si-1/1/0, si-1/2/0, and si-1/3/0. You cannot configure si-0/0/0 for this purpose on MX80 routers.

To enable inline service interfaces:

1. Access an MPC-occupied slot and the PIC where the interface is to be enabled.

   [edit chassis]
   user@host# **edit fpc *slot-number* pic *number***

2. Enable the interface and specify the amount of bandwidth reserved on each Packet Forwarding Engine for tunnel traffic using inline services.

   [edit chassis fpc *slot-number* pic *number*]
   user@host# **set** inline-services bandwidth **(1g | 10g)**

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Configuring IP Inline Reassembly for L2TP

This procedure shows how to configure a service interface on a LAC or LNS to reassembly fragmented IP packets. This example creates a service set that configures the IP reassembly parameters for L2TP fragments. The service set is then associated with the L2TP service.

Before you configure inline IP reassembly, be sure you have:

- Configured L2TP.
- Configured a valid service interface on the LAC or LNS.

To configure inline IP reassembly:

1. Configure the chassis-level bandwidth used by the inline services interface on the FPC and PIC slot for inline IP fragment reassembly.

   ```
   [edit chassis]
   user@host# set fpc 2 pic 1 inline-services bandwidth 10g
   ```

2. Configure the interface-level logical unit used by the inline services (**si-**) interface on the FPC and PIC slot for inline IP fragment reassembly.

   ```
   [edit interfaces]
   user@host# set si-2/1/0 unit 0 family inet
   user@host# set si-2/1/0 unit 0 service-domain inside
   ```

   NOTE: This configuration is not unique to L2TP. However, you must configure the family (**inet**) and service domain (**inside**) as shown.

3. Configure the service set (**set1**) for IP reassembly in the input match direction. (The **local** option loops the reassembled packets back to the local interface.)

   ```
   [edit services]
   user@host# set service-set set1

   [edit services service set ip-reassembly-set]
   user@host# set ip-reassembly-rules ipr_rule1
   user@host# set next-hop-service inside-service-interface si-9/1/0.0
   user@host# set next-hop-service outside-service-interface-type local
   ```

   NOTE: You must configure both inside (**si-** interface) and outside type (**local**) service interfaces statements. The reassembly rule is not formulated outside of the service set; this statement simply initiates the reassembly process.

4. Configure the IP reassembly rule parameter

   ```
   [edit services ip-reassembly]
   user@host# set rule ipr_rule1 match-direction input;
   ```

5. Configure the service set (**set1**) for IP reassembly to bind to the L2TP service.

NOTE:

- The service set must be defined at the **[edit services]** hierarchy level.
- You cannot delete a service set instance if it is associated with an L2TP service.

```
[edit services l2tp]
user@host# set ip-reassembly service-set set1
```

Related Documentation

- IP Packet Fragment Reassembly for L2TP Overview on page 22
- *Protocols and Applications Supported by MX240, MX480, MX960, and MX2020 Enhanced MPCs (MPCEs)*
- ip-reassembly on page 105

Configuring an Inline Service Interface for L2TP LNS

The inline service interface is a virtual physical service interface that resides on the Packet Forwarding Engine. This **si** interface, referred to as an *anchor* interface, makes it possible to provide L2TP services without a special services PIC. The inline service interface is supported only by MPCs on MX Series routers. Four inline service interfaces are configurable per MPC-occupied chassis slot.

You can maximize the number of sessions that can be shaped in one service interface by setting the maximum number of hierarchy levels to two. In this case, each LNS session consumes one L3 node in the scheduler hierarchy for shaping.

If you do not specify the number of levels (two is the only option), then the number of LNS sessions that can be shaped on the service interface is limited to the number of L2 nodes, or 4096 sessions. Additional sessions still come up, but they are not shaped.

To configure an inline service interface:

1. Access the service interface.

   ```
   [edit interfaces]
   user@host# edit si-slot/pic/port
   ```

2. (Optional; for per-session shaping only) Enable the inline service interface for hierarchical schedulers and limit the number of scheduler levels to two.

   ```
   [edit interfaces si-slot/pic/port]
   user@host# set hierarchical-scheduler maximum-hierarchy-levels 2
   ```

3. (Optional; for per-session shaping only) Configure services encapsulation for inline service interface.

   ```
   [edit interfaces si-slot/pic/port]
   user@host# set encapsulation generic-services
   ```

4. Configure the IPv4 family on the reserved unit 0 logical interface.

```
[edit interfaces si-slot/pic/port]
user@host# set unit 0 family inet
```

Related Documentation
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Configuring Options for the LNS Inline Services Logical Interface

You must specify characteristics—**dial-options**—for each of the inline services logical interfaces that you configure for the LNS. LNS on MX Series routers supports only one session per logical interface, so you must configure it as a **dedicated** interface; the **shared** option is not supported. (LNS on M Series routers supports **dedicated** and **shared** options.) You also configure an identifying name for the logical interface that matches the name you specify in the access profile.

To configure the logical interface options:

1. Access the inline services logical interface.

   ```
   [edit]
   user@host# edit interfaces si-fpc/pic/port unit logical-unit-number
   ```

2. Specify an identifier for the logical interface.

   ```
   [edit interfaces si-fpc/pic/port unit logical-unit-number]
   user@host# set dial-options l2tp-interface-id name
   ```

3. Configure the logical interface to be used for only one session at a time.

   ```
   [edit interfaces si-fpc/pic/port unit logical-unit-number]
   user@host# set dial-options dedicated
   ```

4. Configure the address family for each logical interface and enable the local address on the LNS that provides local termination for the L2TP tunnel to be derived from the specified interface name.

   ```
   [edit interfaces si-fpc/pic/port unit logical-unit-number]
   user@host# set family inet unnumbered-address lo0.0
   ```

Related Documentation
- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- Configuring an L2TP Access Profile on the LNS on page 46

Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces

The L2TP tunnel group specifies attributes that apply to L2TP tunnels and sessions from a group of LAC clients. These attributes include the access profile used to validate L2TP connection requests made to the LNS on the local gateway address, a local access profile that overrides the global access profile, the keepalive timer, and whether the IP ToS value is reflected.

NOTE: If you delete a tunnel group, all L2TP sessions in that tunnel group are terminated. If you change the value of the **local-gateway-address**, **service-device-pool**, or **service-interface** statements, all L2TP sessions using those settings are terminated. If you change or delete other statements at the **[edit services l2tp tunnel-group *name*]** hierarchy level, new tunnels you establish use the updated values but existing tunnels and sessions are not affected.

To configure the LNS tunnel group:

1. Create the tunnel group.

   [edit services l2tp]
   user@host# edit tunnel-group ***name***

2. Specify the service anchor interface responsible for L2TP processing on the LNS.

   [edit services l2tp tunnel-group *name*]
   user@host# set service-interface ***interface-name***

   This service anchor interface is required for static LNS sessions, and for dynamic LNS sessions that do not balance traffic across a pool of anchor interfaces. The interface is configured at the **[edit interfaces]** hierarchy level.

3. (Optional; for load-balancing dynamic LNS sessions only) Specify a pool of inline service anchor interfaces to enable load-balancing of L2TP traffic across the interfaces.

   [edit services l2tp tunnel-group *name*]
   user@host# set service-device-pool ***pool-name***

   The pool is defined at the **[edit services service-device-pools]** hierarchy level.

4. (For dynamic LNS sessions only) Specify the name of the dynamic profile that defines and instantiates inline service interfaces for L2TP tunnels

   [edit services l2tp tunnel-group *name*]
   user@host# set dynamic-profile ***profile-name***

   The profile is defined at the **[edit dynamic-profiles]** hierarchy level.

5. Specify the access profile that validates all L2TP connection requests to the local gateway address.

   [edit services l2tp tunnel-group *name*]
   user@host# set l2tp-access-profile ***profile-name***

6. Configure the local gateway address on the LNS; corresponds to the IP address that is used by LACs to identify the LNS.

   [edit services l2tp tunnel-group *name*]
   user@host# set local-gateway address ***address***

7. (Optional) Configure the interval at which the LNS sends hello messages if it has received no messages from the LAC.

   [edit services l2tp tunnel-group *name*]
   user@host# set hello-interval ***seconds***

8. (Optional) Specify a local access profile that overrides the global access profile to configure RADIUS server settings for the tunnel group.

   ```
   [edit services l2tp tunnel-group name]
   user@host# set aaa-access-profile profile-name
   ```

   This local profile is configured at the **[edit access profile]** hierarchy level.

9. (Optional) Configure the LNS to reflect the IP ToS value from the inner IP header to the outer IP header (applies to CoS configurations).

   ```
   [edit services l2tp tunnel-group name]
   user@host# set tos-reflect
   ```

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- Configuring an L2TP Access Profile on the LNS on page 46

Configuring a Pool of Inline Services Interfaces for Dynamic LNS Sessions

You can create a pool of inline service interfaces, also known as a *service device pool*, to enable load-balancing of L2TP traffic across the interfaces. The pool is supported for dynamic LNS configurations, where it provides a set of logical interfaces that can be dynamically created and allocated to L2TP sessions on the LNS. The pool is assigned to an LNS tunnel group. L2TP maintains the state of each inline service interface and uses a round-robin method to evenly distribute the load among available interfaces when new session requests are accepted.

NOTE: Load balancing is available only for dynamically created subscriber interfaces.

LNS sessions anchored on an MPC are not affected by a MIC failure as long as some other path to the peer LACs exists. If the MPC hosting the peer interface fails and there is no path to peer LACs, the failure initiates termination and clean-up of all the sessions on the MPC.

If the MPC anchoring the LNS sessions itself fails, the Routing Engine does not relocate sessions to another slot and all sessions are terminated immediately. New sessions can come up on another available interface when the client retries.

To configure the service device pool:

1. Create the pool.

   ```
   [edit services service-device-pools]
   user@host# edit pool pool-name
   ```

2. Specify the inline service interfaces that make up the pool.

   ```
   [edit services service-device-pools pool pool-name]
   user@host# set interface service-interface-name
   user@host# set interface service-interface-name
   ```

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

Configuring a Dynamic Profile for Dynamic LNS Sessions

You can configure L2TP to dynamically assign inline service interfaces for L2TP tunnels. You must define one or more dynamic profiles and assign a profile to each tunnel group. Both IPv4-only and dual-stack IPv4/IPv6 interfaces are supported.

To configure the L2TP dynamic profile:

1. Create the dynamic profile.

   [edit]
   user@host# **edit dynamic-profiles** ***profile-name***

2. Configure the interface to be dynamically assigned to the routing instance used by the tunneled PPP clients.

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

3. Configure the routing options for access routes in the routing instance.

   [edit dynamic-profiles *profile-name* routing-instances “$junos-routing-instance” routing-options access]
   user@host# **set route next-hop $junos-framed-route-nexthop**
   user@host# **set route metric $junos-framed-route-cost**
   user@host# **set route preference $junos-framed-route-distance**

4. Configure the routing options for access-internal routes in the routing instance.

   [edit dynamic-profiles *profile-name* routing-instances “$junos-routing-instance” routing-options access-internal]
   user@host# **set route $junos-subscriber-ip-address**

5. Define the interfaces used by the dynamic profile. The variable is dynamically replaced by one of the configured inline service interfaces.

   [edit dynamic-profiles *profile-name*]
   user@host# **set interfaces $junos-interface-ifd-name**

6. Configure the inline services logical interfaces to be dynamically instantiated.

   [edit dynamic-profiles *profile-name* interfaces “$junos-interface-ifd-name”]
   user@host# **set unit $junos-interface-unit**

7. Specify an identifier for the logical interfaces.

   [edit dynamic-profiles *profile-name* interfaces “$junos-interface-ifd-name” unit “$junos-interface-unit]
   user@host# **set** dial-options **l2tp-interface-id** ***name***

8. Configure each logical interface to be used for only one session at a time.

   [edit dynamic-profiles *profile-name* interfaces “$junos-interface-ifd-name” unit “$junos-interface-unit]

```
user@host# set dial-options dedicated
```

9. Configure the address family for the logical interfaces and enable the local address on the LNS that provides local termination for the L2TP tunnel to be derived from the specified interface name.

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

Related Documentation

- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

Configuring the L2TP Destination Lockout Timeout

When multiple sets of tunneling parameters are available, L2TP uses a selection process to choose the best tunnel for subscriber traffic. As part of this selection process, L2TP locks out destinations it cannot connect to when a subscriber tries to reach a domain. L2TP places the destination on the destination lockout list and excludes the destination from consideration for a configurable period called the *destination lockout timeout*.

By default, the destination lockout timeout is 300 seconds (5 minutes). You can configure a value from 60 through 3600 seconds (1 minute through 1 hour). When the lockout timeout expires, L2TP assumes that the destination is now available and includes the destination when performing the tunnel selection process. The destination lockout period is a global value and is not individually configurable for particular destinations, tunnels, or tunnel groups.

BEST PRACTICE: **Configure the lockout timeout to be equal to or shorter than the destruct timeout. Otherwise, the destruct timeout expires before the lockout timeout. In this event, the locked-out destination is destroyed and can be subsequently returned to service before the lockout timeout expires, thus negating the effectiveness of the lockout timeout.**

To configure the destination lockout timeout:

- Specify the period in seconds.

```
[edit services l2tp destination]
user@host# set lockout-timeout seconds
```

The **show services l2tp destination lockout** command displays the destination lockout list and for each destination indicates how much time remains before its timeout expires. The **show services l2tp destination detail** command indicates for each destination whether it is locked and waiting for the timeout to expire or not locked.

Related Documentation

- LAC Tunnel Selection Overview on page 17
- Setting the L2TP Destruct Timeout on page 63

- Removing an L2TP Destination from the Destination Lockout List on page 58
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Removing an L2TP Destination from the Destination Lockout List

When a PPP subscriber tries to log in to a domain, L2TP selects a tunnel associated with a destination in that domain and attempts to access the destination. If the connection attempt fails, L2TP places the destination on the destination lockout list. Destinations on this list are excluded from being considered for subsequent connections for a configurable period called the *destination lockout timeout*.

You can issue the **request services l2tp destination unlock** command for a particular destination to remove it from the destination lockout list. The result is that this destination is immediately available for consideration when a subscriber logs in to the associated domain.

To remove a destination from the destination lockout list:

- Specify the name of the destination to be unlocked.

  user@host> request services l2tp destination unlock ***destination-name***

Related Documentation

- LAC Tunnel Selection Overview on page 17
- Configuring the L2TP Destination Lockout Timeout on page 57

Configuring L2TP Tunnel Switching

L2TP tunnel switching enables a router configured as an LTS to forward PPP packets carried on one L2TP session to a second L2TP session terminated on a different LNS. To configure L2TP tunnel switching, you must define a tunnel switch profile and then assign that profile.

To define an L2TP tunnel switch profile:

1. Create the profile.

   [edit access]
   user@host# **edit** tunnel-switch-profile ***profile-name***

2. (Optional) Override the default actions taken for certain L2TP AVPs at the switching boundary.

   [edit access tunnel-switch-profile *profile-name*]
   user@host# **set** avp bearer-type ***action***
   user@host# **set** avp calling-number ***action***
   user@host# **set** avp cisco-nas-port-info ***action***

3. Specify the tunnel profile that defines the tunnel to which the subscriber traffic is switched.

   [edit access tunnel-switch-profile *profile-name*]

```
user@host# set tunnel-profile profile-name
```

4. (Optional) Apply the profile as a global default profile to switch packets from all incoming sessions from the LAC.

```
[edit services l2tp]
user@host1# set tunnel-switch-profile profile-name
```

5. (Optional) Apply the profile as part of a tunnel group to switch packets from all sessions in the tunnel group.

```
[edit services l2tp tunnel-group name]
user@host1# set tunnel-switch-profile profile-name
```

NOTE: The tunnel group is part of the LTS configuration that enables it to act as the LNS for the original sessions from the LAC.

A tunnel group with a tunnel switch profile must also contain a dynamic profile, because tunnel switching supports only dynamic subscribers.

6. (Optional) Apply the profile as part of a domain map to switch packets from all sessions that are associated with the domain.

```
[edit access domain map domain-map-name]
user@host1# set tunnel-switch-profile profile-name
```

NOTE: A domain map cannot have both a tunnel switch profile and a tunnel profile. You must remove one if you add the other.

7. (Optional) Apply the profile by means of the Tunnel-Switch-Profile VSA [26–91] in the RADIUS Access-Accept message returned when the session from the LAC is authenticated. Refer to the documentation for your RADIUS server to determine how to configure this method.

For example, consider the following configuration:

```
[edit access tunnel-switch-profile l2tp-tunnel-switch-profile]
user@host# set avp bearer-type regenerate
user@host# set avp calling-number regenerate
user@host# set avp cisco-nas-port-info drop
user@host# set tunnel-profile l2tp-tunnel-profile1

[edit access tunnel-switch-profile lts-profile-groupA]
user@host# set tunnel-profile l2tp-tunnel-profile2
[edit access tunnel-switch-profile lts-profile-example.com]
user@host# set tunnel-profile l2tp-tunnel-profile3

[edit services l2tp]
user@host1# set tunnel-switch-profile l2tp-tunnel-switch-profile
user@host1# set tunnel-group groupA tunnel-switch-profile lts-profile-groupA

[edit access domain]
```

```
user@host1# set map example.com tunnel-switch-profile lts-profile-example.com
```

This configuration creates three tunnel switch profiles, l2tp-tunnel-switch-profile, lts-profile-groupA, and lts-profile-example-com.

The profile l2tp-tunnel-switch-profile is applied as the global default. When packets are switched according to this profile, the values for the Bearer Type AVP (18) and Calling Number AVP (22) in the L2TP packets are regenerated based on local policy at the L2TP tunnel switch and then sent with the packets. The Cisco NAS Port Info AVP (100) is simply dropped. Finally, l2tp-tunnel-profile1 provides the configuration characteristics of the tunnel to which the traffic is switched.

Tunnel switch profile lts-profile-groupA is applied by means of a tunnel group, groupA; it specifies a different tunnel profile, l2tp-tunnel-profile2 and it does not override any AVP actions. Tunnel switch profile lts-profile-example.com is applied by means of a domain map for the example.com domain; it specifies a different tunnel profile, l2tp-tunnel-profile3 and it does not override any AVP actions.

Related Documentation

- L2TP Tunnel Switching Overview on page 9
- Tunnel Switching Actions for L2TP AVPs at the Switching Boundary on page 13

CHAPTER 6

Configuration Tasks for Both LAC and LNS

Configuring the Number of L2TP Control Message Retransmissions

L2TP peers maintain a queue of control messages that must be sent to the peer device. After a message is sent, the local peer waits for a response from the remote peer. If a response is not received, the local peer retransmits the message. You can configure how many times an unacknowledged message is retransmitted by the LAC or the LNS. For tunnels that have been established, include the **retransmission-count-established** statement at the **[edit services l2tp tunnel]** hierarchy level. For tunnels that are not yet established, include the **retransmission-count-not-established** statement.

The local peer waits one second for the first response to a control message. The retransmit timer then doubles the interval between each successive retransmission, up to a maximum interval of 16 seconds. This behavior allows the remote peer more time to respond. If the maximum retransmission count is reached and no response has been received, the tunnel and all its sessions are cleared.

BEST PRACTICE: Before you downgrade to a Junos OS release that does not support these statements, we recommend that you explicitly unconfigure the feature by including the **no retransmission-count-established** statement and the **no retransmission-count-non-established** statement at the **[edit services l2tp tunnel]** hierarchy level.

BEST PRACTICE: During a unified in-service software upgrade (unified ISSU) on an MX Series router configured as the LAC, the LAC does not respond to control messages from the LNS. This can result in dropping LAC L2TP sessions. You can avoid this situation by ensuring that the maximum retransmission count on the LNS is set to 16 or higher.

To set the maximum retransmission count for established tunnels:

- Configure the count.

```
[edit services l2tp tunnel]
user@host# set retransmission-count-established count
```

To set the maximum retransmission count for non-established tunnels:

- Configure the count.

```
[edit services l2tp tunnel]
user@host# set retransmission-count-not-established count
```

Related Documentation

- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Setting the L2TP Tunnel Idle Timeout

You can configure the LAC or the LNS to specify how long a tunnel without any sessions remains active. The idle timer starts when the last session on the tunnel is terminated. When the timer expires the tunnel is disconnected. This idle timeout frees up resources otherwise consumed by inactive tunnels.

If you set the idle timeout value to zero, the tunnel is forced to remain active indefinitely after the last session is terminated until one of the following occurs:

- You issue the **clear services l2tp tunnel** command.
- The remote peer disconnects the tunnel.

BEST PRACTICE: **Before you downgrade to a Junos OS Release that does not support this statement, we recommend that you explicitly unconfigure the feature by including the no idle-timeout statement at the [edit services l2tp tunnel] hierarchy level.**

To set the tunnel idle timeout:

- Configure the timeout period.

```
[edit services l2tp tunnel]
user@host# set idle-timeout seconds
```

Related Documentation

- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Setting the L2TP Receive Window Size

You can configure the L2TP receive window size for an L2TP tunnel. The receive window size specifies the number of packets a peer can send before waiting for an acknowledgment from the router.

By default, the receive window size is set to four packets. If the receive window size is set to its default value, the router does not send the Receive Window Size AVP, AVP 10, in its first packet sent during tunnel negotiation to its peer.

To configure the receive window size:

```
[edit services l2tp tunnel]
user@host# set rx-window-size packets
```

Related Documentation

- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Setting the L2TP Destruct Timeout

You can configure the LAC or the LNS to specify how long the router attempts to maintain dynamic destinations, tunnels, and sessions after they have been destroyed. This destruct timeout aids debugging and other analysis by saving underlying memory structures after the destination, tunnel, or session is terminated. Any specific dynamic destination, tunnel, or session may not be maintained for this entire time period if the resources must be reclaimed early to allow new tunnels to be established.

BEST PRACTICE: **Before you downgrade to a Junos OS Release that does not support this statement, we recommend that you explicitly unconfigure the feature by including the no destruct-timeout statement at the [edit services l2tp] hierarchy level.**

To set the L2TP destruct timeout:

- Configure the timeout period.

  ```
  [edit services l2tp]
  user@host# set destruct-timeout seconds
  ```

Related Documentation

- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

Enabling Tunnel and Global Counters for SNMP Statistics Collection

By default, SNMP polling is disabled for L2TP statistics. As a consequence, the L2TP tunnel and global counters listed in Table 8 on page 64 have a default value of zero.

Table 8: SNMP Counters for L2TP Statistics

Counter Name	Type
jnxL2tpTunnelStatsDataTxPkts	Tunnel
jnxL2tpTunnelStatsDataRxPkts	Tunnel
jnxL2tpTunnelStatsDataTxBytes	tunnel
jnxL2tpTunnelStatsDataRxBytes	Tunnel
jnxL2tpStatsPayloadRxOctets	Global
jnxL2tpStatsPayloadRxPkts	Global
jnxL2tpStatsPayloadTxOctets	Global
jnxL2tpStatsPayloadTxPkts	Global

You can enable collection of these statistics by including the **enable-snmp-tunnel-statistics** statement at the **[edit services l2tp]** hierarchy level. When enabled, the L2TP process polls for these statistics every 30 seconds for 1000 sessions. The potential age of the statistics increases with the number of subscriber sessions; the data is refreshed more quickly as the number of sessions decreases. For example, with 60,000 sessions, none of these statistics can be more than 30 minutes old.

BEST PRACTICE: **The system load can increase when you enable these counters and also use RADIUS interim accounting updates. We recommend you enable these counters when you are using only SNMP statistics.**

To enable L2TP statistics collection for SNMP:

- Enable statistics collection.

```
[edit services l2tp]
user@host1# set enable-snmp-tunnel-statistics
```

Related Documentation

- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

CHAPTER 7

Example

Example: Configuring an L2TP LNS

This example shows how you can configure an L2TP LNS on an MX Series router to provide tunnel endpoints for an L2TP LAC in your network. This configuration includes a dynamic profile for dual-stack subscribers.

Requirements

L2TP LNS requires the following hardware and software:

- MX Series 3D Universal Edge Router
- One or more MPCs
- Junos OS Release 11.4 or later

No special configuration beyond device initialization is required before you can configure this feature.

You must configure certain standard RADIUS attributes and Juniper Networks VSAs in the attribute return list on the AAA server associated with the LNS for this example to work. Table 9 on page 65 lists the attributes with their required order setting and values. We recommend that you use the most current Juniper Networks RADIUS dictionary, available in the *Downloads* box on the *Junos OS Subscriber Management* page for the current release at http://www.juniper.net/techpubs/en_US/junos/information-products/pathway-pages/subscriber-access/index.html.

Table 9: VSA and Standard RADIUS Attribute Names, Order, and Values Required for Example

VSA Name [Number]	Order	Value
CoS-Parameter-Type [26–108]	1	T01 Multiplay
CoS-Parameter-Type [26–108]	2	T02 10m

Table 9: VSA and Standard RADIUS Attribute Names, Order, and Values Required for Example *(continued)*

VSA Name [Number]	Order	Value
CoS-Parameter-Type [26–108]	3	T08 -36
CoS-Parameter-Type [26–108]	4	T07 cell-mode
Framed-IPv6-Pool [100]	0	jnpr_ipv6_pool
Framed-Pool [88]	0	jnpr_pool
Egress-Policy-Name [26-11]	0	classify
Ingress-Policy-Name [26-10]	0	classify
Virtual-Router [26-1]	0	default

Overview

The LNS employs user group profiles to apply PPP attributes to the PPP subscribers that are tunneled from the LAC. LACs in the network are clients of the LNS. The clients are associated with user group profiles in the L2TP access profile configured on the LNS. In this example, the user group profile **ce-l2tp-group-profile** specifies the following PPP attributes:

- A 30-second interval between PPP keepalive messages for L2TP tunnels from the client LAC terminating on the LNS.
- A 200-second interval that defines how long the PPP subscriber session can be idle before it is considered to have timed out.
- Both PAP and CHAP as the PPP authentication methods that apply to tunneled PPP subscribers at the LNS.

The L2TP access profile **ce-l2tp-profile** defines a set of L2TP parameters for each client LAC. In this example, the user group profile **ce-l2tp-group-profile** is associated with both clients, **lac1** and **lac2**. Both clients are configured to have the LNS renegotiate the link control protocol (LCP) with the PPP client rather than accepting the pre-negotiated LCP parameters that the LACs pass to the LNS. LCP renegotiation also causes authentication to be renegotiated by the LNS; the authentication method is specified in the user group profile. The maximum number of sessions allowed per tunnel is set to 1000 for **lac1** and to 4000 for **lac2**. A different password is configured for each LAC.

A local AAA access profile, **aaa-profile**, enables you to override the global AAA access profile, so that you can specify an authentication order, a RADIUS server that you want to use for L2TP, and a password for the server.

In this example, an address pool defines a range of IP addresses that the LNS allocates to the tunneled PPP sessions. This example defines ranges of IPv4 and IPv6 addresses.

Two inline service interfaces are enabled on the MPC located in slot 5 of the router. For each interface, 10 Gbps of bandwidth is reserved for tunnel traffic on the interface's associated PFE. These *anchor* interfaces serve as the underlying physical interface. To enable CoS queue support on the individual logical inline service interfaces, you must configure both services encapsulation (**generic-services**) and hierarchical scheduling support on the anchors. The IPv4 address family is configured for both anchor interfaces. Both anchor interfaces are specified in the **lns_p1** service device pool. The LNS can balance traffic loads across the two anchor interfaces when the tunnel group includes the pool.

This example uses the dynamic profile **dyn-lns-profile2** to specify characteristics of the L2TP sessions that are created or assigned dynamically when a subscriber is tunneled to the LNS. For many of the characteristics, a predefined variable is set; the variables are dynamically replaced with the appropriate values when a subscriber is tunneled to the LNS.

The interface to which the tunneled PPP client connects (**$junos-interface-name**) is dynamically created in the routing instance (**$junos-routing-instance**) assigned to the subscriber. Routing options for access routes include the route's next hop address (**$junos-framed-route-nexthop**), metric (**$junos-framed-route-cost**), and preference (**$junos-framed-route-distance**). For access-internal routes, a dynamic IP address variable (**$junos-subscriber-ip-address**) is set.

The logical inline service interfaces are defined by the name of a configured anchor interface (**$junos-interface-ifd-name**) and a logical unit number (**$junos-interface-unit**). The profile assigns **l2tp-encapuslation** as the identifier for the logical interface and specifies that each interface can be used for only a single session at a time.

The IPv4 address is set to a value returned from the AAA server. For IPv4 traffic an input firewall filter **$junos-input-filter** and an output firewall filter **$junos-output-filter** are attached to the interface. The loopback variable (**$junos-loopback-interface**) derives an IP address from a loopback interface (**lo**) configured in the routing instance and uses it in IPCP negotiation as the PPP server address. Because this is a dual-stack configuration, the IPv6 address family is also set, with the addresses provided by the **$junos-ipv6-address** variable.

The **$junos-ipv6-address** variable is used because Router Advertisement Protocol is also configured. This variable enables AAA to allocate the first address in the prefix to be reserved as the local address for the interface. The minimal configuration for the Router Advertisement Protocol in the dynamic profile specifies the **$junos-interface-name** and **$junos-ipv6-ndra-prefix** variables to dynamically assign a prefix value in IPv6 neighbor discovery router advertisements.

The dynamic profile also includes the class of service configuration that is applied to the tunnel traffic. The traffic control profile (**tc-profile**) includes variables for the scheduler map (**$junos-cos-scheduler-map**), shaping rate (**$junos-cos-shaping-rate**), overhead accounting (**$junos-cos-shaping-mode**), and byte adjustment **$junos-cos-byte-adjust**). The dynamic profile applies the CoS configuration—including the forwarding class, the output traffic control profile, and the rewrite rules—to the dynamic service interfaces.

The **tg-dynamic** tunnel group configuration specifies the access profile **ce-l2tp-profile**, the local AAA profile **aaa-profile**, and the dynamic profile **dyn-lns-profile2** that are used

to dynamically create LNS sessions and define the characteristics of the sessions. The **lns_p1** service device pool associates a pool of service interfaces with the group to enable LNS to balance traffic across the interfaces. The local gateway address **11.1.1.2** corresponds to the remote gateway address that is configured on the LAC.

NOTE: This example does not show all possible configuration choices.

Configuration

CLI Quick Configuration

To quickly configure an L2TP LNS, copy the following commands, paste them in a text file, remove any line breaks, and then copy and paste the commands into the CLI.

```
[edit]
edit access group-profile ce-l2tp-group-profile
set ppp idle-timeout 200
set ppp ppp-options pap
set ppp ppp-options chap
set ppp keepalive 30
top
edit access profile ce-l2tp-profile
set client lac1 l2tp maximum-sessions-per-tunnel 1000
set client lac1 l2tp interface-id l2tp-encapsulation-1
set client lac1 l2tp lcp-renegotiation
set client lac1 l2tp shared-secret "lac1-secret"
set client lac1 user-group-profile ce-l2tp-group-profile
set client lac2 l2tp maximum-sessions-per-tunnel 4000
set client lac2 l2tp interface-id l2tp-encap-2
set client lac2 l2tp lcp-renegotiation
set client lac2 l2tp shared-secret "lac2-secret"
set client lac2 user-group-profile ce-l2tp-group-profile
top
edit access profile aaa-profile
set authentication-order radius
set radius-server 172.21.146.93 secret "aaa-secret”
top
edit access address-assignment pool client-pool1 family inet
set network 192.168.1.1/16
set range lns-v4-pool-range low 192.168.1.1
set range lns-v4-pool-range high 192.168.255.255
top
edit access address-assignment pool client-ipv6-pool2 family inet6
set prefix 2010:db8::/32
set range lns-v6-pool-range low 2010:db8:1::/48
set range lns-v6-pool-range high 2010:db8:ffff::/48
top
set interfaces ge-5/0/1 unit 11 vlan-id 11
set interfaces ge-5/0/1 unit 11 family inet address 11.1.1.2/24
set interfaces lo0 unit 0 family inet address 127.0.0.1/32
top
set chassis fpc 5 pic 0 inline-services bandwidth 10g
set chassis fpc 5 pic 2 inline-services bandwidth 10g
top
edit interfaces si-5/0/0
```

```
set hierarchical-scheduler maximum-hierarchy-levels 2
set encapsulation generic-services
set unit 0 family inet
top
edit interfaces si-5/2/0
set hierarchical-scheduler maximum-hierarchy-levels 2
set encapsulation generic-services
set unit 0 family inet
top
set services service-device-pools pool lns_p1 interface si-5/0/0
set services service-device-pools pool lns_p1 interface si-5/2/0
top
edit dynamic-profiles dyn-lns-profile2 routing-instances $junos-routing-instance
set interface $junos-interface-name
edit routing-options access route $junos-framed-route-ip-address-prefix
set next-hop $junos-framed-route-nexthop
set metric $junos-framed-route-cost
set preference $junos-framed-route-distance
up 2
edit access-internal route $junos-subscriber-ip-address
set qualified-next-hop $junos-interface-name
up 5
edit interfaces $junos-interface-ifd-name unit $junos-interface-unit
set dial-options l2tp-interface-id l2tp-encapsulation
set dial-options dedicated
set family inet filter input $junos-input-filter
set family inet filter output $junos-output-filter
set family inet unnumbered-address $junos-loopback-interface
set family inet6 address $junos-ipv6-address
set family inet6 filter input $junos-input-ipv6-filter
set family inet6 filter output $junos-output-ipv6-filter
up 3
edit protocols router-advertisement
set interface $junos-interface-name prefix $junos-ipv6-ndra-prefix
top
[edit class-of-service]
edit rewrite-rules dscp rewriteDSCP forwarding-class expedited-forwarding
set loss-priority high code-point af11
set loss-priority high code-point af12
top
edit dynamic-profiles dyn-lns-profile2 class-of-service traffic-control-profiles tc-profile
set scheduler-map $junos-cos-scheduler-map
set shaping-rate $junos-cos-shaping-rate
set overhead-accounting $junos-cos-shaping-mode
set overhead-accounting bytes $junos-cos-byte-adjust
up
edit interfaces $junos-interface-ifd-name unit $junos-interface-unit
set forwarding-class expedited-forwarding
set output-traffic-control-profile tc-profile
set rewrite-rules dscp rewriteDSCP
edit interfaces si-5/0/0
set output-control-profile-remaining tc-profile
top
set services l2tp tunnel-group tg-dynamic l2tp-access-profile ce-l2tp-profile
set services l2tp tunnel-group tg-dynamic aaa-access-profile aaa-profile
set services l2tp tunnel-group tg-dynamic local-gateway address 11.1.1.2
```

```
set services l2tp tunnel-group tg-dynamic service-device-pool lns_p1
set services l2tp tunnel-group tg-dynamic dynamic-profile dyn-lns-profile2
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode*.

To configure an L2TP LNS with inline service interfaces:

1. Configure a user group profile that defines the PPP configuration for tunnel subscribers.

```
[edit access]
user@host# edit group-profile ce-l2tp-group-profile
[edit access group-profile ce-l2tp-group-profile]
user@host# set ppp keepalive 30
user@host# set ppp idle-timeout 200
user@host# set ppp ppp-options chap
user@host# set ppp ppp-options pap
```

2. Configure an L2TP access profile that defines the L2TP parameters for each client LAC. This includes associating a user group profile with the client and specifying the identifier for the inline services logical interface that represents an L2TP session on the LNS.

```
[edit access profile ce-l2tp-profile client lac1]
user@host# set l2tp interface-id l2tp-encapsulation
user@host# set l2tp maximum-sessions-per-tunnel 1000
user@host# set l2tp shared-secret "lac1-secret"
user@host# set l2tp lcp-renegotiation
user@host# set user-group-profile ce-l2tp-group-profile
[edit access profile ce-l2tp-profile client lac2]
user@host# set l2tp interface-id interface-id
user@host# set l2tp maximum-sessions-per-tunnel 4000
user@host# set l2tp shared-secret "lac2-secret"
user@host# set l2tp lcp-renegotiation
user@host# set user-group-profile ce-l2tp-group-profile
```

3. Configure a AAA access profile to override the global access profile for the order of AAA authentication methods and server attributes.

```
[edit access profile aaa-profile]
user@host# set authentication-order radius
user@host# set radius-server 172.21.146.93 secret "aaa-secret"
```

4. Configure IPv4 and IPv6 address-assignment pools to allocate addresses for the clients (LACs).

```
[edit access address-assignment pool client-pool1 family inet]
user@host# set network 192.168.1.1/16
user@host# set range lns-v4-pool-range low 192.168.1.1 high 192.168.255.255
[edit access address-assignment pool client-ipv6-pool2 family inet6]
user@host# set prefix 2010:DB8::/32
user@host# set range lns-v6-pool-range low 2010:DB8:1::/48
user@host# set range lns-v6-pool-range high 2010:DB8:ffff::/48
```

5. Configure the peer interface to terminate the tunnel and the PPP server-side IPCP address (loopback address).

```
[edit interfaces ge-5/0/1
user@host# set vlan-tagging
user@host# set unit 11
[edit interfaces ge-5/0/1.11
user@host# set vlan-id 11
user@host# set family inet address 11.1.1.2/24
[edit interfaces lo0]
user@host# set unit 0 family inet address 127.0.0.1/32
```

6. Enable inline service interfaces on an MPC.

```
[edit chassis fpc 5]
user@host# set pic 0 inline-services bandwidth 10g
user@host# set pic 2 inline-services bandwidth 10g
```

7. Configure the anchor service interfaces with services encapsulation, hierarchical scheduling, and the address family.

```
[edit interfaces si-5/0/0]
user@host# set hierarchical-scheduler maximum hierarchy-levels 2
user@host# set encapsulation generic-services
user@host# set unit 0 family inet
[edit interfaces si-5/2/0]
user@host# set hierarchical-scheduler maximum hierarchy-levels 2
user@host# set encapsulation generic-services
user@host# set unit 0 family inet
```

8. Configure a pool of service interfaces for dynamic LNS sessions.

```
[edit services service-device-pools pool lns_p1]
user@host# set interface si-5/0/0
user@host# set interface si-5/2/0
```

9. Configure a dynamic profile that dynamically creates L2TP logical interfaces for dual-stack subscribers.

```
[edit dynamic-profiles dyn-lns-profile2]
user@host# edit routing-instances $junos-routing-instance
user@host# set interface $junos-interface-name
[edit dynamic-profiles dyn-lns-profile2 routing-instances “$junos-routing-instance”]
user@host# edit routing-options access route $junos-framed-route-ip-address-prefix
[edit dynamic-profiles dyn-lns-profile2 routing-instances “$junos-routing-instance”
  routing-options access route “$junos-framed-route-ip-address-prefix”]
user@host# set next-hop $junos-framed-route-nexthop
user@host# set metric $junos-framed-route-cost
user@host# set preference $junos-framed-route-distance
[edit dynamic-profiles dyn-lns-profile2 routing-instances “$junos-routing-instance”
  routing-options access-internal]
user@host# set route $junos-subscriber-ip-address qualified-next-hop
  $junos-interface-name
[edit dynamic-profiles dyn-lns-profile2 interfaces “$junos-interface-ifd-name” unit
  “$junos-interface-unit”]
user@host# set dial-options l2tp-interface-id l2tp-encapsulation
user@host# set dial-options dedicated
user@host# set family inet unnumbered-address $junos-loopback-interface
user@host# set family inet filter input $junos-input-filter
```

```
user@host# set family inet filter output $junos-output-filter
user@host# set family inet6 address $junos-ipv6-address
set family inet6 filter input $junos-input-ipv6-filter
set family inet6 filter output $junos-output-ipv6-filter
[edit dynamic-profiles dyn-lns-profile2 protocols router-advertisement]
user@host# set interface $junos-interface-name prefix $junos-ipv6-ndra-prefix
```

10. Configure shaping, scheduling, and rewrite rules, and apply in the dynamic profile to tunnel traffic.

```
[edit class-of-service]
user@host# edit rewrite-rules dscp rewriteDSCP forwarding-class
  expedited-forwarding
user@host# set loss-priority high code-point af11
user@host# set loss-priority high code-point af12
[edit dynamic-profiles dyn-lns-profile2 class-of-service traffic-control-profiles
  tc-profile]
user@host# set scheduler-map $junos-cos-scheduler-map
user@host# set shaping-rate $junos-cos-shaping-rate
user@host# set overhead-accounting $junos-cos-shaping-mode
user@host# set overhead-accounting bytes $junos-cos-byte-adjust
[edit dynamic-profiles dyn-lns-profile2 class-of-service interfaces
  “$junos-interface-ifd-name” unit "$junos-interface-unit"]
user@host# set forwarding-class expedited-forwarding
user@host# set output-traffic-control-profile tc-profile
user@host# set rewrite-rules dscp rewriteDSCP
[edit class-of-service interfaces si-5/0/0]
user@host# set output-traffic-control-profile-remaining tc-profile
```

11. Configure the L2TP tunnel group to bring up dynamic LNS sessions using the pool of inline service interfaces to enable load-balancing.

```
[edit services l2tp tunnel-group tg-dynamic]
user@host# set l2tp-access-profile ce-l2tp-profile
user@host# set local-gateway address 11.1.1.2
user@host# set aaa-access-profile aaa-profile
user@host# set dynamic-profile dyn-lns-profile2
user@host# set service-device-pool lns_p1
```

Results From configuration mode, confirm the access profile, group profile, AAA profile, and address-assignment pools configuration by entering the **show access** command. Confirm the inline services configuration by entering the **show chassis** command. Confirm the interface configuration by entering the **show interfaces** command. Confirm the dynamic profile configuration by entering the **show dynamic-profiles** command. Confirm the tunnel group configuration by entering the **show services l2tp** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show access
group-profile ce-l2tp-group-profile {
  ppp {
    idle-timeout 200;
    ppp-options {
      pap;
```

```
        chap;
      }
      keepalive 30;
    }
  }
  profile ce-l2tp-profile {
    client lac1 {
      l2tp {
        maximum-sessions-per-tunnel 1000;
        interface-id l2tp-encapsulation-1;
        lcp-renegotiation;
        shared-secret "$9$ZJGi.Pfz6/tmPtu1IleLxNbwgaZjmPQDi"; ## SECRET-DATA
      }
      user-group-profile ce-l2tp-group-profile;
    }
    client lac2 {
      l2tp {
        maximum-sessions-per-tunnel 4000;
        interface-id l2tp-encap-2;
        lcp-renegotiation;
        shared-secret ""$9$KCjvLNdVYoaUdVDi.m3ntuOREyevLdVY8X"; ## SECRET-DATA
      }
      user-group-profile ce-l2tp-group-profile;
    }
  }
  profile aaa-profile {
    authentication-order radius;
    radius-server {
      172.21.146.93 secret "$9$41JZjk.5Qz6k."; ## SECRET-DATA
    }
  }
  address-assignment {
    pool client-pool1 {
      family inet {
        network 192.168.1.1/16;
        range lns-v4-pool-range {
          low 192.168.1.1;
          high 192.168.255.255;
        }
      }
    }
    pool client-ipv6-pool2 {
      family inet6 {
        prefix 2010:db8::/32;
        range lns-v6-pool-range {
          low 2010:db8:1::/48;
          high 2010:db8:ffff::/48;
        }
      }
    }
  }

  [edit]
  user@host# show chassis
  fpc 5 {
```

```
    pic 0 {
        inline-services {
            bandwidth 10g;
        }
    }
    pic 2 {
        inline-services {
            bandwidth 10g;
        }
    }
}

[edit]
user@host# show interfaces
ge-5/0/1 {
    vlan-tagging;;
    unit 11 {
        vlan-id 11;
        family inet {
            address 11.1.1.2/24;
        }
    }
}
si-5/0/0 {
    hierarchical-scheduler maximum-hierarchy-levels 2;
    encapsulation generic-services;
    unit 0 {
        family inet;
    }
}
si-5/2/0 {
    hierarchical-scheduler maximum-hierarchy-levels 2;
    encapsulation generic-services;
    unit 0 {
        family inet;
    }
}
lo0 {
    unit 0 {
        family inet {
            address 127.0.0.1/32;
        }
    }
}
[edit]
user@host# show dynamic-profiles
dyn-lns-profile2 {
    routing-instances {
        "$junos-routing-instance" {
            interface "$junos-interface-name";
            routing-options {
                access {
                    route $junos-framed-route-ip-address-prefix {
                        next-hop "$junos-framed-route-nexthop";
                        metric "$junos-framed-route-cost";
```

```
            preference "$junos-framed-route-distance";
          }
        }
        access-internal {
          route $junos-subscriber-ip-address {
            qualified-next-hop "$junos-interface-name";
          }
        }
      }
    }
  }
  interfaces {
    "$junos-interface-ifd-name" {
      unit "$junos-interface-unit" {
        dial-options {
          l2tp-interface-id l2tp-encapsulation;
          dedicated;
        }
        family inet {
          filter {
            input "$junos-input-filter";
            output "$junos-output-filter";
          }
          unnumbered-address "$junos-loopback-interface";
        }
        family inet6 {
          address $junos-ipv6-address;
          input $junos-input-ipv6-filter;
          output $junos-output-ipv6-filter;
        }
      }
    }
  }
  protocols {
    router-advertisement {
      interface "$junos-interface-name" {
        prefix $junos-ipv6-ndra-prefix;
      }
    }
  }
  class-of-service {
    rewrite-rules {
      dscp rewriteDSCP {
        forwarding-class expedited-forwarding {
          loss-priority high code-point af11
          loss-priority high code-point af12
        }
      }
    }
    traffic-control-profiles {
      tc-profile {
        scheduler-map "$junos-cos-scheduler-map";
        shaping-rate "$junos-cos-shaping-rate";
        overhead-accounting "$junos-cos-shaping-mode" bytes "$junos-cos-byte-adjust";
      }
    }
```

```
    interfaces {
      "$junos-interface-ifd-name" {
        unit "$junos-interface-unit" {
          forwarding-class expedited-forwarding;
          output-traffic-control-profile tc-profile;
          rewrite-rules {
            dscp rewriteDSCP;
          }
        }
      }
    }
  }
}

[edit]
user@host# show services l2tp
tunnel-group tg-dynamic {
  l2tp-access-profile ce-l2tp-profile;
  aaa-access-profile aaa-profile;
  local-gateway {
    address 11.1.1.2;
  }
  service-device-pool lns_p1;
  dynamic-profile dyn-lns-profile2;
}
```

When you are done configuring the device, enter **commit** from configuration mode.

Related Documentation

- L2TP for Subscriber Access Overview on page 3
- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- Configuring an L2TP LAC on page 29

CHAPTER 8

Configuration Statements

[edit access tunnel-profile] Hierarchy Level

```
access {
  tunnel-profile profile-name {
    tunnel tunnel-id {
      identification name;
      logical-system logical-system-name;
      max-sessions number;
      medium type;
      nas-port-method cisco-avp;
      preference number;
      remote-gateway {
        address server-ip-address;
        gateway-name server-name;
      }
      routing-instance routing-instance-name;
      secret password;
      source-gateway {
        address client-ip-address;
        gateway-name client-name;
      }
      type tunnel-type;
    }
  }
}
```

Related Documentation

- Configuring a Tunnel Profile for Subscriber Access on page 31

[edit access tunnel-switch-profile] Hierarchy Level

```
access {
  tunnel-switch-profile profile-name {
    avp {
      bearer-type action;
      calling-number action;
```

```
        cisco-nas-port-info action;
      }
      tunnel-profile profile-name;
    }
  }
```

Related Documentation

- Configuring L2TP Tunnel Switching on page 58

[edit services l2tp] Hierarchy Level

NOTE: The tunnel-group *group-name* stanza is not supported for L2TP LAC. It applies only to L2TP LNS. Similarly, some of the options for the traceoptions statement apply only to L2TP LNS; for more information, see traceoptions.

```
services {
  l2tp {
    destination
      lockout-timeout seconds;
    }
    destruct-timeout seconds;
    disable-calling-number-avp;
    disable-failover-protocol;
    enable-snmp-tunnel-statistics;
    fail-over-within-preference;
    ip-reassembly;
    rx-connect-speed-when-equal;
    traceoptions {
      debug-level level;
      file filename <files number> <match regular-expression > <size maximum-file-size>
        <world-readable | no-world-readable>;
      filter {
        protocol name;
        user-name username;
      }
      flag flag;
      interfaces interface-name {
        debug-level severity;
        flag flag;
      }
      level (all | error | info | notice | verbose | warning);
      no-remote-trace;
    }
    tunnel {
      assignment-id-format (assignment-id |client-server-id);
      idle-timeout seconds;
      retransmission-count-established count;
      retransmission-count-not-established count;
      tx-address-change (accept | ignore | ignore-ip-address | ignore-udp-port);
    }
    tunnel-group group-name {
      aaa-access-profile profile-name;
      dynamic-profile;
```

```
            hello-interval seconds;
            hide-avps;
            l2tp-access-profile profile-name;
            local-gateway address address;
            maximum-send-window packets;
            ppp-access-profile profile-name;
            receive-window packets;
            retransmit-interval seconds;
            service-device-pool;
            service-interface interface-name;
            syslog {
              host hostname {
                facility-override facility-name;
                log-prefix prefix-value;
                services severity-level;
              }
            }
            tos-reflect;
            tunnel-switch-profile profile-name;
            tunnel-timeout seconds;
          }
          tunnel-switch-profile profile-name;
          tx-connect-speed-method method;
          weighted-load-balancing;
        }
      }
```

Related Documentation

- L2TP for Subscriber Access Overview on page 3
- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

aaa-access-profile (L2TP LNS)

Syntax aaa-access-profile *profile-name*;

Hierarchy Level [edit services l2tp tunnel-group *name*],
[edit access profile *profile-name* client *client-name* l2tp]

Release Information Statement introduced in Junos OS Release 11.4.
Support at the **[edit access profile *profile-name* client *client-name* l2tp]** hierarchy level introduced in Junos OS Release 12.1.

Description Specify a AAA access profile that overrides the AAA access profile configured for the routing instance with the **access-profile** statement. You can configure a profile to specify the RADIUS server settings for a tunnel group or for a LAC client, or both. The AAA access profile configured for the client takes precedence over the AAA access profile configured for the tunnel group, which takes precedence over the access profile configured for the routing instance.

Options ***profile-name***—Name of the local access profile for the tunnel group or client.

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

Related Documentation
- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

address (Tunnel Profile Remote Gateway)

Syntax address *server-ip-address*;

Hierarchy Level [edit access tunnel-profile *profile-name* tunnel *tunnel-id* remote-gateway]

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the IP address of the remote gateway device at the L2TP tunnel endpoint, the LNS.

Options ***server-ip-address***—IP address of the remote gateway device.
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 a Tunnel Profile for Subscriber Access on page 31

address (Tunnel Profile Source Gateway)

Syntax address *client-ip-address*;

Hierarchy Level [edit access tunnel-profile *profile-name* tunnel *tunnel-id* source-gateway]

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the IP address of the source gateway device at the local L2TP tunnel endpoint, the LAC. This value overrides the default address for the logical system or routing instance.

Options ***client-ip-address***—IP address of the source gateway device.

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 a Tunnel Profile for Subscriber Access on page 31

assignment-id-format (L2TP LAC)

Syntax assignment-id-format (assignment-id | client-server-id);

Hierarchy Level [edit services l2tp tunnel]

Release Information Statement introduced in Junos OS Release 11.4.

Description Set the format for the name used for a tunnel, the tunnel assignment ID.

NOTE: Before you downgrade to a Junos OS Release that does not support this statement, unconfigure the statement by issuing **no services l2tp tunnel assignment-id-format**.

Default assignment-id

Options

assignment-id—The tunnel name corresponds to RADIUS attribute Tunnel-Assignment-Id [82].

client-server-id—The tunnel name is a combination of RADIUS attributes Tunnel-Client-Auth-Id [90], Tunnel-Server-Auth-Id [91], and Tunnel-Assignment-Id [82].

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

Related Documentation

- Setting the Format for the Tunnel Name on page 38

avp (L2TP Tunnel Switching)

Syntax

```
avp {
  bearer-type;
  calling-number;
  cisco-nas-port-info;
}
```

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

Release Information Statement introduced in Junos OS Release 13.2.

Description Specify the action taken on L2TP AVPs that are negotiated when the first session is created; these AVPs are contained in the L2TP packets that are switched by the tunnel switch 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 L2TP Tunnel Switching on page 58

bandwidth (Inline Services)

Syntax bandwidth (1g | 10g);

Hierarchy Level [edit chassis fpc *slot-number* pic *number* inline-services]

Release Information Statement introduced in Junos OS Release 11.4.

Description Configure the amount of bandwidth reserved on each Packet Forwarding Engine for tunnel traffic using inline services.

Options **1g**—Reserves 1 Gbps of bandwidth for tunnel traffic.

10g—Reserves 10 Gbps of bandwidth for tunnel traffic.

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

Related Documentation

- Enabling Inline Service Interfaces on page 50
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

bearer-type (L2TP Tunnel Switching)

Syntax bearer-type *action*;

Hierarchy Level [edit access tunnel-switch-profile *profile-name* avp]

Release Information Statement introduced in Junos OS Release 13.2.

Description Specify the action taken on the Bearer Type AVP (18) in the L2TP packets during tunnel switching if the AVP is negotiated when the first session is created.

Options ***action***—One of the following actions:

- **drop**—Drop the AVP.
- **regenerate**—Regenerate the AVP based on the local policy at the LTS and send it in the switched packet. The local policy may or may not use the value for the AVP received during negotiation for the first session.
- **relay**—Forward the AVP transparently as is and send it in the switched packet.

Default: relay

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

Related Documentation

- Configuring L2TP Tunnel Switching on page 58

calling-number (L2TP Tunnel Switching)

Syntax calling-number *action*;

Hierarchy Level [edit access tunnel-switch-profile *profile-name* avp]

Release Information Statement introduced in Junos OS Release 13.2.

Description Specify the action taken on the Calling Number AVP (22) in the L2TP packets during tunnel switching if the AVP is negotiated when the first session is created.

Options ***action***—One of the following actions:

- **drop**—Drop the AVP.
- **regenerate**—Regenerate the AVP based on the local policy at the LTS and send it in the switched packet. The local policy may or may not use the value for the AVP received during negotiation for the first session.
- **relay**—Forward the AVP transparently as is and send it in the switched packet.

Default: relay

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

Related Documentation

- Configuring L2TP Tunnel Switching on page 58

chap

Syntax

```
chap {
  access-profile name;
  challenge-length minimum minimum-length maximum maximum-length;
  default-chap-secret name;
  local-name name;
  passive;
}
```

Hierarchy Level

[edit interfaces *interface-name* ppp-options],
[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]

Release Information

Statement introduced before Junos OS Release 7.4.

Description

Allow each side of a link to challenge its peer, using a "secret" known only to the authenticator and that peer. The secret is not sent over the link.

By default, PPP CHAP is disabled. If CHAP is not explicitly enabled, the interface makes no CHAP challenges and denies all incoming CHAP challenges.

For ATM2 IQ interfaces only, you can configure CHAP on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:

- **atm-ppp-llc**—PPP over AAL5 LLC encapsulation.
- **atm-ppp-vc-mux**—PPP over AAL5 multiplex encapsulation.

BEST PRACTICE: On inline service (si) interfaces for L2TP, only the chap statement itself is typically used for subscriber management. We recommend that you leave the subordinate statements at their default values.

The remaining 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 the PPP Challenge Handshake Authentication Protocol*
- *Junos OS Administration Library for Routing Devices*
- Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface on page 44

chap (Dynamic PPP)

Syntax

```
chap {
  challenge-length minimum minimum-length maximum maximum-length;
}
```

Hierarchy Level [edit dynamic-profiles *profile-name* interfaces pp0 unit "$junos-interface-unit" ppp-options], [edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit "$junos-interface-unit" ppp-options]

Release Information Statement introduced in Junos OS Release 9.5.
Support at the **[edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit "$junos-interface-unit" ppp-options]** hierarchy level introduced in Junos OS Release 12.2.

Description Specify CHAP authentication in a PPP dynamic profile.

The remaining statement is explained separately.

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

Related Documentation

- *Dynamic Profiles Overview*
- *Configuring Dynamic Authentication for PPP Subscribers*
- *Attaching Dynamic Profiles to Static PPP Subscriber Interfaces*
- Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface on page 44

chap (L2TP)

Syntax

```
chap;
```

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

Release Information Statement introduced in Junos OS Release 11.4.

Description (MX Series routers only) Specify CHAP authentication for PPP subscribers in an L2TP LNS user group profile.

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

Related Documentation

- Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile on page 43
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

cisco-nas-port-info (L2TP Tunnel Switching)

Syntax cisco-nas-port-info *action*;

Hierarchy Level [edit access tunnel-switch-profile *profile-name* avp]

Release Information Statement introduced in Junos OS Release 13.2.

Description Define a tunnel profile for subscriber access.

Specify the action taken on the Cisco NAS Port Info AVP (100) in the L2TP packets during tunnel switching if the AVP is negotiated when the first session is created.

Options *action*—One of the following actions:

- **drop**—Drop the AVP.
- **regenerate**—Regenerate the AVP based on the local policy at the LTS and send it in the switched packet. The local policy may or may not use the value for the AVP received during negotiation for the first session.
- **relay**—Forward the AVP transparently as is and send it in the switched packet.

Default: relay

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

Related Documentation

- Configuring L2TP Tunnel Switching on page 58

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-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;
  }
  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.

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*
- *Configuring Access Profiles for L2TP or PPP Parameters*
- Configuring an L2TP Access Profile on the LNS on page 46

destination (L2TP Destination Lockout)

Syntax
```
destination {
  lockout-timeout seconds;
}
```

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 13.2.

Description Configure how long a destination is locked out from being considered when a new tunnel is created. Destinations are locked out when L2TP cannot connect to the destination during the tunnel selection process.

The remaining statement is 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 the L2TP Destination Lockout Timeout on page 57
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

destruct-timeout (L2TP)

Syntax destruct-timeout *seconds*;

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 12.1.

Description Set how long the router attempts to maintain dynamic destinations, tunnels, and sessions after they have been destroyed.

BEST PRACTICE: **Before you downgrade to a Junos OS Release that does not support this statement, unconfigure the statement by issuing no services l2tp destruct-timeout.**

Options *seconds*—Length of the destruct timeout.

Range: 10 through 3600

Default: 300

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

Related Documentation

- Setting the L2TP Destruct Timeout on page 63
- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

dial-options

Syntax

```
dial-options {
  ipsec-interface-id name;
  l2tp-interface-id name;
  (shared | dedicated);
}
```

Hierarchy Level

[edit interfaces sp-*fpc/pic/port* unit *logical-unit-number*],
[edit interfaces si-*fpc/pic/port* unit *logical-unit-number*],
[edit logical-systems *logical-system-name* interfaces sp-*fpc/pic/port* unit *logical-unit-number*],
[edit logical-systems *logical-system-name* interfaces si-*fpc/pic/port* unit *logical-unit-number*]

Release Information

Statement introduced before Junos OS Release 7.4.
The **[edit ...si-...]** hierarchy levels introduced in Junos OS Release 11.4.

Description

Specify the options for configuring logical interfaces for group and user sessions in L2TP or IPsec dynamic endpoint tunneling.

Options

dedicated—(LNS on M Series routers and MX Series routers only) Specify that a logical interface can host only one session at a time.

ipsec-interface-id *name*—(M Series routers only) Interface identifier for group of dynamic peers. This identifier must be replicated at the **[edit access profile *name* client * ike]** hierarchy level.

l2tp-interface-id *name*—Interface identifier that must be replicated at the **[edit access profile *name*]** hierarchy level.

shared—(LNS on M Series routers only) Specify that a logical interface can host multiple (shared) sessions at a time.

Required Privilege Level

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

Related Documentation

- *Configuring the Identifier for Logical Interfaces that Provide L2TP Services*
- *Configuring Dynamic Endpoints for IPsec Tunnels*
- Configuring Options for the LNS Inline Services Logical Interface on page 53

dial-options (Dynamic Profiles)

Syntax

```
dial-options {
  ipsec-interface-id name;
  l2tp-interface-id name;
  (shared | dedicated);
}
```

Hierarchy Level [edit dynamic-profiles *profile-name* interfaces *interface-name* unit *logical-unit-number*]

Release Information Statement introduced in Junos OS Release 11.4.

Description Specify the options for configuring logical interfaces in dynamic profiles for group and user sessions in L2TP or IPsec dynamic endpoint tunneling.

Options

dedicated—(LNS on M Series routers and MX Series routers only) Specify that a logical interface can host only one session at a time.

ipsec-interface-id *name*—Interface identifier for group of dynamic peers. This identifier must be replicated at the **[edit access profile** *name* **client * ike]** hierarchy level. This options is not currently supported.

l2tp-interface-id *name*—(MX Series routers only) L2TP interface identifier that must be replicated at the **[edit access profile** *name***]** hierarchy level.

shared—(LNS on M Series routers only) Specify that a logical interface can host multiple (shared) sessions at a time

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

Related Documentation

- Configuring a Dynamic Profile for Dynamic LNS Sessions on page 56

disable-calling-number-avp (L2TP LAC)

Syntax

```
disable-calling-number-avp;
```

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 10.4.

Description Prevent the LAC from sending L2TP Calling Number AVP 22 in incoming-call request (ICRQ) packets to the LNS. By default, the LAC in an L2TP network generates this AVP from the Calling-Station-Id and sends it to the LNS.

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

Related Documentation

- Preventing the LAC from Sending Calling Number AVP 22 to the LNS on page 35

disable-failover-protocol (L2TP LAC)

Syntax disable-failover-protocol;

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 11.2.

Description Configure the LAC to use only the silent failover method when resynchronizing with the peer LNS in the event of LAC failover. This command prevents the default behavior, wherein the LAC first attempts to use the failover protocol and then falls back on the silent failover method. This configuration can be useful when routers that act as the LNS are configured for silent failover or incorrectly negotiate use of the failover protocol even though they do not support it.

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

Related Documentation
- Preventing the LAC From Negotiating L2TP Failover Protocol on page 37

dynamic-profile (L2TP)

Syntax dynamic-profile *profile-name*;

Hierarchy Level [edit services l2tp tunnel-group *name*]

Release Information Statement introduced in Junos OS Release 11.4.

Description Assign a dynamic profile to the tunnel group for dynamic LNS sessions.

Options ***profile-name***—Name of the dynamic profile for the tunnel group.

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

Related Documentation
- Configuring a Dynamic Profile for Dynamic LNS Sessions on page 56

enable-snmp-tunnel-statistics (L2TP)

Syntax enable-snmp-tunnel-statistics;

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 12.1R4 and supported in later 12.1Rx releases.
Statement supported in Junos OS Release 12.2R2 and later 12.2Rx releases. (Not supported in Junos OS Release 12.2R1.)
Statement supported in Junos OS Release 12.3 and later releases.

Description Enable collection of L2TP tunnel and global counters for SNMP statistics.

NOTE: The system load can increase when you enable these counters and also use RADIUS interim accounting updates. We recommend you enable these counters when you are using only SNMP statistics.

Default Disabled.

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

Related Documentation
- Enabling Tunnel and Global Counters for SNMP Statistics Collection on page 64

fail-over-within-preference (L2TP LAC)

Syntax fail-over-within-preference;

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 10.4.

Description Enable L2TP LAC tunnel selection within a preference level. When the router is unable to connect to a destination at a given preference level, it attempts to connect to another destination at the same level. By default, when a connection attempt fails at one preference level, the next attempt is made at the next lower level.

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

Related Documentation
- Configuring LAC Tunnel Selection Failover Within a Preference Level on page 34
- Configuring the L2TP LAC Tunnel Selection Parameters on page 34

fpc (MX Series 3D Universal Edge Routers)

Syntax

```
fpc slot-number {
  inline-services {
    flow-table-size {
      ipv4-flow-table-size units;
      ipv4-flow-table-size  units;
    }
  }
  pic number {
    inline-services {
      bandwidth (1g | 10g);
    }
    port-mirror-instance port-mirroring-instance-name-pic-level;
    tunnel-services {
      bandwidth (1g | 10g)
    }
  }
  port-mirror-instance port-mirroring-instance-name-fpc-level;
}
```

Hierarchy Level [edit chassis]

Release Information Statement introduced in Junos OS Release 8.2.
port-mirror-instance option introduced in Junos OS Release 9.3.

Description Configure properties for the DPC or MPC and corresponding Packet Forwarding Engines to create tunnel interfaces.

(MX Series Virtual Chassis only) To configure properties for MPCs in a member router in an MX Series Virtual Chassis configuration, you must specify the router's Virtual Chassis member number *before* the **fpc** statement. Specify the member number in the form **member *member-id***, where ***member-id*** is 0 or 1. If you do not specify the member number before the **fpc** statement, the commit operation fails and the software displays an error message indicating that the **fpc** statement must include the member number for routers in Virtual Chassis mode.

Options

fpc *slot-number*—Specify the slot number of the DPC.

Range: 0 through 11

pic *number*—Specify the number of the Packet Forwarding Engine. Each DPC includes four Packet Forwarding Engines.

Range: 0 through 4

port-mirror-instance *port-mirroring-instance-name-fpc-level*—Associate a port-mirroring instance with the DPC and its corresponding PICs. The port-mirroring instance is configured under the **[edit forwarding-options port-mirroring]** hierarchy level.

The remaining 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 Port-Mirroring Instances on MX Series 3D Universal Edge Routers*
- Enabling Inline Service Interfaces on page 50

gateway-name (Tunnel Profile Remote Gateway)

Syntax
gateway-name *server-name*;

Hierarchy Level
[edit access tunnel-profile *profile-name* tunnel *tunnel-id* remote-gateway]

Release Information
Statement introduced in Junos OS Release 10.4.

Description
Specify the hostname expected by the remote gateway—the LNS—from the source gateway—the LAC—when you set up a tunnel.

Options
server-name—Name of the LNS.

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

Related Documentation
- Configuring a Tunnel Profile for Subscriber Access on page 31

gateway-name (Tunnel Profile Source Gateway)

Syntax
gateway-name *client-name*;

Hierarchy Level
[edit access tunnel-profile *profile-name* tunnel *tunnel-id* source-gateway]

Release Information
Statement introduced in Junos OS Release 10.4.

Description
Specify the hostname provided by the source gateway—the LAC—to the remote gateway—the LNS—when you set up a tunnel.

Options
client-name—Name of the LAC.

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

Related Documentation
- Configuring a Tunnel Profile for Subscriber Access on page 31

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 {
      chap;
      pap;
    }
    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.

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*
- Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile on page 43

hello-interval

Syntax hello-interval *seconds*;

Hierarchy Level [edit services l2tp tunnel-group *name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Specify the keepalive timer for L2TP tunnels.

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

Options ***seconds***—Interval, in seconds, after which the server sends a hello message if no messages are received. A value of **0** means that no hello messages are sent.

Default: 60 seconds

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

Related Documentation

- *Configuring Timers for L2TP Tunnels*
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

identification (Tunnel Profile)

Syntax identification *name*;

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the assignment ID of an L2TP tunnel. L2TP sessions with the same tunnel assignment identification and destination are grouped into the same tunnel.

Options ***name***—Tunnel assignment ID; string of up to 32 alphanumeric characters.

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

Related Documentation

- Configuring a Tunnel Profile for Subscriber Access on page 31

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.

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 Group Profile for Defining L2TP Attributes*
- *Configuring PPP Properties for a Client-Specific Profile*
- Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile on page 43

idle-timeout (L2TP)

Syntax idle-timeout *seconds*;

Hierarchy Level [edit services l2tp tunnel]

Release Information Statement introduced in Junos OS Release 12.1.

Description Specify how long a tunnel is active after its last session is terminated. The timer starts when the session is terminated and the tunnel is disconnected when the timer expires.

BEST PRACTICE: **Before you downgrade to a Junos OS Release that does not support this statement, unconfigure the statement by issuing no services l2tp tunnel idle-timeout.**

Options *seconds*—Length of the idle timeout. A value of **0** creates a persistent tunnel; that is, the tunnel remains active indefinitely until the remote peer disconnects it or you issue the **clear services l2tp tunnel** command.

Range: 0 through 86,400

Default: 60

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

Related Documentation

- Setting the L2TP Tunnel Idle Timeout on page 62
- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

inline-services (FPC Level)

Syntax

```
inline-services {
  flow-table-size {
    ipv4-flow-table-size units;
    ipv6-flow-table-size units;
  }
}
```

Hierarchy Level [edit chassis fpc *slot-number*]

Release Information Statement introduced in Junos OS Release 12.1.

Description Enable inline services on MPCs, configured at the FPC level. To enable inline services that are specified at the PIC level, see configuration statement **inline-services (PIC level)**.

Options The remaining statements are defined separately.

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

Related Documentation

- Enabling Inline Service Interfaces on page 50
- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- *Configuring Inline Sampling*

inline-services (PIC level)

Syntax

```
inline-services {
  bandwidth (1g | 10g);
}
```

Hierarchy Level [edit chassis fpc *slot-number* pic *number*]

Release Information Statement introduced in Junos OS Release 11.4.

Description Enable inline services on PICs residing on MPCs. To enable inline services that are specified at the fpc level, see configuration statement **inline-services (FPC Level)**

The remaining statement is explained separately.

Options The option is described separately.

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

Related Documentation

- Enabling Inline Service Interfaces on page 50
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

interface (L2TP Service Interfaces)

Syntax interface *service-interface-name*;

Hierarchy Level [edit services service-device-pools pool *pool-name*]

Release Information Statement introduced in Junos OS Release 11.4.

Description Specify a service interface assigned to a service interface pool. You specify more than one interface for each pool; the interfaces are used by an L2TP tunnel group to balance traffic loads.

Options ***service-interface-name***—Name of the service interface.

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

Related Documentation

- Configuring a Pool of Inline Services Interfaces for Dynamic LNS Sessions on page 55
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

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 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 the Group Profile for Defining L2TP Attributes*
- *Configuring the Group Profile for Defining L2TP Attributes*
- *Configuring L2TP Properties for a Client-Specific Profile*
- *Configuring PPP Properties for a Client-Specific Profile*
- *Configuring an IKE Access Profile*
- Configuring an L2TP Access Profile on the LNS on page 46

ip-reassembly

Syntax

```
ip-reassembly {
  profile profile-name
  rule rule-name{
    match-direction direction
  };
}
```

Hierarchy Level [edit services]

Release Information Statement introduced in Junos OS Release 13.1.

Description Configure the IP reassembly parameters to be applied to the L2TP server.

NOTE: Inline IP reassembly configuration does not require you to configure the profile statement. The profile configuration is used when IP reassembly is configured on services PICs.

Options **profile *profile-name***—Name of the IP reassembly profile.

The remaining 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 IP Inline Reassembly for L2TP on page 51
- IP Packet Fragment Reassembly for L2TP Overview on page 22

ip-reassembly-rules (Service Set)

Syntax ip-reassembly-rules *rule-name*;

Hierarchy Level [edit services service-set*service-set-name*]

Release Information Statement introduced in Junos OS Release 13.1.

Description Specify one or more previously configured IP reassembly rules to associate with the service set.

NOTE: **The IP reassembly rule must be defined at the [edit services ip-reassembly rule] hierarchy level.**

Options ***rule-name***—Name of an IP reassembly rule.

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

Related Documentation

- Configuring IP Inline Reassembly for L2TP on page 51
- IP Packet Fragment Reassembly for L2TP Overview on page 22

ip-reassembly (L2TP)

Syntax

```
ip-reassembly {
  service-set service-set-name;
}
```

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 13.1.

Description Associate the reassembly service-set with the L2TP service.

NOTE: The service set must be defined at the [edit services] hierarchy level.

Options **service-set *service-set-name***—Identifies the service set to be associated with the L2TP service.

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

Related Documentation

- IP Packet Fragment Reassembly for L2TP Overview on page 22
- Configuring IP Inline Reassembly for L2TP on page 51

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 Group Profile for Defining L2TP Attributes*
- *Configuring PPP Properties for a Client-Specific Profile*
- Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile on page 43

keepalives

Syntax keepalives <interval *seconds*> <down-count *number*> <up-count *number*>;

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

Release Information Statement introduced before Junos OS Release 7.4.

Description Enable the sending of keepalives on a physical interface configured with PPP, Frame Relay, or Cisco HDLC encapsulation.

For ATM2 IQ interfaces only, you can enable keepalives on a logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:

- **atm-ppp-llc**—PPP over AAL5 LLC encapsulation.
- **atm-ppp-vc-mux**—PPP over AAL5 multiplex encapsulation.

Default Sending of keepalives is enabled by default. The default keepalive interval is 10 seconds for PPP, Frame Relay, or Cisco HDLC. The default down-count is 3 and the default up-count is 1 for PPP or Cisco HDLC.

Options

down-count *number*—The number of keepalive packets a destination must fail to receive before the network takes down a link.

Range: 1 through 255

Default: 3

interval *seconds*—The time in seconds between successive keepalive requests.

Range: 1 through 32767 seconds

Default: 10 seconds

up-count *number*—The number of keepalive packets a destination must receive to change a link's status from down to up.

Range: 1 through 255

Default: 1

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

Related Documentation

- *Configuring Keepalives*
- *Configuring Frame Relay Keepalives*
- Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface on page 44

keepalives (Dynamic Profiles)

Syntax

```
keepalives {
  interval seconds;
  }
```

Hierarchy Level

[edit dynamic-profiles *profile-name* interfaces pp0 unit *logical-unit-number*]
[edit dynamic-profiles *profile-name* interfaces pp0 unit “$junos-interface-unit”]
[edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit “$junos-interface-unit”]

Release Information

Statement introduced in Junos OS Release 9.5.
Support at the **[edit dynamic-profiles *profile-name* interfaces pp0 unit “$junos-interface-unit”]** hierarchy level introduced in Junos OS Release 10.1.
Support at the **[edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit “$junos-interface-unit”]** hierarchy level introduced in Junos OS Release 12.2.

Description

Specify the keepalive interval in a PPP dynamic profile.

Default

Sending of keepalives is enabled by default.

Options

interval *seconds*—The time in seconds between successive keepalive requests.

Range: 1 through 32767 seconds

Default: 30 seconds for LNS-based PPP sessions. 10 seconds for all other PPP sessions.

Required Privilege Level

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

Related Documentation

- *Dynamic Profiles Overview*
- *Configuring Dynamic Authentication for PPP Subscribers*
- Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface on page 44

l2tp

Syntax

```
l2tp {
  destination
    lockout-timeout seconds;
  }
  destruct-timeout seconds;
  disable-calling-number-avp;
  disable-failover-protocol;
  enable-snmp-tunnel-statistics;
  fail-over-within-preference;
  ip-reassembly;
  rx-connect-speed-when-equal;
  traceoptions {
    debug-level level;
    file filename <files number> <match regular-expression > <size maximum-file-size>
      <world-readable | no-world-readable>;
    filter {
      protocol name;
      user-name username;
    }
    flag flag;
    interfaces interface-name {
      debug-level severity;
      flag flag;
    }
    level (all | error | info | notice | verbose | warning);
    no-remote-trace;
  }
  tunnel {
    assignment-id-format (assignment-id |client-server-id);
    idle-timeout seconds;
    retransmission-count-established count;
    retransmission-count-not-established count;
    tx-address-change (accept | ignore | ignore-ip-address | ignore-udp-port);
    rx-window-size packets;
  }
  tunnel-group group-name {
    aaa-access-profile profile-name;
    dynamic-profile profile-name;
    hello-interval seconds;
    hide-avps;
    l2tp-access-profile profile-name;
    local-gateway address address;
    maximum-send-window packets;
    ppp-access-profile profile-name;
    receive-window packets;
    retransmit-interval seconds;
    service-device-pool pool-name;
    service-interface interface-name;
    syslog {
      host hostname {
        facility-override facility-name;
        log-prefix prefix-value;
```

```
            services severity-level;
          }
        }
        tos-reflect;
        tunnel-switch-profile profile-name;
        tunnel-timeout seconds;
      }
      tunnel-switch-profile profile-name;
      tx-connect-speed-method method;
      weighted-load-balancing;
}
```

Hierarchy Level [edit services]

Release Information Statement 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 Configure L2TP services to establish PPP tunnels across a network.

The remaining statements are explained separately.

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

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

Related Documentation

- *Layer 2 Tunneling Protocol Overview*
- L2TP for Subscriber Access Overview on page 3

l2tp-access-profile

Syntax l2tp-access-profile *profile-name*;

Hierarchy Level [edit services l2tp tunnel-group *name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Specify the profile used to validate all L2TP connection requests to the local gateway address.

Options ***profile-name***—Identifier for the L2TP connection profile.

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

Related Documentation
- *Configuring Access Profiles for L2TP Tunnel Groups*
- Configuring an L2TP Access Profile on the LNS on page 46

l2tp-access-profile

Syntax l2tp-access-profile *profile-name*;

Hierarchy Level [edit services l2tp tunnel-group *name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Specify the profile used to validate all L2TP connection requests to the local gateway address.

Options ***profile-name***—Identifier for the L2TP connection profile.

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

Related Documentation
- *Configuring Access Profiles for L2TP Tunnel Groups*
- Configuring an L2TP Access Profile on the LNS on page 46

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 the Group Profile for Defining L2TP Attributes*
- *Configuring L2TP Properties for a Client-Specific Profile*
- Configuring an L2TP Access Profile on the LNS on page 46

local-gateway address

Syntax local-gateway address *address*;

Hierarchy Level [edit services l2tp tunnel-group *name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Specify the local (LNS) IP address for L2TP tunnel.

Options ***address***—Local IP address; corresponds to the IP address that is used by LACs to identify the LNS. When the LAC is an MX Series router, this address matches the remote gateway address configured in the LAC tunnel profile.

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

Related Documentation

- *Configuring the Local Gateway Address and PIC*.
- *Configuring L2TP Tunnel Groups*
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

lockout-timeout (L2TP Destination Lockout)

Syntax lockout-timeout *seconds*;

Hierarchy Level [edit services l2tp destination]

Release Information Statement introduced in Junos OS Release 13.2.

Description Set the duration of the timeout period for which all future destinations are locked out, meaning that they are not considered for selection when a new tunnel is created. This statement does not affect destinations that are currently locked out.

Options ***seconds***—Length of the period during which the destination is locked out.

Range: 60 through 3600 seconds

Default: 300 seconds

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

Related Documentation

- Configuring the L2TP Destination Lockout Timeout on page 57
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

logical-system (Tunnel Profile)

Syntax logical-system *logical-system-name*;

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify a logical system for a tunnel. When you specify a logical system, you must also specify a routing instance.

Options ***logical-system-name***— Name of the logical system.
Default: Logical system *default*

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

Related Documentation
- Configuring a Tunnel Profile for Subscriber Access on page 31

match-direction (IP Reassembly Rule)

Syntax match-direction *direction*

Hierarchy Level [edit services ip-reassemblyrule*rule-name*]

Release Information Statement introduced in Junos OS Release 13.1.

Description Configure the direction in which the IP reassembly rule matching is applied. The match direction is used with respect to the traffic flow through the inline services interface. You must configure a match direction for an IP reassembly rule.

Options ***direction***—Match direction. For inline IP reassembly, **input** is the only match direction supported.

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

Related Documentation
- Configuring IP Inline Reassembly for L2TP on page 51
- IP Packet Fragment Reassembly for L2TP Overview on page 22

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 the Group Profile for Defining L2TP Attributes*
- *Configuring L2TP Properties for a Client-Specific Profile*
- Configuring an L2TP Access Profile on the LNS on page 46

max-sessions (Tunnel Profile)

Syntax max-sessions *number*;

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the maximum number of sessions allowed in the tunnel.

Options *number*—Maximum number of sessions allowed in the tunnel.
Range: 0 through 60,000
Default: 0

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

Related Documentation

- Configuring a Tunnel Profile for Subscriber Access on page 31

medium (Tunnel Profile)

Syntax medium *type*;

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the medium type for the tunnel.

Default ipv4

Options *type*—Medium type for the tunnel. The only value currently available is **ipv4**.

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

Related Documentation
- Configuring a Tunnel Profile for Subscriber Access on page 31

nas-port-method (Tunnel Profile)

Syntax nas-port-method cisco-avp;

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

Release Information Statement introduced in Junos OS Release 13.2.

Description Configure the LAC to interoperate with Cisco LNS devices by including the Cisco NAS Port Info AVP (100) in the ICRQ to the LNS. This AVP conveys the physical NAS port number identifier and the type of the physical port, such as Ethernet or ATM.

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

Related Documentation
- Configuring a Tunnel Profile for Subscriber Access on page 31

next-hop-service

Syntax

```
next-hop-service {
  inside-service-interface interface-name.unit-number;
  outside-service-interface interface-name.unit-number;
  outside-service-interface-type local;
  service-interface-pool name;
}
```

Hierarchy Level [edit services service-set *service-set-name*]

Release Information Statement introduced before Junos OS Release 7.4.
service-interface-pool option added in Junos OS Release 9.3.

Description Specify interface names or a service interface pool for the forwarding next-hop service set. You cannot specify both a service interface pool and an inside or outside interface.

Options

inside-service-interface ***interface-name.unit-number***—Name and logical unit number of the service interface associated with the service set applied inside the network.

outside-service-interface ***interface-name.unit-number***—Name and logical unit number of the service interface associated with the service set applied outside the network.

outside-service-interface-type ***interface-type***—Identifies the interface type of the service interface associated with the service set applied outside the network. For inline IP reassembly, set the interface type to local.

service-interface-pool ***name***—Name of the pool of logical interfaces configured at the **[edit services service-interface-pools pool *pool-name*]** hierarchy level. You can configure a service interface pool only if the service set has a PGCP rule configured. The service set cannot contain any other type of rule.

NOTE: **service-interface-pool** is not applicable for IP reassembly configuration on L2TP.

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

Related Documentation

- *Configuring Service Sets to be Applied to Services Interfaces*

pap

Syntax

```
pap {
  access-profile name;
  default-pap-password password;
  local-name name;
  local-password password;
  passive;
}
```

Hierarchy Level

[edit interfaces *interface-name* ppp-options],
[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]

Release Information

Statement introduced in Junos OS Release 8.3.

Description

Configure the Password Authentication Protocol (PAP). Use PAP authentication as a means to provide a simple method for the peer to establish its identity using a two-way handshake. This is done only upon initial link establishment.

After the link is established, an ID and password pair is repeatedly sent by the peer to the authenticator until authentication is acknowledged or the connection is terminated.

BEST PRACTICE: On inline service (si) interfaces for L2TP, only the pap statement itself is typically used for subscriber management. We recommend that you leave the subordinate statements at their default values.

The remaining 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 the PPP Challenge Handshake Authentication Protocol*
- *Configuring PPP PAP Authentication*
- *Tracing Operations of the pppd Process*
- *traceoptions (PPP Process)*
- *Junos OS Administration Library for Routing Devices*
- Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface on page 44

pap (Dynamic PPP)

Syntax pap;

Hierarchy Level [edit dynamic-profiles *profile-name* interfaces pp0 unit "$junos-interface-unit" ppp-options], [edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit "$junos-interface-unit" ppp-options]

Release Information Statement introduced in Junos OS Release 9.5.
Support at the **[edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit "$junos-interface-unit" ppp-options]** hierarchy level introduced in Junos OS Release 12.2.

Description Specify PAP authentication in a PPP dynamic profile.

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

Related Documentation

- *Dynamic Profiles Overview*
- *Configuring Dynamic Authentication for PPP Subscribers*
- *Attaching Dynamic Profiles to Static PPP Subscriber Interfaces*
- Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface on page 44

pap (L2TP)

Syntax pap;

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

Release Information Statement introduced in Junos OS Release 11.4.

Description (MX Series routers only) Specify PAP authentication for PPP subscribers in an L2TP LNS user group profile.

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

Related Documentation

- Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile on page 43

pic (M Series, MX Series, and T Series Routers)

Syntax

```
pic pic-number {
  ce1 {
    e1 port-number {
      channel-group group-number timeslots slot-number;
    }
  }
  ct3 {
    port port-number {
      t1 link-number {
        channel-group group-number timeslots slot-number;
      }
    }
  }
  framing (sdh | sonet);
  idle-cell format {
    itu-t;
    payload-pattern payload-pattern-byte;
  }
  inline-services {
    bandwidth (1g | 10g);
  }
  max-queues-per-interface (8 | 4);
  no-concatenate;
}
```

Hierarchy Level [edit chassis fpc *slot-number*]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure properties for an individual PIC.

Options ***pic-number***—Slot number in which the PIC is installed.

Range: 0 through 3

The remaining 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 the Junos OS to Enable SONET/SDH Framing for SONET/SDH PICs*
- *Configuring the Junos OS to Enable a SONET PIC to Operate in Channelized (Multiplexed) Mode*
- *Configuring the Junos OS to Support Channelized DS3-to-DS0 Naming for Channel Groups and Time Slots*
- *Configuring the Junos OS to Support Channel Groups and Time Slots for Channelized E1 PICs*
- Enabling Inline Service Interfaces on page 50

pool (L2TP Service Interfaces)

Syntax

```
pool pool-name {
  interface service-interface-name;
}
```

Hierarchy Level [edit services service-device-pools]

Release Information Statement introduced in Junos OS Release 11.4.

Description Define a pool of service interfaces that can be assigned to an L2TP tunnel group for traffic load-balancing. The service device pool is required for dynamic LNS sessions.

Options ***pool-name***—Name of the service interface pool.

The remaining statement is 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 a Pool of Inline Services Interfaces for Dynamic LNS Sessions on page 55

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 {
    chap;
    pap;
  }
  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.

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 Group Profile for Defining L2TP Attributes*
- Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile on page 43

ppp-options

Syntax

```
ppp-options {
  authentication [ authentication-protocols ];
  chap {
    access-profile name;
    challenge-length minimum minimum-length maximum maximum-length;
    default-chap-secret name;
    local-name name;
    passive;
  }
  compression {
    acfc;
    pfc;
  }
  dynamic-profile profile-name;
  lcp-max-conf-req number
  lcp-restart-timer milliseconds;
  loopback-clear-timer seconds;
  ncp-max-conf-req number
  ncp-restart-timer milliseconds;
  on-demand-ip-address
  pap {
    access-profile name;
    default-pap-password password;
    local-name name;
    local-password password;
    passive;
  }
}
```

Hierarchy Level

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

Release Information

Statement introduced before Junos OS Release 7.4.

Description

On interfaces with PPP encapsulation, configure PPP-specific interface properties.

For ATM2 IQ interfaces only, you can configure CHAP on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:

- **atm-ppp-llc**—PPP over AAL5 LLC encapsulation.
- **atm-ppp-vc-mux**—PPP over AAL5 multiplex encapsulation.

BEST PRACTICE: On inline service (si) interfaces for L2TP, only the **chap** and **pap** statements are typically used for subscriber management. We recommend that you leave the other statements subordinate to **ppp-options**—including those subordinate to **chap** and **pap**—at their default values.

The remaining 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 the PPP Challenge Handshake Authentication Protocol*
- Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface on page 44

ppp-options (Dynamic PPP)

Syntax
```
ppp-options {
  authentication [ authentication-protocols ];
  chap {
    challenge-length minimum minimum-length maximum maximum-length;
  }
  on-demand-ip-address;
  pap;
}
```

Hierarchy Level
[edit dynamic-profiles *profile-name* interfaces pp0 unit “$junos-interface-unit”],
[edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit “$junos-interface-unit”]

Release Information
Statement introduced in Junos OS Release 9.5.
Support at the **[edit dynamic-profiles *profile-name* interfaces "$junos-interface-ifd-name" unit “$junos-interface-unit”]** hierarchy level introduced in Junos OS Release 12.2.

Description
Configure PPP-specific interface properties in a dynamic profile.

The remaining 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
- *Dynamic Profiles Overview*
- *Configuring Dynamic Authentication for PPP Subscribers*
- *Attaching Dynamic Profiles to Static PPP Subscriber Interfaces*
- Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface on page 44

ppp-options (L2TP)

Syntax

```
ppp-options {
  chap;
  pap;
}
```

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

Release Information Statement introduced in Junos OS Release 11.4.

Description Configure PPP-specific properties in a group profile that applies to tunneled PPP subscribers at the LNS.

The remaining 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 the Group Profile for Defining L2TP Attributes*
- Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile on page 43

preference (Tunnel Profile)

Syntax preference *number*;

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the preference for a tunnel. You can specify up to 8 levels of preference, and you can assign the same preference to a maximum of 31 tunnels. When you define multiple preferences for a destination, you increase the probability of a successful connection.

This value can be overridden by RADIUS attribute Tunnel-Preference [83].

Options ***number***—Number that indicates the order in which the router attempts to connect to the destination. Zero is the highest level of preference.

Range: 0 through 2000

Default: 2000

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

Related Documentation

- Configuring a Tunnel Profile for Subscriber Access on page 31

remote-gateway (Tunnel Profile)

Syntax

```
remote-gateway {
    address server-ip-address;
    gateway-name server-name;
}
```

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the IP address and hostname of the remote gateway at the L2TP tunnel endpoint, the LNS.

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 a Tunnel Profile for Subscriber Access on page 31

request services l2tp destination unlock

Syntax **request services l2tp destination unlock *destination-name***

Release Information Command introduced in Junos OS Release 13.2.

Description Remove the specified destination from the destination lockout list immediately, before its lockout period expires. As a result, the L2TP process can again consider the destination during the selection of new tunnels.

Options ***destination-name***—Name of the destination to be unlocked.

Required Privilege Level view

Related Documentation

- Removing an L2TP Destination from the Destination Lockout List on page 58
- Configuring the L2TP Destination Lockout Timeout on page 57
- show services l2tp destination lockout on page 198

List of Sample Output request services l2tp destination unlock on page 129

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

request services l2tp destination unlock

```
user@host> request services l2tp destination unlock dest-a
Destination dest-a unlocked
```

retransmission-count-established (L2TP)

Syntax retransmission-count-established *count*;

Hierarchy Level [edit services l2tp tunnel]

Release Information Statement introduced in Junos OS Release 12.1.

Description Set the maximum number of times control messages are retransmitted for established tunnels.

BEST PRACTICE: **Before you downgrade to a Junos OS Release that does not support this statement, unconfigure the statement by issuing no services l2tp tunnel retransmission-count-established.**

Options *count*—Number of retransmissions.

Range: 2 through 30

Default: 7

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

Related Documentation

- Configuring the Number of L2TP Control Message Retransmissions on page 61
- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

retransmission-count-not-established (L2TP)

Syntax retransmission-count-not-established *count*;

Hierarchy Level [edit services l2tp tunnel]

Release Information Statement introduced in Junos OS Release 12.1.

Description Set the maximum number of times control messages are retransmitted for tunnels that are not established.

BEST PRACTICE: **Before you downgrade to a Junos OS Release that does not support this statement, unconfigure the statement by issuing no services l2tp tunnel retransmission-count-not-established.**

Options *count*—Number or retransmissions.
Range: 2 through 30
Default: 5

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

Related Documentation
- Configuring the Number of L2TP Control Message Retransmissions on page 61
- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

routing-instance (Tunnel Profile)

Syntax routing-instance *routing-instance-name*;

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify a routing instance for a tunnel.

Options ***routing-instance-name***—Name of the routing instance.
Default: Routing instance *default*

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

Related Documentation
- Configuring a Tunnel Profile for Subscriber Access on page 31

rule (IP Reassembly)

Syntax

```
rule rule-name {
  match-direction direction;
}
```

Hierarchy Level [edit services ip-reassembly]

Release Information Statement introduced in Junos OS Release 13.1.

Description Configure an IP reassembly rule, which is used for inline IP reassembly on the inline services interface. The IP reassembly rule can be attached to a service set to indicate that the service set is of type IP reassembly. For inline IP reassembly, each rule must include the **match-direction** statement, which specifies the direction in which the match is applied.

NOTE: If you configure an IP reassembly rule, then you must configure the match-direction statement.

Options *rule-name*—Name of the IP reassembly rule.

Range: Up to 63 characters

The remaining statement is explained separately.

NOTE: To create more than one IP reassembly rule, include the rule statement multiple times.

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

Related Documentation

- Configuring IP Inline Reassembly for L2TP on page 51
- IP Packet Fragment Reassembly for L2TP Overview on page 22

rx-connect-speed-when-equal (L2TP LAC)

Syntax rx-connect-speed-when-equal

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 13.1.

Description Enable sending the receive connect speed, which is represented by AVP 38, even when its value is equal to that of the transmit connect speed, which is represented by AVP 24. By default, AVP 38 is sent from the LAC to the LNS during the establishment of an L2TP tunnel session, only when its value is different from AVP 24. You can override the default setting with this configuration statement.

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

Related Documentation

- Configuring the Method to Set the LAC Connection Speeds to the LNS on page 36
- Transmission of the Receive Connect Speed AVP When Transmit and Receive Connect Speeds are Equal on page 37

rx-window-size (L2TP)

Syntax rx-window-size *packets*;

Hierarchy Level [edit services l2tp tunnel]

Release Information Statement introduced in Junos OS Release 13.3.

Description Configure the L2TP receive window size for an L2TP tunnel.

Options *packets*—Number of packets that a peer can transmit without receiving an acknowledgment from the router. By default, this value is set to 4 packets. If the receive window size is configured to its default value, the router does not send the Receive Window Size AVP (AVP 10) in the first tunnel negotiation packet that is sent to its peer.

Range: 4 through 128

Default: 4

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

Related Documentation

- Setting the L2TP Receive Window Size on page 63
- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

secret (Tunnel Profile)

Syntax secret *password*;

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the tunnel password sent to the LNS for authentication.

Options ***password***—Cleartext password.

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

Related Documentation
- Configuring a Tunnel Profile for Subscriber Access on page 31

service-device-pool (L2TP)

Syntax service-device-pool *pool-name*;

Hierarchy Level [edit services l2tp tunnel-group *name*]

Release Information Statement introduced in Junos OS Release 11.4.

Description Assign a pool of service interfaces to the tunnel group to balance traffic across.

NOTE: The service interface configuration is required for static LNS sessions. Either the service interface configuration or the service device pool configuration can be used for dynamic LNS sessions.

Options ***pool-name***—Name of the service device pool.

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

Related Documentation
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

service-device-pools (L2TP Service Interfaces)

Syntax

```
service-device-pools {
  pool pool-name {
    interface service-interface-name;
  }
}
```

Hierarchy Level [edit services]

Release Information Statement introduced in Junos OS Release 11.4.

Description Configure one or more pools of service interfaces that can be assigned to an L2TP tunnel group for traffic load-balancing. The service device pool is required for dynamic LNS sessions.

Options *pool-name*—Name of the service interface pool.

The remaining 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 a Pool of Inline Services Interfaces for Dynamic LNS Sessions on page 55

service-interface

Syntax service-interface *interface-name*;

Hierarchy Level [edit services l2tp tunnel-group *name*]

Release Information Statement introduced before Junos OS Release 7.4.
Option **si-*fpc/pic/port*** introduced in Junos OS Release 11.4.

Description Specify the service interface responsible for handling L2TP processing.

NOTE: On MX Series routers, the service interface configuration is required for static LNS sessions. Either the service interface configuration or the service device pool configuration can be used for dynamic LNS sessions.

Options ***interface-name***—Name of the service interface. The interface type depends on the line card as follows:

- **sp-*fpc/pic/port***—On AS or Multiservices PICs on M7i, M10i, and M120 routers.
- **si-*fpc/pic/port***—On MPCs on MX Series routers.

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

Related Documentation

- *Configuring the Local Gateway Address and PIC*
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

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*
- Configuring an L2TP Access Profile on the LNS on page 46

source-gateway (Tunnel Profile)

Syntax

```
source-gateway {
    address client-ip-address;
    gateway-name client-name;
}
```

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the IP address and hostname of the source gateway at the local L2TP tunnel endpoint, the LAC.

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 a Tunnel Profile for Subscriber Access on page 31

tos-reflect (L2TP)

Syntax

```
tos-reflect;
```

Hierarchy Level [edit services l2tp tunnel-group *name*]

Release Information Statement introduced in Junos OS Release 11.4.

Description Configure the LNS to reflect the IP ToS value in the inner IP header to the outer IP header. When CoS rewrite rules are also configured (**[edit class-of-service interfaces *interface-name* unit *logical-unit-number* rewrite-rules]**), the rewrite is performed only on the inner IP ToS; the outer IP TOS value is not affected.

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

Related Documentation

- *Configuring Access Profiles for L2TP Tunnel Groups*
- *Configuring Dynamic CoS for an L2TP LNS Inline Service*

traceoptions (L2TP)

Syntax

```
traceoptions {
  debug-level level;
  file filename <files number> <match regular-expression > <size maximum-file-size>
    <world-readable | no-world-readable>;
  filter {
    protocol name;
    user-name username;
  }
  flag flag;
  interfaces interface-name {
    debug-level level;
    flag flag;
  }
  level (all | error | info | notice | verbose | warning);
  no-remote-trace;
}
```

Hierarchy Level [edit services l2tp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Define tracing operations for L2TP processes.

Options

debug-level *level*—Trace level for PPP, L2TP, RADIUS, and UDP; this option does not apply to L2TP on MX Series routers:

- **detail**—Trace detailed debug information.
- **error**—Trace error information.
- **packet-dump**—Trace packet decoding information.

file *filename*—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory **/var/log**.

files *number*—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the **size** option.

Range: 2 through 1000

Default: 3 files

filter protocol *name*—Additional filter for the specified protocol; this option does not apply to L2TP on MX Series routers:

- **l2tp**
- **ppp**
- **radius**
- **udp**

filter user-name *username*—Additional filter for the specified username; this option does not apply to L2TP on MX Series routers.

flag ***flag***—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags:

- **all**—Trace all operations.
- **configuration**—Trace configuration events.
- **events**—Trace interface events.
- **general**—Trace general events.
- **gres**—Trace GRES events.
- **init**—Trace daemon initialization.
- **ipc-rx**—Trace IPC receive events.
- **ipc-tx**—Trace IPC transmit events.
- **memory**—Trace memory management code.
- **message**—Trace message processing code.
- **packet-error**—Trace packet error events.
- **parse**—Trace parsing events.
- **protocol**—Trace L2TP events.
- **receive-packets**—Trace received L2TP packets.
- **routing-process**—Trace routing process interactions.
- **routing-socket**—Trace routing socket events.
- **session-db**—Trace session database interactions.
- **states**—Trace state machine events.
- **timer**—Trace timer events.
- **transmit-packets**—Trace transmitted L2TP packets.
- **tunnel**—Trace tunnel events.

interfaces ***interface-name***—Apply L2TP traceoptions to a specific services interface. This option does not apply to L2TP on MX Series routers.

- **debug-level** ***level***—Trace level for the interface; this option does not apply to L2TP on MX Series routers:
  - **detail**—Trace detailed debug information.
  - **error**—Trace error information.
  - **extensive**—Trace all PIC debug information.
- **flag** ***flag***—Tracing operation to perform for the interface. This option does not apply to L2TP on MX Series routers. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags:
  - **all**—Trace everything.
  - **ipc**—Trace L2TP Inter-Process Communication (IPC) messages between the PIC and the Routing Engine.
  - **packet-dump**—Dump each packet content based on debug level.
  - **protocol**—Trace L2TP, PPP, and multilink handling.
  - **system**—Trace packet processing on the PIC.

level—Specify level of tracing to perform. The option you configure enables tracing of events at that level and all higher (more restrictive) levels. You can specify any of the following levels:

- **all**—Match messages of all levels.
- **error**—Match error messages.
- **info**—Match informational messages.
- **notice**—Match notice messages about conditions requiring special handling.
- **verbose**—Match verbose messages. This is the lowest (least restrictive) severity level; when you configure **verbose**, messages at all higher levels are traced. Therefore, the result is the same as when you configure **all**.
- **warning**—Match warning messages.

match ***regular-expression***—(Optional) Refine the output to include lines that contain the regular expression.

no-remote-trace—Disable remote tracing.

no-world-readable—(Optional) Disable unrestricted file access.

size *maximum-file-size*—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

Syntax: ***size*k** to specify KB, ***size*m** to specify MB, or ***size*g** to specify GB

Range: 10240 through 1073741824

world-readable—(Optional) Enable unrestricted file access.

Required Privilege Level

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

Related Documentation

- *Tracing L2TP Operations*
- Tracing L2TP Operations for Subscriber Access on page 261

tunnel (Tunnel Profile)

Syntax

```
tunnel tunnel-id {
  identification name;
  logical-system logical-system-name;
  max-sessions number;
  medium type;
  nas-port-method cisco-avp;
  preference number;
  remote-gateway {
    address server-ip-address;
    gateway-name server-name;
  }
  routing-instance routing-instance-name;
  secret password;
  source-gateway {
    address client-ip-address;
    gateway-name client-name;
  }
  type tunnel-type;
}
```

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Define the attributes of a tunnel for the tunnel profile. You can define up to 31 tunnels for each tunnel profile.

Options ***tunnel-id***—Unique integer that identifies a tunnel defined within a profile. For a subscriber, RADIUS attributes and VSAs can supply or override the attributes defined here for the tunnel.

Range: 1 through 31

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 a Tunnel Profile for Subscriber Access on page 31

tunnel (L2TP)

Syntax

```
tunnel {
  assignment-id-format (assignment-id | client-server-id);
  idle-timeout seconds;
  retransmission-count-established count;
  retransmission-count-not-established count;
  rx-window-size
  tx-address-change (accept | ignore | ignore-ip-address | ignore-udp-port);
}
```

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 11.4.
rx-window-size option introduced in Junos OS Release 13.2.

Description Configure L2TP tunnel characteristics.

The remaining 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 an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41

tunnel-group

Syntax

```
tunnel-group group-name {
  aaa-access-profile profile-name;
  dynamic-profile profile-name;
  hello-interval seconds;
  hide-avps;
  l2tp-access-profile profile-name;
  local-gateway address address;
  maximum-send-window packets;
  ppp-access-profile profile-name;
  receive-window packets;
  retransmit-interval seconds;
  service-device-pool pool-name;
  service-interface interface-name;
  syslog {
    host hostname {
      services severity-level;
      facility-override facility-name;
      log-prefix prefix-value;
    }
  }
  tos-reflect;
  tunnel-switch-profile profile-name;
  tunnel-timeout seconds;
}
```

Hierarchy Level [edit services l2tp]

Release Information Statement introduced before Junos OS Release 7.4.
Support for MX Series routers introduced in Junos OS Release 11.4.

Description Specify the L2TP tunnel properties.

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

Options *group-name*—Identifier for the tunnel group.

The remaining 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 Tunnel Groups*
- Configuring an L2TP Tunnel Group for LNS Sessions with Inline Services Interfaces on page 53

tunnel-profile (L2TP Tunnel Switching)

Syntax tunnel-profile *profile-name*;

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

Release Information Statement introduced in Junos OS Release 13.2.

Description Specify the name of an L2TP tunnel profile that defines the tunnel to which PPP subscriber traffic is switched.

Options ***profile-name***—Unique name that identifies the tunnel profile; configured with the **tunnel-profile** statement at the **[edit access]** hierarchy level.

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

Related Documentation

- Configuring L2TP Tunnel Switching on page 58

tunnel-profile (Tunnel Profile)

Syntax

```
tunnel-profile profile-name {
  tunnel tunnel-id {
    identification name;
    logical-system logical-system-name;
    max-sessions number;
    medium type;
    nas-port-method cisco-avp;
    preference number;
    remote-gateway {
      address server-ip-address;
      gateway-name server-name;
    }
    routing-instance routing-instance-name;
    secret password;
    source-gateway {
      address client-ip-address;
      gateway-name client-name;
    }
    type tunnel-type;
  }
}
```

Hierarchy Level [edit access]

Release Information Statement introduced in Junos OS Release 10.4.

Description Define a tunnel profile for subscriber access.

Options *profile-name*—Unique name that identifies the tunnel profile. The profile can be referenced from within a domain map or by the RADIUS Tunnel-Group VSA [26-64].

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 a Tunnel Profile for Subscriber Access on page 31

tunnel-switch-profile (L2TP Tunnel Switching, Application)

Syntax tunnel-switch-profile *profile-name*;

Hierarchy Level [edit access domain map *domain-map-name*],
[edit services l2tp],
[edit services l2tp tunnel-group *group-name*]

Release Information Statement introduced in Junos OS Release 13.2.

Description Specify a tunnel switch profile that determines whether packets in an L2TP session from a LAC are switched to another session that has a different destination LNS.

Options ***profile-name***—Unique name that identifies the tunnel switch profile.

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

Related Documentation
- Configuring L2TP Tunnel Switching on page 58

tunnel-switch-profile (L2TP Tunnel Switching, Definition)

Syntax

```
tunnel-switch-profile profile-name {
  avp {
    bearer-type action;
    calling-number action;
    cisco-nas-port-info action;
  }
  tunnel-profile profile-name;
}
```

Hierarchy Level [edit access]

Release Information Statement introduced in Junos OS Release 13.2.

Description Define a tunnel switch profile for subscriber access; specify actions to take for L2TP AVPs in the switched packets and the profile for the tunnel to which the PPP traffic is switched.

The remaining statements are explained separately.

Options ***profile-name***—Unique name that identifies the tunnel switch profile. The profile can be applied as a default or referenced from within a domain map, a tunnel group, or by the RADIUS Tunnel-Group VSA [26-64].

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

Related Documentation
- Configuring L2TP Tunnel Switching on page 58

tx-address-change (L2TP LAC)

Syntax tx-address-change (accept | ignore | ignore-ip-address | ignore-udp-port);

Hierarchy Level [edit services l2tp tunnel]

Description Configure whether the LAC accepts or ignores requests from a peer to change the destination IP address, UDP port, or both.

Default The LAC accepts the IP address change from its peer.

Options

accept—Accept a change in IP address , UDP port, or both.

ignore—Ignore a change request for IP address or UDP port.

ignore-ip-address—Ignore a change request for IP address.

ignore-udp-port—Ignore a change request for UDP port.

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

Related Documentation

- Configuring the LAC to Ignore Address and Port Changes Requested by the LNS on page 39

tx-connect-speed-method (L2TP LAC)

Syntax tx-connect-speed-method *method*;

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 11.4.
Options **ancp**, **pppoe-ia-tag**, and **static** introduced in Junos OS Release 13.1.

Description Specify the method that determines the connection speed values sent from the LAC to the LNS in Incoming-Call-Connected (ICCN) messages. The transmit speed is conveyed in AVP 24 (Tx Connect Speed) and the receive speed is conveyed in AVP 38 (Rx Connect Speed). Both values are in bits per seconds (BPS).

Default static

Options *method*—Method used to derive the connection speed values.

- **ancp**—The speed is derived from the configured ANCP value for the underlying interface. You can change this rate after a subscriber has logged in, but those changes do not affect the actual rate used by the LNS. The **ancp** method gets the highest preference among the methods configured.
- **pppoe-ia-tags**—PPPoE IA tags sent from the DSLAM to the LAC. This speed value transmitted when a subscriber logs in and it cannot be subsequently changed. This value is used when the **ancp** value is not available. This speed does not apply to the subscribers that are already logged in; it is effective only for subscribers that log in after this setting has been saved. AVP 24 is the value of Actual-Data-Rate-Downstream (VSA 26-129). AVP 38 is the value of Actual-Data-Rate-Upstream (VSA 26-130), and is sent only when the VSA values differ.

  NOTE: **This rate does not affect the subscribers already logged in; however, new subscribers inherit the new rate.**

- **static**—The speed is derived from the recommended (advisory) shaping rate configured on the PPPoE logical interface underlying the subscriber interface. If the advisory speed is not configured on the underlying interface, then the actual port speed is used. The default method, when no other methods yield a value, is the **static** method or the advisory speed method. If the advisory speed is not configured, then the actual port speed is used. For ge and xe interfaces, the speed value is set to 10,000,000 and for ae interfaces, the speed value is set to 0 and sent in both AVP 24 and AVP 38.

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

Related Documentation
- Configuring the Method to Set the LAC Connection Speeds to the LNS on page 36

type (Tunnel Profile)

Syntax type *tunnel-type*;

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

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify the tunnel type (protocol).

Default **l2tp**

Options ***tunnel-type***—Tunnel protocol type. The only value currently available is **l2tp**.

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

Related Documentation
- Configuring a Tunnel Profile for Subscriber Access on page 31

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.

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*
- Configuring an L2TP Access Profile on the LNS on page 46

weighted-load-balancing (L2TP LAC)

Syntax weighted-load-balancing;

Hierarchy Level [edit services l2tp]

Release Information Statement introduced in Junos OS Release 10.4.

Description Specify that the router chooses among multiple tunnels that share the same preference level by considering the maximum sessions configured per tunnel. The tunnel configured with the highest maximum number of sessions in the preference level has the highest weight. This tunnel is selected until the maximum number of sessions for the tunnel is reached. Then the router selects the tunnel with the next higher weight to establish connections until that tunnel's maximum session limit is reached, and so on.

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

Related Documentation

- Configuring Weighted Load Balancing for LAC Tunnel Sessions on page 35
- Configuring the L2TP LAC Tunnel Selection Parameters on page 34

PART 3

Administration

CHAPTER 9

Verifying and Monitoring Configurations

Verifying and Managing L2TP for Subscriber Access

Purpose View or clear information about L2TP tunnels and sessions.

Action

- To display a summary of L2TP tunnels, sessions, errors, and control and data packets:

  user@host> show services l2tp summary

- To display the L2TP destinations:

  user@host> show services l2tp destination

- To clear all L2TP destinations:

  user@host> clear services l2tp destination **all**

- To clear statistics for all L2TP tunnels belonging to a destination, tunnels belonging to a specified local-gateway address, and tunnels belonging to a specified peer-gateway address:

  user@host>**clear services l2tp destination statistics all**
  user@host>**clear services l2tp destination local-gateway 10.1.1.2**

- To display the L2TP sessions:

  user@host> show services l2tp session

- To clear all L2TP sessions, the session with a specified local session ID, or sessions associated with the local gateway specified by an IP address or name:

  user@host>clear services l2tp session **all**
  user@host>**clear services l2tp session local-session-id 40553**
  user@host>**clear services l2tp session local-gateway 10.1.1.2**
  user@host>**clear services l2tp session local-gateway-name lns-mx960**

- To clear statistics for all L2TP sessions, the session with a specified local session ID, or sessions associated with the local gateway specified by an IP address or name:

  user@host>clear services l2tp session statistics **all**
  user@host>**clear services l2tp session statistics local-session-id 17967**
  user@host>**clear services l2tp session statistics local-gateway 10.1.1.2**
  user@host>**clear services l2tp session statistics local-gateway-name lns-mx960**

- To display the L2TP tunnels:

  user@host> show services l2tp tunnel

- To clear all L2TP tunnels, the tunnel with a specified local tunnel ID, or tunnels associated with the local gateway specified by an IP address or name:

  user@host> clear services l2tp tunnel **all**
  user@host>**clear services l2tp tunnel local-tunnel-id 40553**
  user@host>**clear services l2tp tunnel local-gateway 10.1.1.2**
  user@host>**clear services l2tp tunnel local-gateway-name lns-mx960**

- To clear statistics for all L2TP tunnels, the tunnel with a specified local tunnel ID, or tunnels associated with the local gateway specified by an IP address or name:

  user@host> clear services l2tp tunnel statistics **all**
  user@host>**clear services l2tp tunnel statistics local-tunnel-id 40553**
  user@host>**clear services l2tp tunnel statistics local-gateway 10.1.1.2**
  user@host>**clear services l2tp tunnel statistics local-gateway-name lns-mx960**

Related Documentation

- Configuring an L2TP LAC on page 29
- Configuring an L2TP LNS with Inline Service Interfaces on page 41
- *Junos OS Operational Mode Commands*.

Testing L2TP Tunnel Configurations from the LAC

You can test L2TP tunnel configurations on the LAC and successful subscriber authentication and tunneling without bringing up a PPP user and an associated tunnel.

Issue the **test services l2tp tunnel** command from CLI operational mode to map a subscriber to an L2TP tunnel, verify the L2TP tunnel configuration (both locally on the LAC and on a back-end server such as a RADIUS server), and verify that L2TP tunnels from the LAC can be established with the remote LNS.

The Junos OS LAC implementation enables you to configure multiple tunnels from which one tunnel is chosen for tunneling a PPP subscriber. You can use the **test services l2tp tunnel** command to test all possible tunnel configurations to verify that each can be established. Alternatively, you can test only a specific tunnel for the subscriber.

You must specify a configured subscriber username when you issue the command. The test generates a dummy password—*testpass*—for the subscriber, or you can optionally specify the password. The test verifies whether the subscriber identified by that username can be tunneled according to the tunnel configuration. If the subscriber can be tunneled, then the test verifies whether the L2TP tunnel can be established with the LNS according to the L2TP configuration.

You can optionally specify a tunnel ID, in which case only that tunnel is tested; the tunnel must be already configured for that username. If you omit this option, the test is applied to the full set of tunnel configurations that are returned for the username. The tunnel ID you specify is the same as that used by Tunnel-Assignment-Id (RADIUS attribute 82) and specified by the **identification** statement in the tunnel profile.

To test subscriber authentication and tunnel configuration:

- Specify only the username.

  Example 1:

  ```
  user@host> test services l2tp tunnel user test-user1@example.com
  Subscriber: test-user1@example.com, authentication failed
  ```

  The user failed authentication with the generated password and consequently was not tunneled.

  Example 2:

  ```
  user@host> test services l2tp tunnel user user23@example.com
  Subscriber: user23@example.com, authentication success, l2tp tunneled
    Tunnel-name   Tunnel-peer   Logical-System  Routing-Instance Status
    test1tunnel    192.168.2.3      default         default         Up
    test2tunnel    172.24.3.3       default         default        Peer
  unresponsive
    test3tunnel    172.24.5.1       default           test          Up
  ```

  This user was authenticated with the generated password and successfully tunneled. A set of tunnels was found to be associated with that username and the entire set was tested.

- Specify the username and the user's configured password.

  ```
  user@host> test services l2tp tunnel user test-user1@example.com password grZ98#jW
  Subscriber: test-user1@example.com, authentication success, locally terminated
  ```

  The subscriber was authenticated. However, the user was terminated locally rather than tunneled; this means that no tunnel was found to be associated with the user.

- Specify the username and a particular tunnel for the subscriber.

  ```
  user@host> test services l2tp tunnel user rx37w@example.com tunnel-name ce-lac
  Subscriber: rx37w@example.com, authentication success, l2tp tunneled
    Tunnel-name   Tunnel-peer   Logical-System  Routing-Instance Status
    ce-lac         192.168.5.10      default         default         Up
  ```

  The subscriber was authenticated and tunneled. The specified tunnel was found for the subscriber and the tunnel was established, confirming the tunnel configuration.

- Specify the username, the user's configured password, and a tunnel.

  ```
  user@host> test services l2tp tunnel user fanta4-mfg-fan@example.com password dieda499
  tunnel-name tunnel5
  Subscriber: fanta4-mfg-fan@example.com, authentication success, l2tp tunneled
  ```

  The subscriber was authenticated and tunneled. The absence of tunnel information in the output indicates that the specified tunnel configuration does not exist.

Related Documentation

- L2TP for Subscriber Access Overview on page 3

CHAPTER 10

Monitoring Commands

clear services l2tp destination

Syntax clear services l2tp destination
<all | local-gateway *gateway-address* | peer-gateway *gateway-address*>

Release Information Command introduced in Junos OS Release 10.4.
Statistics option introduced in Junos OS Release 13.1

Description Clear all Layer 2 Tunneling Protocol (L2TP) destinations and all tunnels and sessions that belong to the destinations. This command is available only for LAC on MX Series routers.

Options **all**—Close all L2TP destinations.

local-gateway *gateway-address*—Clear only the L2TP destinations and all tunnels and sessions associated with the specified local gateway address.

peer-gateway *gateway-address*—Clear only the L2TP destinations and all tunnels and sessions associated with the peer gateway with the specified address.

Required Privilege Level clear

Related Documentation
- show services l2tp destination on page 194

List of Sample Output clear services l2tp destination all on page 160

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear services l2tp destination all

```
user@host> clear services l2tp destination all

  Destination 2 closed
```

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.

Options **all**—Close all L2TP sessions.

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 on page 163
- show services l2tp session on page 199

List of Sample Output

clear services l2tp session on page 162
clear services l2tp session interface on page 162

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 session statistics

Syntax clear services l2tp session statistics (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.
Support for MX Series routers added in Junos OS Release 10.4.

Description (M10i and M7i routers: LNS only. MX Series routers: LAC and LNS.) Clear statistics for Layer 2 Tunneling Protocol (L2TP) sessions.

Options **all**—Clear statistics for all L2TP sessions.

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 statistics for only the L2TP sessions associated with the local gateway with the specified address.

local-gateway-name ***gateway-name***—Clear statistics for only the L2TP sessions associated with the local gateway with the specified name.

local-session-id ***session-id*** —Clear statistics for only the L2TP sessions with this identifier for the local endpoint of the L2TP session.

local-tunnel-id ***tunnel-id***—Clear statistics for only the L2TP sessions associated with the specified local tunnel identifier.

peer-gateway ***gateway-address***—Clear statistics for only the L2TP sessions associated with the peer gateway with the specified address.

peer-gateway-name ***gateway-name***—Clear statistics for only the L2TP sessions associated with the peer gateway with the specified name.

tunnel-group ***group-name***—Clear statistics for only the L2TP sessions associated with the specified tunnel group. This option is not available for L2TP LAC on MX Series routers.

user ***username*** **<statistics>**—Clear statistics for only the L2TP sessions for the specified username. This option is not available for L2TP LAC on MX Series routers.

Required Privilege Level view

Related Documentation

- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*
- clear services l2tp session on page 161
- show services l2tp session on page 199

List of Sample Output clear services l2tp session statistics all on page 164

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear services l2tp session statistics all

```
user@host> clear services l2tp session statistics all
  Session 26497 statistics cleared
```

clear services l2tp tunnel

Syntax

clear services l2tp tunnel (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 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: LNS only. MX Series routers: LAC and LNS.) Clear Layer 2 Tunneling Protocol (L2TP) tunnels.

Options

all—Clear all L2TP tunnels.

sp-*fpc/pic/port*—(Optional) Clear only the L2TP tunnels using the specified adaptive services interface. This option is not available for L2TP on MX Series routers.

local-gateway *gateway-address*—Clear only the L2TP tunnels associated with the local gateway with the specified address.

local-gateway-name *gateway-name*—Clear only the L2TP tunnels associated with the local gateway with the specified name.

local-tunnel-id *tunnel-id*—Clear only the L2TP tunnels that have the specified local tunnel identifier.

peer-gateway *gateway-address*—Clear only the L2TP tunnels associated with the peer gateway with the specified address.

peer-gateway-name *gateway-name*—Clear only the L2TP tunnels associated with the peer gateway with the specified name.

tunnel-group *group-name*—Clear only the L2TP tunnels in the specified tunnel group. This option is not available for L2TP LAC on MX Series routers.

Required Privilege Level

view

Related Documentation

- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*
- clear services l2tp tunnel statistics on page 167
- show services l2tp tunnel on page 227

List of Sample Output

clear services l2tp tunnel on page 166

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear services l2tp tunnel

```
user@host> clear services l2tp tunnel 17185

  Tunnel 17185 closed
```

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 on page 165
- show services l2tp tunnel on page 227

List of Sample Output clear services l2tp tunnel statistics all on page 168

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
```

restart

Syntax

restart
<adaptive-services |ancpd-service | application-identification |audit-process |
auto-configuration |captive-portal-content-delivery |ce-l2tp-service |chassis-control |
class-of-service |clksyncd-service |database-replication|datapath-trace-service
|dhcp-service | diameter-service | disk-monitoring | dynamic-flow-capture |
ecc-error-logging | ethernet-connectivity-fault-management
|ethernet-link-fault-management |event-processing | firewall
|general-authentication-service | gracefully | iccp-service |idp-policy | immediately
|interface-control | ipsec-key-management | kernel-replication | l2-learning | l2cpd-service
| l2tp-service | l2tp-universal-edge | lacp | license-service |link-management
|local-policy-decision-function |mac-validation |mib-process | mobile-ip | mountd-service
|mpls-traceroute |mspd | multicast-snooping |named-service | nfsd-service |
packet-triggered-subscribers |peer-selection-service |pgcp-service | pgm |
pic-services-logging | pki-service |ppp | ppp-service |pppoe |
protected-system-domain-service | redundancy-interface-process | remote-operations |
root-system-domain-service | routing <logical-system *logical-system-name*> | sampling
| sbc-configuration-process | sdk-service |service-deployment | services | services pgcp
gateway *gateway-name* | snmp |soft |static-subscribers |statistics-service|
subscriber-management | subscriber-management-helper | tunnel-oamd |usb-control|
vrrp |web-management>
<gracefully | immediately | soft>

Syntax (ACX Series Routers)

restart
<adaptive-services |audit-process | auto-configuration | autoinstallation |chassis-control |
class-of-service |clksyncd-service |database-replication| dhcp-service | diameter-service
| disk-monitoring | dynamic-flow-capture | ethernet-connectivity-fault-management
|ethernet-link-fault-management |event-processing | firewall
|general-authentication-service | gracefully | immediately |interface-control |
ipsec-key-management | l2-learning | lacp |link-management |mib-process | mobile-ip |
mountd-service |mpls-traceroute |mspd | named-service | nfsd-service | pgm | pki-service
|ppp | pppoe | redundancy-interface-process | remote-operations | routing | sampling |
sdk-service |secure-neighbor-discovery | service-deployment | services | snmp |soft
|statistics-service| subscriber-management | subscriber-management-helper | tunnel-oamd
| vrrp>

Syntax (EX Series Switches)

restart
<autoinstallation | chassis-control | class-of-service | database-replication | dhcp |
dhcp-service | diameter-service | dot1x-protocol | ethernet-link-fault-management |
ethernet-switching | event-processing | firewall | general-authentication-service |
interface-control | kernel-replication | l2-learning | lacp | license-service | link-management
| lldpd-service | mib-process | mountd-service | multicast-snooping | pgm |
redundancy-interface-process | remote-operations | routing | secure-neighbor-discovery
| service-deployment | sflow-service | snmp | vrrp | web-management>

Syntax (Routing Matrix)

restart
<adaptive-services | audit-process | chassis-control | class-of-service | disk-monitoring |
dynamic-flow-capture | ecc-error-logging | event-processing | firewall | interface-control
| ipsec-key-management | kernel-replication | l2-learning | l2tp-service | lacp |
link-management | mib-process | pgm | pic-services-logging | ppp | pppoe |
redundancy-interface-process | remote-operations | routing <logical-system
logical-system-name> | sampling | service-deployment | snmp>
<all | all-lcc | lcc *number*>

<gracefully | immediately | soft>

Syntax (J Series Routing Platform)

restart
<adaptive-services | audit-process | chassis-control | class-of-service | dhcp | dialer-services | dlsw | event-processing | firewall | interface-control | ipsec-key-management | isdn-signaling | l2-learning | l2tp-service | mib-process | network-access-service | pgm | ppp | pppoe | remote-operations | routing <logical-system *logical-system-name*> | sampling | service-deployment | snmp | usb-control | web-management>
<gracefully | immediately | soft>

Syntax (TX Matrix Routers)

restart
<adaptive-services | audit-process | chassis-control | class-of-service | dhcp-service | diameter-service | disk-monitoring | dynamic-flow-capture | ecc-error-logging | event-processing | firewall | interface-control | ipsec-key-management | kernel-replication | l2-learning | l2tp-service | lacp | link-management | mib-process |pgm | pic-services-logging | ppp | pppoe | redundancy-interface-process | remote-operations | routing <logical-system *logical-system-name*> | sampling | service-deployment | snmp| statistics-service>
<all-chassis | all-lcc | lcc *number* | scc>
<gracefully | immediately | soft>

Syntax (TX Matrix Plus Routers)

restart
<adaptive-services | audit-process | chassis-control | class-of-service | dhcp-service | diameter-service | disk-monitoring | dynamic-flow-capture | ecc-error-logging | event-processing | firewall | interface-control | ipsec-key-management | kernel-replication | l2-learning | l2tp-service | lacp | link-management | mib-process | pgm | pic-services-logging | ppp | pppoe | redundancy-interface-process | remote-operations | routing <logical-system *logical-system-name*> | sampling | service-deployment | snmp| statistics-service>
<all-chassis | all-lcc | all-sfc | lcc *number* | sfc *number*>
<gracefully | immediately | soft>

Syntax (MX Series Routers)

restart
<adaptive-services | ancpd-service |application-identification|audit-process | auto-configuration |captive-portal-content-delivery |ce-l2tp-service |chassis-control | class-of-service |clksyncd-service |database-replication| datapath-trace-service |dhcp-service | diameter-service | disk-monitoring | dynamic-flow-capture | ecc-error-logging | ethernet-connectivity-fault-management |ethernet-link-fault-management |event-processing | firewall | general-authentication-service | gracefully |iccp-service |idp-policy |immediately |interface-control | ipsec-key-management | kernel-replication | l2-learning |l2cpd-service |l2tp-service | l2tp-universal-edge | lacp | license-service |link-management |local-policy-decision-function |mac-validation |mib-process | mobile-ip |mountd-service |mpls-traceroute |mspd | multicast-snooping |named-service | nfsd-service | packet-triggered-subscribers |peer-selection-service | pgcp-service | pgm | pic-services-logging | pki-service |ppp | ppp-service |pppoe | protected-system-domain-service | redundancy-interface-process | remote-operations |root-system-domain-service | routing |routing <logical-system *logical-system-name*> | sampling | sbc-configuration-process | sdk-service |service-deployment |services | services pgcp gateway *gateway-name* |snmp |soft |static-subscribers |statistics-service| subscriber-management | subscriber-management-helper | tunnel-oamd | usb-control| vrrp |web-management>
<all-members>
<gracefully | immediately | soft>
<local>
<member *member-id*>

Syntax (J Series Routers)

restart
<adaptive-services | audit-process | chassis-control | class-of-service | dhcp | dhcp-service | dialer-services | diameter-service | dlsw | event-processing | firewall | interface-control | ipsec-key-management | isdn-signaling | l2ald | l2-learning | l2tp-service | mib-process | network-access-service | pgm | ppp | pppoe | remote-operations | routing <logical-system *logical-system-name*> | sampling | service-deployment | snmp | usb-control | web-management>
<gracefully | immediately | soft>

Syntax (QFX Series)

restart
<adaptive-services | audit-process | chassis-control | class-of-service | dialer-services | diameter-service | dlsw | ethernet-connectivity | event-processing | fibre-channel | firewall | general-authentication-service | igmp-host-services | interface-control | ipsec-key-management | isdn-signaling | l2ald | l2-learning | l2tp-service | mib-process | named-service | network-access-service | nstrace-process | pgm | ppp | pppoe | redundancy-interface-process | remote-operations |*logical-system-name*> | routing | sampling |secure-neighbor-discovery | service-deployment | snmp | usb-control | web-management>
<gracefully | immediately | soft>

Release Information

Command introduced before Junos OS Release 7.4.
Command introduced in Junos OS Release 9.0 for EX Series switches.
Command introduced in Junos OS Release 11.1 for the QFX Series.
Command introduced in Junos OS Release 12.2 for ACX Series routers.
Options added:

- **dynamic-flow-capture** in Junos OS Release 7.4.
- **dlsw** in Junos OS Release 7.5.
- **event-processing** in Junos OS Release 7.5.
- **ppp** in Junos OS Release 7.5.
- **l2ald** in Junos OS Release 8.0.
- **link-management** in Release 8.0.
- **pgcp-service** in Junos OS Release 8.4.
- **sbc-configuration-process** in Junos OS Release 9.5.
- **services pgcp gateway** in Junos OS Release 9.6.
- **sfc** and **all-sfc** for the TX Matrix Router in Junos OS Release 9.6.

Description

Restart a Junos OS process.

CAUTION: Never restart a software process unless instructed to do so by a customer support engineer. A restart might cause the router or switch to drop calls and interrupt transmission, resulting in possible loss of data.

Options

none—Same as **gracefully**.

adaptive-services—(Optional) Restart the configuration management process that manages the configuration for stateful firewall, Network Address Translation (NAT), intrusion detection services (IDS), and IP Security (IPsec) services on the Adaptive Services PIC.

all-chassis—(TX Matrix and TX Matrix Plus routers only) (Optional) Restart the software process on all chassis.

all-lcc—(TX Matrix and TX Matrix Plus routers only) (Optional) For a TX Matrix router, restart the software process on all T640 routers connected to the TX Matrix router. For a TX Matrix Plus router, restart the software process on all T1600 routers connected to the TX Matrix Plus router.

all-members—(MX Series routers only) (Optional) Restart the software process for all members of the Virtual Chassis configuration.

all-sfc—(TX Matrix Plus routers only) (Optional) For a TX Matrix Plus router, restart the software processes for the TX Matrix Plus router (or switch-fabric chassis).

ancpd-service—(Optional) Restart the Access Node Control Protocol (ANCP) process, which works with a special Internet Group Management Protocol (IGMP) session to collect outgoing interface mapping events in a scalable manner.

application-identification—(Optional) Restart the process that identifies an application using intrusion detection and prevention (IDP) to allow or deny traffic based on applications running on standard or nonstandard ports.

audit-process—(Optional) Restart the RADIUS accounting process that gathers statistical data that can be used for general network monitoring, analyzing, and tracking usage patterns, for billing a user based on the amount of time or type of services accessed.

auto-configuration—(Optional) Restart the Interface Auto-Configuration process.

autoinstallation—(EX Series switches only) (Optional) Restart the autoinstallation process.

captive-portal-content-delivery—(Optional) Restart the HTTP redirect service by specifying the location to which a subscriber's initial Web browser session is redirected, enabling initial provisioning and service selection for the subscriber.

ce-l2tp-service—(M10, M10i, M7i, and MX Series routers only) (Optional) Restart the Universal Edge Layer 2 Tunneling Protocol (L2TP) process, which establishes L2TP tunnels and Point-to-Point Protocol (PPP) sessions through L2TP tunnels.

chassis-control—(Optional) Restart the chassis management process.

class-of-service—(Optional) Restart the class-of-service (CoS) process, which controls the router's or switch's CoS configuration.

clksyncd-service—(Optional) Restart the external clock synchronization process, which uses synchronous Ethernet (SyncE).

database-replication—(EX Series switches and MX Series routers only) (Optional) Restart the database replication process.

datapath-trace-service—(Optional) Restart the packet path tracing process.

dhcp—(J Series routers and EX Series switches only) (Optional) Restart the software process for a Dynamic Host Configuration Protocol (DHCP) server. A DHCP server allocates network IP addresses and delivers configuration settings to client hosts without user intervention.

dhcp-service—(Optional) Restart the Dynamic Host Configuration Protocol process.

dialer-services—(J Series routers and EX Series switches only) (Optional) Restart the ISDN dial-out process.

diameter-service—(Optional) Restart the diameter process.

disk-monitoring—(Optional) Restart disk monitoring, which checks the health of the hard disk drive on the Routing Engine.

dlsw—(J Series routers and QFX Series only) (Optional) Restart the data link switching (DLSw) service.

dot1x-protocol—(EX Series switches only) (Optional) Restart the port-based network access control process.

dynamic-flow-capture—(Optional) Restart the dynamic flow capture (DFC) process, which controls DFC configurations on Monitoring Services III PICs.

ecc-error-logging—(Optional) Restart the error checking and correction (ECC) process, which logs ECC parity errors in memory on the Routing Engine.

ethernet-connectivity-fault-management—(Optional) Restart the process that provides IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management (CFM) database information for CFM maintenance association end points (MEPs) in a CFM session.

ethernet-link-fault-management—(EX Series switches and MX Series routers only) (Optional) Restart the process that provides the OAM link fault management (LFM) information for Ethernet interfaces.

ethernet-switching—(EX Series switches only) (Optional) Restart the Ethernet switching process.

event-processing—(Optional) Restart the event process (eventd).

fibre-channel—(QFX Series only) (Optional) Restart the Fibre Channel process.

firewall—(Optional) Restart the firewall management process, which manages the firewall configuration and enables accepting or rejecting packets that are transiting an interface on a router or switch.

general-authentication-service—(EX Series switches and MX Series routers only) (Optional) Restart the general authentication process.

gracefully—(Optional) Restart the software process.

iccp-service—(Optional) Restart the Inter-Chassis Communication Protocol (ICCP) process.

idp-policy—(Optional) Restart the intrusion detection and prevention (IDP) protocol process.

immediately—(Optional) Immediately restart the software process.

interface-control—(Optional) Restart the interface process, which controls the router's or switch's physical interface devices and logical interfaces.

ipsec-key-management—(Optional) Restart the IPsec key management process.

isdn-signaling—(J Series routers and QFX Series only) (Optional) Restart the ISDN signaling process, which initiates ISDN connections.

kernel-replication—(Optional) Restart the kernel replication process, which replicates the state of the backup Routing Engine when graceful Routing Engine switchover (GRES) is configured.

l2-learning—(Optional) Restart the Layer 2 address flooding and learning process.

l2cpd-service—(Optional) Restart the Layer 2 Control Protocol process, which enables features such as Layer 2 protocol tunneling and nonstop bridging.

l2tp-service— (M10, M10i, M7i, and MX Series routers only) (Optional) Restart the Layer 2 Tunneling Protocol (L2TP) process, which sets up client services for establishing Point-to-Point Protocol (PPP) tunnels across a network and negotiating Multilink PPP if it is implemented.

l2tp-universal-edge—(MX Series routers only) (Optional) Restart the L2TP process, which establishes L2TP tunnels and PPP sessions through L2TP tunnels.

lacp—(Optional) Restart the Link Aggregation Control Protocol (LACP) process. LACP provides a standardized means for exchanging information between partner systems on a link to allow their link aggregation control instances to reach agreement on the identity of the LAG to which the link belongs, and then to move the link to that LAG, and to enable the transmission and reception processes for the link to function in an orderly manner.

lcc ***number***—(TX Matrix and TX Matrix Plus routers only) (Optional) For a TX Matrix router, restart the software process for a specific T640 router that is connected to the TX Matrix router. For a TX Matrix Plus router, restart the software process for a specific router that is connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

license-service—(EX Series switches only) (Optional) Restart the feature license management process.

link-management— (TX Matrix and TX Matrix Plus routers and EX Series switches only) (Optional) Restart the Link Management Protocol (LMP) process, which establishes and maintains LMP control channels.

lldpd-service—(EX Series switches only) (Optional) Restart the Link Layer Discovery Protocol (LLDP) process.

local—(MX Series routers only) (Optional) Restart the software process for the local Virtual Chassis member.

local-policy-decision-function— (Optional) Restart the process for the Local Policy Decision Function, which regulates collection of statistics related to applications and application groups and tracking of information about dynamic subscribers and static interfaces.

mac-validation— (Optional) Restart the Media Access Control (MAC) validation process, which configures MAC address validation for subscriber interfaces created on demux interfaces in dynamic profiles on MX Series routers.

member *member-id*—(MX Series routers only) (Optional) Restart the software process for a specific member of the Virtual Chassis configuration. Replace ***member-id*** with a value of **0** or **1**.

mib-process—(Optional) Restart the Management Information Base (MIB) version II process, which provides the router's MIB II agent.

mobile-ip—(Optional) Restart the Mobile IP process, which configures Junos OS Mobile IP features.

mountd-service—(EX Series switches and MX Series routers only) (Optional) Restart the service for NFS mount requests.

mpls-traceroute—(Optional) Restart the MPLS Periodic Traceroute process.

mspd—(Optional) Restart the Multiservice process.

multicast-snooping—(EX Series switches and MX Series routers only) (Optional) Restart the multicast snooping process, which makes Layer 2 devices, such as VLAN switches, aware of Layer 3 information, such as the media access control (MAC) addresses of members of a multicast group.

named-service—(Optional) Restart the DNS Server process, which is used by a router or a switch to resolve hostnames into addresses.

network-access-service—(J Series routers and QFX Series only) (Optional) Restart the network access process, which provides the router's Challenge Handshake Authentication Protocol (CHAP) authentication service.

nfsd-service—(Optional) Restart the Remote NFS Server process, which provides remote file access for applications that need NFS-based transport.

packet-triggered-subscribers—(Optional) Restart the packet-triggered subscribers and policy control (PTSP) process, which allows the application of policies to dynamic subscribers that are controlled by a subscriber termination device.

peer-selection-service—(Optional) Restart the Peer Selection Service process.

pgcp-service—(Optional) Restart the pgcpd service process running on the Routing Engine. This option does not restart pgcpd processes running on mobile station PICs. To restart pgcpd processes running on mobile station PICs, use the **services pgcp gateway** option.

pgm—(Optional) Restart the process that implements the Pragmatic General Multicast (PGM) protocol for assisting in the reliable delivery of multicast packets.

pic-services-logging—(Optional) Restart the logging process for some PICs. With this process, also known as fsad (the file system access daemon), PICs send special logging information to the Routing Engine for archiving on the hard disk.

pki-service—(Optional) Restart the PKI Service process.

ppp—(Optional) Restart the Point-to-Point Protocol (PPP) process, which is the encapsulation protocol process for transporting IP traffic across point-to-point links.

ppp-service—(Optional) Restart the Universal Edge PPP process, which is the encapsulation protocol process for transporting IP traffic across Universal Edge routers.

pppoe—(Optional) Restart the Point-to-Point Protocol over Ethernet (PPPoE) process, which combines PPP that typically runs over broadband connections with the Ethernet link-layer protocol that allows users to connect to a network of hosts over a bridge or access concentrator.

protected-system-domain-service—(Optional) Restart the Protected System Domain (PSD) process.

redundancy-interface-process—(Optional) Restart the ASP redundancy process.

remote-operations—(Optional) Restart the remote operations process, which provides the ping and traceroute MIBs.

root-system-domain-service—(Optional) Restart the Root System Domain (RSD) service.

routing—(ACX Series routers, QFX Series, EX Series switches, and MX Series routers only) (Optional) Restart the routing protocol process.

routing <logical-system *logical-system-name*>—(Optional) Restart the routing protocol process, which controls the routing protocols that run on the router or switch and maintains the routing tables. Optionally, restart the routing protocol process for the specified logical system only.

sampling—(Optional) Restart the sampling process, which performs packet sampling based on particular input interfaces and various fields in the packet header.

sbc-configuration-process—(Optional) Restart the session border controller (SBC) process of the border signaling gateway (BSG).

scc—(TX Matrix routers only) (Optional) Restart the software process on the TX Matrix router (or switch-card chassis).

sdk-service—(Optional) Restart the SDK Service process, which runs on the Routing Engine and is responsible for communications between the SDK application and Junos OS. Although the SDK Service process is present on the router, it is turned off by default.

secure-neighbor-discovery—(QFX Series, EX Series switches, and MX Series routers only) (Optional) Restart the secure Neighbor Discovery Protocol (NDP) process, which provides support for protecting NDP messages.

sfc *number*—(TX Matrix Plus routers only) (Optional) Restart the software process on the TX Matrix Plus router (or switch-fabric chassis). Replace ***number*** with **0**.

service-deployment—(Optional) Restart the service deployment process, which enables Junos OS to work with the Session and Resource Control (SRC) software.

services—(Optional) Restart a service.

services pgcp gateway *gateway-name*—(Optional) Restart the pgcpd process for a specific border gateway function (BGF) running on an MS-PIC. This option does not restart the pgcpd process running on the Routing Engine. To restart the pgcpd process on the Routing Engine, use the **pgcp-service** option.

sflow-service—(EX Series switches only) (Optional) Restart the flow sampling (sFlow technology) process.

snmp—(Optional) Restart the SNMP process, which enables the monitoring of network devices from a central location and provides the router's or switch's SNMP master agent.

soft—(Optional) Reread and reactivate the configuration without completely restarting the software processes. For example, BGP peers stay up and the routing table stays constant. Omitting this option results in a graceful restart of the software process.

static-subscribers—(Optional) Restart the static subscribers process, which associates subscribers with statically configured interfaces and provides dynamic service activation and activation for these subscribers.

statistics-service—(Optional) Restart the process that manages the Packet Forwarding Engine statistics.

subscriber-management—(Optional) Restart the Subscriber Management process.

subscriber-management-helper—(Optional) Restart the Subscriber Management Helper process.

tunnel-oamd—(Optional) Restart the Tunnel OAM process, which enables the Operations, Administration, and Maintenance of Layer 2 tunneled networks. Layer 2 protocol tunneling (L2PT) allows service providers to send Layer 2 PDUs across the provider's cloud and deliver them to Juniper Networks EX Series Ethernet Switches that are not part of the local broadcast domain.

usb-control—(J Series routers and MX Series routers only) (Optional) Restart the USB control process.

vrrp—(ACX Series routers, EX Series switches, and MX Series routers only) (Optional) Restart the Virtual Router Redundancy Protocol (VRRP) process, which enables hosts on a LAN to make use of redundant routing platforms on that LAN without requiring more than the static configuration of a single default route on the hosts.

web-management—(J Series routers, QFX Series, EX Series switches, and MX Series routers only) (Optional) Restart the Web management process.

Required Privilege Level reset

Related Documentation
- *Overview of Junos OS CLI Operational Mode Commands*

List of Sample Output restart interfaces on page 178

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

restart interfaces

```
user@host> restart interfaces
interfaces process terminated
interfaces process restarted
```

show ppp interface

Syntax show ppp interface *interface-name*
<extensive| terse>

Release Information Command introduced in Junos OS Release 7.5.

Description Display information about PPP interfaces.

Options ***interface-name***—Name of a logical interface.

extensive | terse—(Optional) Display the specified level of output.

Required Privilege Level view

List of Sample Output
show ppp interface on page 186
show ppp interface extensive on page 186
show ppp interface terse on page 187

Output Fields Table 10 on page 179 lists the output fields for the **show ppp interface** command. Output fields are listed in the approximate order in which they appear.

Table 10: show ppp interface Output Fields

Field Name	Field Description	Level of Output
Session	Name of the logical interface on which the session is running.	All levels
Type	Session type: PPP.	All levels
Phase	PPP process phase: **Authenticate**, **Pending**, **Establish**, **LCP**, **Network**, **Disabled**, and **Tunneled**.	All levels
Session flags	Special conditions present in the session: **Bundled**, **TCC**, **No-keepalives**, **Looped**, **Monitored**, and **NCP-only**.	All levels
***protocol* State**	Protocol state information. See specific protocol state fields for information.	None specified
AUTHENTICATION	Challenge-Handshake Authentication Protocol (CHAP) authentication state information or Password Authentication Protocol (PAP) state information. See the **Authentication** field description for further information.	None specified

Table 10: show ppp interface Output Fields *(continued)*

Field Name	Field Description	Level of Output
Keepalive settings	Keepalive settings for the PPP sessions on the L2TP network server (LNS). LNS based PPP sessions are supported only on service interfaces (si). • **Interval**—Time in seconds between successive keepalive requests. Keepalive aging timeout is calculated as a product of the **interval** and **Down-count** values. If the keepalive aging timeout is greater than 180 seconds, the keepalive packets are handled by the Routing Engine. If the aging timeout is less than or equal to 180 seconds, the packets are handled by the Packet Forwarding Engine. • **Up-count**—The number of keepalive packets a destination must receive to change a link's status from down to up. • **Down-count**—The number of keepalive packets a destination must fail to receive before the network takes down a link.	**extensive**
RE Keepalive statistics	Keepalive statistics for the packets handled by the Routing Engine. • **LCP echo req Tx**—LCP echo requests sent from the Routing Engine. • **LCP echo req Rx**—LCP echo requests received at the Routing Engine. • **LCP echo rep Tx**—LCP echo responses sent from the Routing Engine. • **LCP echo rep Rx**—LCP echo responses received at the Routing Engine. • **LCP echo req timeout**—Number of keepalive packets where the keepalive aging timer has expired. • **LCP Rx echo req Magic Num Failures**—LCP echo requests where the magic numbers shared between the PPP peers during LCP negotiation did not match. • **LCP Rx echo rep Magic Num Failures**—LCP echo responses where the magic numbers shared between the PPP peers during LCP negotiation did not match.	**extensive**

Table 10: show ppp interface Output Fields *(continued)*

Field Name	Field Description	Level of Output

LCP	**LCP information:**
	• **State**—LCP protocol state (all platforms except M120 and M320 routers):
	  • **Ack-rcvd**—A Configure-Request has been sent and a Configure-Ack has been received.
	  • **Ack-sent**—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • **Closed**—Link is not available for traffic.
	  • **Opened**—Link is administratively available for traffic.
	  • **Req-sent**—An attempt has been made to configure the connection.
	• **State**—LCP protocol state (M120 and M320 routers):
	  • **Ack-rcvd**—A Configure-Request has been sent and a Configure-Ack has been received.
	  • **Ack-sent**—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • **Closed**—Link is available (up), but no Open has occurred.
	  • **Closing**—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	  • **Opened**—Link is administratively available for traffic. A Configure-Ack has been both sent and received.
	  • **Req-sent**—An attempt has been made to configure the connection. A Configure-Request has been sent but a Configure-Ack has not yet been received.
	  • **Starting**—An administrative Open has been initiated, but the lower layer is still unavailable (Down).
	  • **Stopped**—The system is waiting for a Down event after the This-Layer-Finished action, or after sending a Terminate-Ack.
	  • **Stopping**—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	• **Last started**—LCP state start time.
	• **Last completed**—LCP state completion time.
		extensive

Table 10: show ppp interface Output Fields *(continued)*

Field Name	Field Description	Level of Output

	• **Negotiated options**:
	  • **ACFC**—Address and-Control Field Compression. A configuration option that provides a method to negotiate the compression of the Data Link Layer Address and Control fields.
	  • **Asynchronous map**—Asynchronous control character map. A configuration option used on asynchronous links such as telephone lines to identify control characters that must be replaced by a two-character sequence to prevent them from being interpreted by equipment used to establish the link.
	  • **Authentication protocol**—Protocol used for authentication. This option provides a method to negotiate the use of a specific protocol for authentication. It requires a peer to authenticate itself before allowing network-layer protocol packets to be exchanged. By default, authentication is not required.
	  • **Authentication algorithm**—Type of authentication algorithm. The Message Digest algorithm (MD5) is the only algorithm supported.
	  • **Endpoint discriminator class**—For multilink PPP (MLPPP), a configuration option that identifies the system transmitting the packet. This option advises a system that the peer on this link could be the same as the peer on another existing link.
	  • **Magic number**—A configuration option that provides a method to detect looped-back links and other data-link layer anomalies. By default, the magic number is not negotiated.
	  • **MRU**—Maximum receive unit. A configuration option that may be sent to inform the peer that the implementation can receive larger packets, or to request that the peer send smaller packets. The default value is 1500 octets.
	  • **MRRU**—For multilink PPP, the maximum receive reconstructed unit. A configuration option that specifies the maximum number of octets in the Information fields of reassembled packets.
	  • **Multilink header suspendable classes**—For MLPPP, an LCP option that advises the peer that the implementation wishes to receive fragments with a format given by the code number, with the maximum number of suspendable classes given.
	  • **Multilink header format classes**—For MLPPP, an LCP option that advises the peer that the implementation wishes to receive fragments with a format given by the code number.
	  • **PFC**—Protocol-Field-Compression. A configuration option that provides a method to negotiate the compression of the PPP Protocol field.
	  • **short sequence**—For MLPPP, an option that advises the peer that the implementation wishes to receive fragments with short, 12-bit sequence numbers.	

Table 10: show ppp interface Output Fields *(continued)*

Field Name	Field Description	Level of Output
Authentication	CHAP or PAP authentication state information. For CHAP authentication: • **Chap-ans-rcvd**—Packet was sent from the peer, indicating that the peer received the **Chap-resp-sent** packet. • **Chap-ans-sent**—Packet was sent from the authenticator, indicating that the authenticator received the peer's **Chap-resp-rcvd** packet. • **Chap-chal-rcvd**—Challenge packet has been received by the peer. • **Chap-chal-sent**—Challenge packet has been sent by the authenticator to begin the CHAP protocol or has been transmitted at any time during the Network-Layer Protocol (NCP) phase to ensure that the connection has not been altered. • **Chap-resp-rcvd**—CHAP response packet has been received by the authenticator. • **Chap-resp-sent**—CHAP response packet has been sent to the authenticator. • **Closed**—Link is not available for authentication. • **Failure**—Authenticator compares the response value in the response packet from the peer with its own response value, but the value does not match. Authentication fails. • **Success**—Authenticator compares the response value in the response packet from the peer with its own response value, and the value matches. Authentication is successful. For PAP authentication: • **Pap-resp-sent**—PAP response sent to peer (ACK/NACK)t. • **Pap-req-rcvd**—PAP request packet received from peer. • **Pap-resp-rcvd**—PAP response received from the peer (ACK/NACK). • **Pap-req-sent**—PAP request packet sent to the peer. • **Closed**—Link is not available for authentication. • **Failure**—Authenticator compares the response value in the response packet from the peer with its own response value, but the value does not match. Authentication fails. • **Success**—Authenticator compares the response value in the response packet from the peer with its own response value, and the value matches. Authentication is successful.	None specified

Table 10: show ppp interface Output Fields *(continued)*

Field Name	Field Description	Level of Output

IPCP	Internet Protocol Control Protocol (IPCP) information.
	• **State**—(All platforms except M120 and M320 routers) One of the following values:
	  • **Ack-rcvd**—A Configure-Request has been sent and a Configure-Ack has been received.
	  • **Ack-sent**—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • **Closed**—Link is not available for traffic.
	  • **Opened**—Link is administratively available for traffic.
	  • **Req-sent**—An attempt has been made to configure the connection.
	• **State**—(M120 and M320 routers) One of the following values:
	  • **Ack-rcvd**—A Configure-Request has been sent and a Configure-Ack has been received.
	  • **Ack-sent**—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • **Closed**—Link is available (up), but no Open has occurred.
	  • **Closing**—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	  • **Opened**—Link is administratively available for traffic. A Configure-Ack has been both sent and received.
	  • **Req-sent**—An attempt has been made to configure the connection. A Configure-Request has been sent but a Configure-Ack has not yet been received.
	  • **Starting**—An administrative Open has been initiated, but the lower layer is still unavailable (Down).
	  • **Stopped**—The system is waiting for a Down event after the This-Layer-Finished action, or after sending a Terminate-Ack.
	  • **Stopping**—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	• **Last started**—IPCP state start time.
	• **Last completed**—IPCP state authentication completion time.
	• **Negotiated options:**
	  • **compression protocol**—Negotiate the use of a specific compression protocol. By default, compression is not enabled.
	  • **local address**—Desired local address of the sender of a Configure-Request. If all four octets are set to zero, the peer provides the IP address.
	  • **primary DNS server**—Negotiate with the remote peer to select the address of the primary DNS server to be used on the local end of the link.
	  • **primary WINS server**—Negotiate with the remote peer to select the address of the primary WINS server to be used on the local end of the link.
	  • **remote address**—IP address of the remote end of the link in dotted quad notation.
	  • **secondary DNS server**—Negotiate with the remote peer to select the address of the secondary DNS server to be used on the local end of the link.
	  • **secondary WINS server**—Negotiate with the remote peer to select the address of the secondary WINS server to be used on the local end of the link.
		extensive

Table 10: show ppp interface Output Fields *(continued)*

Field Name	Field Description	Level of Output

IPV6CP	Internet Protocol version 6 Control Protocol (IPV6CP) information.
	• **State**—(All platforms except M120 and M320 routers) One of the following values:
	  • **Ack-rcvd**—A Configure-Request has been sent and a Configure-Ack has been received.
	  • **Ack-sent**—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • **Closed**—Link is not available for traffic.
	  • **Opened**—Link is administratively available for traffic.
	  • **Req-sent**—An attempt has been made to configure the connection.
	• **State**—(M120 and M320 routers) One of the following values:
	  • **Ack-rcvd**—A Configure-Request has been sent and a Configure-Ack has been received.
	  • **Ack-sent**—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • **Closed**—Link is available (up), but no Open has occurred.
	  • **Closing**—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	  • **Opened**—Link is administratively available for traffic. A Configure-Ack has been both sent and received.
	  • **Req-sent**—An attempt has been made to configure the connection. A Configure-Request has been sent but a Configure-Ack has not yet been received.
	  • **Starting**—An administrative Open has been initiated, but the lower layer is still unavailable (Down).
	  • **Stopped**—The system is waiting for a Down event after the This-Layer-Finished action, or after sending a Terminate-Ack.
	  • **Stopping**—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	• **Last started**—IPV6CP state start time.
	• **Last completed**—IPV6CP state authentication completion time.
	• **Negotiated options**:
	  • **local interface identifier**—Desired local address of the sender of a Configure-Request. If all four octets are set to zero, the peer provides the IP address.
	  • **remote interface identifier**—IP address of the remote end of the link in dotted quad notation.
		extensive

OSINLCP State	OSI Network Layer Control Protocol (OSINLCP) protocol state information (all platforms except M120 and M320 routers):
	• **State:**
	  • **Ack-rcvd**—Configure-Request has been sent and Configure-Ack has been received.
	  • **Ack-sent**—Configure-Request and Configure-Ack have both been sent, but Configure-Ack has not yet been received.
	  • **Closed**—Link is not available for traffic.
	  • **Opened**—Link is administratively available for traffic.
	  • **Req-sent**—Attempt has been made to configure the connection.
	• **Last started**—OSINLCP state start time.
	• **Last completed**—OSINCLP state completion time.
		extensive

Table 10: show ppp interface Output Fields *(continued)*

Field Name	Field Description	Level of Output

TAGCP	TAGCP information.
	• **State**—(All platforms except M120 and M320 routers) One of the following values:
	  • **Ack-rcvd**—A Configure-Request has been sent and a Configure-Ack has been received.
	  • **Ack-sent**—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • **Closed**—Link is not available for traffic.
	  • **Opened**—Link is administratively available for traffic.
	  • **Req-sent**—An attempt has been made to configure the connection.
	• **State**—(M120 and M320 routers) One of the following values:
	  • **Ack-rcvd**—A Configure-Request has been sent and a Configure-Ack has been received.
	  • **Ack-sent**—A Configure-Request and a Configure-Ack have both been sent, but a Configure-Ack has not yet been received.
	  • **Closed**—Link is available (up), but no Open has occurred.
	  • **Closing**—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	  • **Opened**—Link is administratively available for traffic. A Configure-Ack has been both sent and received.
	  • **Req-sent**—An attempt has been made to configure the connection. A Configure-Request has been sent but a Configure-Ack has not yet been received.
	  • **Starting**—An administrative Open has been initiated, but the lower layer is still unavailable (Down).
	  • **Stopped**—The system is waiting for a Down event after the This-Layer-Finished action, or after sending a Terminate-Ack.
	  • **Stopping**—A Terminate-Request has been sent but a Terminate-Ack has not yet been received.
	• **Last started**—TAGCP state start time.
	• **Last completed**—TAGCP state authentication completion time.
		extensive
		none

Sample Output

show ppp interface

```
user@host> show ppp interface si-1/3/0.0
Session si-1/3/0.0, Type: PPP, Phase: Authenticate
  Session flags: Monitored
    LCP State: Opened
    AUTHENTICATION: CHAP State: Chap-resp-sent, Chap-ans-sent
    IPCP State: Closed, OSINLCP State: Closed
```

show ppp interface extensive

```
user@host> show ppp interface si-0/0/3.0 extensive
    Session si-0/0/3.0, Type: PPP, Phase: Network
        Keepalive settings: Interval 30 seconds, Up-count 1, Down-count 3
RE Keepalive statistics:
  LCP echo req Tx        :  657 (last sent 00:50:10 ago)
  LCP echo req Rx        :    0 (last seen: never)
  LCP echo rep Tx        :    0
```

```
  LCP echo rep Rx        :  657
  LCP echo req timout    :    0
  LCP Rx echo req Magic Num Failures :    0
  LCP Rx echo rep Magic Num Failures :    0
LCP
      State: Opened
      Last started: 2007-01-29 10:43:50 PST
      Last completed: 2007-01-29 10:43:50 PST
      Negotiated options:
        Authentication protocol: PAP, Magic number: 2341124815, MRU: 4470
    Authentication: PAP
      State: Success
      Last started: 2007-01-29 10:43:50 PST
      Last completed: 2007-01-29 10:43:50 PST
    IPCP
      State: Opened
      Last started: 2007-01-29 10:43:50 PST
      Last completed: 2007-01-29 10:43:50 PST
      Negotiated options:
        Local address: 10.10.10.1, Remote address: 10.10.10.2
```

show ppp interface terse

```
user@host> show ppp interface si-1/3/0 terse
Session name    Session type   Session phase      Session flags
si-1/3/0.0      PPP            Authenticate       Monitored
```

show services inline ip-reassembly statistics

Syntax show services inline ip-reassembly statistics
<fpc *fpc-slot*>
<pfe *pfe-slot*>

Release Information Statement introduced in Junos OS Release 12.2X49.

Description Display the inline IP reassembly statistics for the Packet Forwarding Engines on one or more MPCs. Inline IP reassembly statistics are collected at the Packet Forwarding Engine level.

NOTE: For more information on MPCs that support inline IP reassembly, refer to *Protocols and Applications Supported by MX240, MX480, MX960, and MX2020 Enhanced MPCs (MPCEs)*.

Options **none**—Displays standard inline IP reassembly statistics for all MPCs.

fpc *fpc*—(Optional) Displays inline IP reassembly statistics for the specified MPC.

pfe *pfe*—(Optional) Displays inline IP reassembly for the specified Packet Forwarding Engine slot. You must specify an FPC slot number before specifying a Packet Forwarding Engine slot.

Required Privilege Level view

Related Documentation
- ip-reassembly on page 105

List of Sample Output show services inline ip-reassembly statistics fpc on page 192

Output Fields Table 11 on page 188 lists the output fields for the **show services inline ip-reassembly statistics** command. Output fields are listed in the approximate order in which they appear.

Table 11: show services inline ip-reassembly statistics Output Fields

Field Name	Field Description
FPC	MPC slot number for which the statistics are displayed.
PFE	Packet Forwarding Engine on the MPC for which the statistics are displayed.

Table 11: show services inline ip-reassembly statistics Output Fields *(continued)*

Field Name	Field Description
NOTE: The output fields displayed (per Packet Forwarding Engine) are arranged in a logical sequence from top to bottom to enable users to understand how the inline IP reassembly statistics are gathered. The information about total number of fragments received is displayed first, and then the information about the reassembled packets and those pending reassembly are displayed. Then, the reasons why the fragments were dropped or not reassembled are displayed. Finally, the information about the fragments reassembled, fragments dropped, and fragments sent to the backup user plane PIC (services PIC) are displayed.	
Total Fragments Received	Total number of fragments received and the current rate of fragments received for inline IP reassembly. The following information is also displayed: • **First Fragments**—Number of first fragments received and current rate of first fragments processed. • **Intermediate Fragments**—Number of intermediate fragments received and current rate of intermediate fragments processed. • **Last Fragments**—Number and rate of last fragments received. NOTE: Current rate refers to the current number of fragments processed per second in the instant preceding the command's execution.
Total Packets Reassembled	Total number of packets reassembled and current rate, in the instant preceding the command's execution, at which the packets are reassembled.
Approximate Packets Pending Reassembly	Approximate number of packets pending reassembly.

Table 11: show services inline ip-reassembly statistics Output Fields *(continued)*

Field Name	Field Description
Fragments Dropped Reasons	Total number of fragments dropped reasons and the current rate of total fragment dropped reasons. The number of dropped reasons and rate corresponding to each of the following reasons are also displayed: • Buffers not available • Fragments per packet exceeded • Packet length exceeded • Record insert error • Record in use error • Duplicate first fragments • Duplicate last fragments • Missing first fragment NOTE: • These fields indicate *why* a fragment was dropped. When a fragment is dropped, the corresponding reason field is incremented by 1. For example, when a fragment is dropped because the memory runs out, the **Buffers not available** field increases by 1. • The maximum number of fragments allowed for reassembly is 16. If the interface encounters a 17th fragment, it drops the entire packet and increments the **Fragment per packet exceeded** field by 17. • Current rate refers to the current number of fragment dropped reasons per second in the instant preceding the command's execution.
Reassembly Errors Reasons	Number of errors during reassembly and the current rate of reassembly errors. The number of errors and the rate for each of the following types of errors are also displayed: • Fragment not found • Fragment not in sequence • ASIC errors NOTE: Current rate refers to the current number of reassembly errors processed per second in the instant preceding the command's execution.
Aged out packets	Number of aged out packets and the current number of packets aged out per second in the instant preceding the command's execution. NOTE: In some cases, aged out packets can refer to aged out fragments. If previous fragments of the packet have already been discarded then linking of the dropped fragments to the aged out fragments cannot occur.
Total Fragments Successfully Reassembled	Number of fragments successfully reassembled and the current number of fragments reassembled per second in the instant preceding the command's execution.

Table 11: show services inline ip-reassembly statistics Output Fields *(continued)*

Field Name	Field Description
Total Fragments Dropped	Total number of fragments dropped and the current rate of total number of fragments dropped. The number of fragments dropped and rate corresponding to each of the following reasons are also displayed: • Buffers not available • Fragments per packet exceeded • Packet length exceeded • Record insert error • Record in use error • Duplicate first fragments • Duplicate last fragments • Missing first fragment • Fragment not found • Fragment not in sequence • ASIC errors • Aged out fragments
Total fragments punted to UPIC	Number of fragments sent to the backup user plane PIC (services PIC) and current rate of fragments sent per second in the instant preceding the command's execution

The following information applies to the **Total Fragments Dropped** field.

- These fields indicate *how many* of the packet fragments received were then dropped due to a particular reason.

  For example, consider a packet that has 10 fragments, 9 of which have been received and stored in memory. When the tenth fragment arrives, if the memory runs out (Buffers not available), then this fragment is dropped. Because the tenth fragment has been dropped, the other 9 fragments must also be dropped. In this case, the **Buffers not available** field (under the **Fragments Dropped Reasons** field) is incremented by 1 and the **Buffers not available** field (under the **Total Fragments Dropped** field) is incremented by 10.

  For the next packet arriving, which also has 10 fragments, the first four fragments are stored but the memory runs out for the fifth fragment. Then the first 5 fragments (fifth and the first four) are dropped. In this case, the **Buffers not available** field (under the **Fragments Dropped Reasons** field) is incremented by 1 and the **Buffers not available** field (under the **Total Fragments Dropped** field) is incremented by 5.

  For the remaining fragments of the packet, if memory becomes available, the next 5 fragments (6 through 10) that arrive are stored in memory. The fragments are stored until the timeout period elapses, and are eventually dropped. In this case, the **Aged out packets** field is incremented by 1 and the **Aged out fragments** field (under the **Total Fragments Dropped** field) is incremented by 5.

  The fragment counters (after both packets have been processed) are as follows:

  - **Fragments Dropped Reasons**
    - **Buffers not available** 2
    - **Aged out packets** 1
  - **Total Fragment Dropped**
    - **Buffers not available** 15
    - **Aged out packets** 5

- Current rate refers to the current total number fragments dropped per second in the instant preceding the command's execution.

Sample Output

show services inline ip-reassembly statistics fpc

```
user@host> show services inline ip-reassembly statistics fpc 0
FPC: 0 PFE: 0
=============
                                              Total   Current Rate
Total Fragments Received                  728177644          83529
   First Fragments                        260759430          29924
   Intermediate Fragments                 206658784          23681
   Last Fragments                         260759430          29924

Total Packets Successfully Reassembled    260746982          29924

Approximate Packets Pending Reassembly            4

Fragments Dropped Reasons                     34558              3
   Buffers not available                          0              0
   Fragments per packet exceeded                  0              0
   Packet length exceeded                         0              0
   Record insert error                            0              0
   Record in use error                        34558              3
   Duplicate first fragments                      0              0
   Duplicate last fragments                       0              0
   Missing first fragment                         0              0

Reassembly Errors Reasons                         0              0
   Fragment not found                             0              0
   Fragment not in sequence                       0              0
   ASIC errors                                    0              0

Aged out packets                                 63              0

Total Fragments Successfully Reassembled  728142977          83528

Total Fragments Dropped                       34673              3
   Buffers not available                          0              0
   Fragments per packet exceeded                  0              0
   Packet length exceeded                         0              0
   Record insert error                            0              0
   Record in use error                        34558              3
   Duplicate first fragments                      0              0
   Duplicate last fragments                       0              0
   Missing first fragment                         0              0
```

```
    Fragment not found                          0              0
    Fragment not in sequence                    0              0
    ASIC errors                                 0              0
    Aged out fragments                        115              0

Total fragments punted to UPIC                  0              0
```

show services l2tp destination

Syntax

show services l2tp destination
<brief | detail | extensive>
<local-gateway *gateway-address*>
<peer-gateway *gateway-address*>
<statistics>

Release Information

Command introduced in Junos OS Release 10.4.

Description

Display information about L2TP tunnel destinations.

Options

brief | detail | extensive—(Optional) Display the specified level of information.

local-gateway *gateway-address*—(Optional) Display L2TP session information for only the specified local gateway address.

peer-gateway *gateway-address*—(Optional) Display L2TP session information for only the specified peer gateway address.

statistics—(Optional) Display the number of control packets and bytes transmitted and received for the destination. You cannot include this option with any of the level options, **brief**, **detail**, or **extensive**.

Required Privilege Level

view

Related Documentation

- clear services l2tp destination on page 160
- show services l2tp destination lockout on page 198
- show services l2tp session on page 199
- show services l2tp summary on page 222
- show services l2tp tunnel on page 227

List of Sample Output

show services l2tp destination on page 196
show services l2tp destination detail on page 196
show services l2tp destination extensive (LAC) on page 196
show services l2tp destination extensive (LNS) on page 196
show services l2tp destination statistics (LAC only on MX Series Routers) on page 197

Output Fields

Table 12 on page 194 lists the output fields for the **show services l2tp destination** command. Output fields are listed in the approximate order in which they appear.

Table 12: show services l2tp destination Output Fields

Field Name	Field Description	Level of Output
Local Name	Name of this destination.	All levels
Remote IP	IP address of the remote peer (LNS).	All levels

Table 12: show services l2tp destination Output Fields *(continued)*

Field Name	Field Description	Level of Output
Tunnels	Number of tunnel connections for the destination in the following categories: • total • active • failed	All levels for total **extensive** for active and failed
Sessions	Number of session connections for the destination in the following categories: • total • active • failed	All levels for total **extensive** for active and failed
State	Administrative state of the L2TP destination: • **Enabled**—No restrictions exist on creation or operation of sessions and tunnels for this destination. • **Disabled**—Existing sessions and tunnels for this destination have been disabled and no new sessions or tunnels are created while in the **Disabled** state.	All levels
Local IP	IP address of the local gateway (LAC).	**detail extensive**
Transport	Medium used for tunneling. Only **ipUdp** is supported.	**detail extensive**
Logical System	Logical system in which the tunnel is configured.	**detail extensive**
Router Instance	Routing instance in which the tunnel is configured.	**detail extensive**
Lockout State	Reachability state of the destination: • **not locked**—Destination is considered reachable. • **waiting for lockout timeout**—Destination is locked out by L2TP because it is unreachable, so no attempts are made to reach the destination until the lockout timeout (300 seconds) expires, unless this is the only destination available for tunneling the subscriber.	**detail extensive**
Connections	Number of total, active, and failed tunnel and session connections for the destination.	**extensive**
Control Tx	Amount of control information transmitted, in packets and bytes.	**statistics**
Control Rx	Amount of control information received, in packets and bytes.	**statistics**
Data Tx	Amount of data transmitted, in packets and bytes.	**statistics**
Data Rx	Amount of data received, in packets and bytes.	**statistics**
Error Tx	Number of errors transmitted, in packets.	**statistics**

Table 12: show services l2tp destination Output Fields *(continued)*

Field Name	Field Description	Level of Output
Error Rx	Number of errors received, in packets.	**statistics**

Sample Output

show services l2tp destination

```
user@host> show services l2tp destination
  Local Name    Remote IP        Tunnels       Sessions  State
  1             10.10.1.1        1             1         Enabled
```

show services l2tp destination detail

```
user@host> show services l2tp destination detail
 Local name: 1
    Remote IP: 10.1.1.1
    Tunnels: 1, Sessions: 1
    State: Enabled
    Local IP: 10.1.1.2
    Transport: ipUdp, Logical System: default, Router Instance: default
    Lockout State: not locked
 Local name: 1
    Remote IP: 10.1.1.8
    Tunnels: 1, Sessions: 1
    State: Enabled
    Local IP: 10.1.1.2
    Transport: ipUdp, Logical System: default, Router Instance: default
    Lockout State: waiting for lockout timeout
```

show services l2tp destination extensive (LAC)

```
user@host> show services l2tp destination extensive
  Local name: 1
    Remote IP: 10.1.1.1
    State: Enabled
    Local IP: 10.1.1.2
    Transport: ipUdp, Logical System: default, Router Instance: default
    Lockout State: not locked
      Connections     Totals        Active       Failed
      Tunnels              1             1            0
      Sessions             1             1            0
```

show services l2tp destination extensive (LNS)

```
user@host> show services l2tp destination extensive
  Local name: 3
    Remote IP: 11.1.1.3
    State: Enabled
    Local IP: 11.1.1.2
    Transport: ipUdp, Logical System: default, Router Instance: default
    Lockout State: not locked
      Connections     Totals        Active       Failed
      Tunnels              1             1            0
      Sessions             1             1            0
```

show services l2tp destination statistics (LAC only on MX Series Routers)

```
user@host> show services l2tp destination statistics
Local name: 2, Tunnels: 1, Sessions: 210
       Packets   Bytes
Control Tx     680   63.3k
Control Rx     283   10.6k
Data Tx       1129   14.3k
Data Rx       877   10.9k
Errors Tx          0
Errors Rx          0
```

show services l2tp destination lockout

Syntax **show services l2tp destination lockout**

Release Information Command introduced in Junos OS Release 13.2.

Description Display a list of destinations that are currently locked out and the time remaining for each to remain in the lockout state.

Options This command has no options.

Required Privilege Level view

Related Documentation

- clear services l2tp destination on page 160
- request services l2tp destination unlock on page 129
- show services l2tp destination on page 194
- show services l2tp session on page 199
- show services l2tp summary on page 222
- show services l2tp tunnel on page 227

List of Sample Output show services l2tp destination lockout on page 198

Output Fields Table 13 on page 198 lists the output fields for the **show services l2tp destination lockout** command. Output fields are listed in the approximate order in which they appear.

Table 13: show services l2tp destination lockout Output Fields

Field Name	Field Description
Destination	Name of the destination.
Time Remaining	Time remaining for the destination to be locked out.
L2TP lockout destinations found	Total count of lockout destinations.

Sample Output

show services l2tp destination lockout

```
user@host> show services l2tp destination lockout
  Destination   Time Remaining
  4             45
  5             43
  6             8
3 L2TP lockout destinations found
```

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 161

List of Sample Output

show services l2tp session (LNS on M Series Routers) on page 203
show services l2tp session (LNS on MX Series Routers) on page 203
show services l2tp session (LAC) on page 203
show services l2tp session detail (LAC) on page 203
show services l2tp session extensive (LAC) on page 204
show services l2tp session extensive (LNS on M Series Routers) on page 204
show services l2tp session extensive (LNS on MX Series Routers) on page 205
show services l2tp session statistics (MX Series Routers) on page 205

Output Fields Table 14 on page 200 lists the output fields for the **show services l2tp session** command. Output fields are listed in the approximate order in which they appear.

Table 14: 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
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

Table 14: show services l2tp session Output Fields *(continued)*

Field Name	Field Description	Level of Output
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**
Tx speed	Transmit speed of the session conveyed from the LAC to the LNS, in bits per second (bps).	**extensive**
Rx speed	Receive speed of the session conveyed from the LAC to the LNS, in bits per second (bps).	**extensive**

Table 14: show services l2tp session Output Fields *(continued)*

Field Name	Field Description	Level of Output
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**
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 14: 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: 10.1.1.2:1701, Remote IP: 10.1.1.1:1701
    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: 10.10.1.2:1701, Remote IP: 10.10.1.1:1701
    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 (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: 10.128.1.1:1701, Remote IP: 10.128.1.2:1701
    Username: usr1@juniper_1.net, Assigned IP address: 10.50.2.1/32
    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: 10.128.11.1:1701, Remote IP: 10.128.11.2:1701
    Username: usr1@company.com, Assigned IP address: 10.46.2.3/24
    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: 11.1.1.2:1701, Remote IP: 11.1.1.3:1701
    Local name: lns-mx960, Remote name: testlac
    Tx speed: 56000, Rx speed: 0
    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 tunnel-switch destination

Syntax
show services l2tp tunnel-switch destination
< detail | extensive>
<statistics>

Release Information
Command introduced in Junos OS Release 13.2.

Description
Display information about L2TP switched tunnel destinations.

Options
none—Display standard information for all L2TP switched tunnel destinations.

detail | extensive—(Optional) Display the specified level of information.

statistics—(Optional) Display the number of control packets and bytes transmitted and received for the destination. You cannot include this option with either of the level options, **detail** or **extensive**.

Required Privilege Level
view

Related Documentation
- show services l2tp tunnel-switch session on page 210
- show services l2tp tunnel-switch summary on page 220
- show services l2tp tunnel-switch tunnel on page 215

List of Sample Output
show services l2tp tunnel-switch destination on page 208
show services l2tp tunnel-switch destination detail on page 208
show services l2tp destination extensive on page 208
show services l2tp destination statistics on page 209

Output Fields
Table 15 on page 206 lists the output fields for the **show services l2tp tunnel-switch destination** command. Output fields are listed in the approximate order in which they appear.

Table 15: show services l2tp tunnel-switch destination Output Fields

Field Name	Field Description	Level of Output
Local Name	Name of this destination.	All levels
Remote IP	IP address of the remote peer (LNS).	All levels
Tunnels	Number of tunnel connections for the destination in the following categories: • total • active • failed	All levels for total **extensive** for active and failed

Table 15: show services l2tp tunnel-switch destination Output Fields *(continued)*

Field Name	Field Description	Level of Output
Sessions	Number of session connections for the destination in the following categories: • total • active • failed	All levels for total **extensive** for active and failed
Switched-sessions	Number of L2TP sessions established by tunnel switching.	All levels
State	Administrative state of the L2TP destination: • **Enabled**—No restrictions exist on creation or operation of sessions and tunnels for this destination. • **Disabled**—Existing sessions and tunnels for this destination have been disabled and no new sessions or tunnels are created while in the **Disabled** state.	All levels
Local IP	IP address of the local gateway (LAC).	**detail extensive**
Transport	Medium used for tunneling. Only **ipUdp** is supported.	**detail extensive**
Logical System	Logical system in which the tunnel is configured.	**detail extensive**
Router Instance	Routing instance in which the tunnel is configured.	**detail extensive**
Lockout State	Reachability state of the destination: • **not locked**—Destination is considered reachable. • **waiting for lockout timeout**—Destination is locked out by L2TP because it is unreachable, so no attempts are made to reach the destination until the lockout timeout (300 seconds) expires, unless this is the only destination available for tunneling the subscriber.	**detail extensive**
Connections	Number of total, active, and failed tunnel and session connections for the destination.	**extensive**
Control Tx	Amount of control information transmitted, in packets and bytes.	**extensive statistics**
Control Rx	Amount of control information received, in packets and bytes.	**extensive statistics**
Data Tx	Amount of data transmitted, in packets and bytes.	**extensive statistics**
Data Rx	Amount of data received, in packets and bytes.	**extensive statistics**
Error Tx	Number of errors transmitted, in packets.	**extensive statistics**
Error Rx	Number of errors received, in packets.	**extensive statistics**

Sample Output

show services l2tp tunnel-switch destination

```
user@host> show services l2tp tunnel-switch destination
  Local Name   Remote IP       Tunnels  Sessions Switched-sessions State
  1            192.168.20.3    1        1        1                 Enabled
  2            10.1.1.10       1        1        1                 Enabled
```

show services l2tp tunnel-switch destination detail

```
user@host> show services l2tp destination detail
  Local name: 1
    Remote IP: 192.168.20.3
    Tunnels: 1, Sessions: 1, Switched sessions: 1
    State: Enabled
    Local IP: 10.50.1.1
    Transport: ipUdp, Logical System: default, Router Instance: default
    Lockout State: not locked
  Local name: 2
    Remote IP: 172.20.1.10
    Tunnels: 1, Sessions: 1, Switched sessions: 1
    State: Enabled
    Local IP: 10.30.1.1
    Transport: ipUdp, Logical System: default, Router Instance: default
    Lockout State: not locked
```

show services l2tp destination extensive

```
user@host> show services l2tp destination extensive
Waiting for statistics...
  Local name: 1
    Remote IP: 192.168.20.3
    Tunnels: 1, Sessions: 1, Switched sessions: 1
    State: Enabled
    Local IP: 10.50.1.1
    Transport: ipUdp, Logical System: default, Router Instance: default
    Lockout State: not locked
      Connections     Totals        Active       Failed
      Tunnels              1             1            0
      Sessions             1             1            0
                         Packets       Bytes
      Control Tx             6           239
      Control Rx             6           267
      Data Tx               67           815
      Data Rx                0             0
      Errors Tx              0
      Errors Rx              0
  Local name: 2
    Remote IP: 172.20.1.10
    Tunnels: 1, Sessions: 1, Switched sessions: 1
    State: Enabled
    Local IP: 10.30.1.1
    Transport: ipUdp, Logical System: default, Router Instance: default
    Lockout State: not locked
      Connections     Totals        Active       Failed
      Tunnels              1             1            0
      Sessions             1             1            0
                         Packets       Bytes
      Control Tx             7           462
      Control Rx             6           171
```

```
    Data Tx                 0            0
    Data Rx                66          798
    Errors Tx               0
    Errors Rx               0
```

show services l2tp destination statistics

```
user@host> show services l2tp destination statistics
Waiting for statistics...
  Local name: 2, Tunnels: 1, Sessions: 1
                        Packets        Bytes
    Control Tx                5          452
    Control Rx                4          147
    Data Tx                   0            0
    Data Rx                   4           54
    Errors Tx                 0
    Errors Rx                 0
  Local name: 1, Tunnels: 1, Sessions: 1
                        Packets        Bytes
    Control Tx                4          184
    Control Rx                4          243
    Data Tx                   5           71
    Data Rx                   0            0
    Errors Tx                 0
    Errors Rx                 0
```

show services l2tp tunnel-switch session

Syntax
show services l2tp tunnel-switch session
<detail | extensive>
<statistics>

Release Information
Command introduced in Junos OS Release 13.2.

Description
Display information about L2TP switched tunnel sessions.

Options
none—Display standard information about all active L2TP switched tunnel sessions.

detail | extensive—(Optional) Display the specified level of output.

statistics—(Optional) Display the number of control packets and bytes transmitted and received for the session. You cannot include this option with either of the level options, **detail** or **extensive**.

Additional Information

Required Privilege Level
view

Related Documentation
- show services l2tp tunnel-switch destination on page 206
- show services l2tp tunnel-switch summary on page 220
- show services l2tp tunnel-switch tunnel on page 215

List of Sample Output
show services l2tp tunnel-switch session on page 212
show services l2tp tunnel-switch session detail on page 213
show services l2tp tunnel-switch session extensive on page 213

Output Fields
Table 16 on page 210 lists the output fields for the **show services l2tp tunnel-switch session** command. Output fields are listed in the approximate order in which they appear.

Table 16: show services l2tp tunnel-switch session Output Fields

Field Name	Field Description	Level of Output
Tunnel local ID	Identifier of the local endpoint of the tunnel, as assigned by the L2TP network server (LNS).	All levels
Local ID	Identifier of the local endpoint of the L2TP session, as assigned by the LNS.	none
Remote ID	Identifier of the remote endpoint of the L2TP session, as assigned by the L2TP access concentrator (LAC).	none

Table 16: show services l2tp tunnel-switch session Output Fields *(continued)*

Field Name	Field Description	Level of Output
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
Interface unit	Logical interface for this session.	All levels
Interface Name	(LNS only) Name of an adaptive services interface.	none
Session local ID	Identifier of the local endpoint of the L2TP session, as assigned by the LNS.	**detail extensive**
Session remote ID	Identifier of the remote endpoint of the L2TP session, as assigned by the L2TP access concentrator (LAC).	**detail extensive**
Tunnel switch profile name	Name of a tunnel switch profile.	**detail extensive**
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.	**detail extensive**
Local IP	IP address of local endpoint of the Point-to-Point Protocol (PPP) session.	**detail extensive**
Remote IP	IP address of remote endpoint of the PPP session.	**detail extensive**
Local name	For LNS, name of the LNS instance in which the session was created. For LAC, name of the LAC.	**detail extensive**
Remote name	For LNS, name of the LAC from which the session was created. For LAC, name of the LAC instance.	**detail 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**

Table 16: show services l2tp tunnel-switch session Output Fields *(continued)*

Field Name	Field Description	Level of Output
Framing type	Type of framing enabled: • **1**—Synchronous framing • **2**—Asynchronous framing	**extensive**
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**
Call serial number	Unique serial number assigned to the call.	**extensive**
Tx speed	Transmit speed of the session conveyed from the LAC to the LNS, in bits per second (bps).	**extensive**
Rx speed	Receive speed of the session conveyed from the LAC to the LNS, in bits per second (bps).	**extensive**
Create time	Day, 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**
ToS Reflect	Status of IP ToS value reflection, **Disabled** or **Enabled**.	**extensive**
Statistics since	Date and time when collection of the following statistics began: • **Data Tx**—Amount of data transmitted, in packets and bytes. • **Data Rx**—Amount of data received, in packets and bytes.	**extensive**

Sample Output

show services l2tp tunnel-switch session

```
user@host> show services l2tp tunnel-switch session
Tunnel local ID: 37602
  Local  Remote   State               Interface         Interface
  ID     ID                           unit              Name
  13545  1        Established         1073741842        si-2/1/0

Tunnel local ID: 37060
  Local  Remote   State               Interface         Interface
```

```
  ID     ID                          unit              Name
  58296  1        Established        1073741843        si-2/1/0
```

show services l2tp tunnel-switch session detail

```
user@host> show services l2tp tunnel-switch session detail
Tunnel local ID: 37602
  Session local ID: 13545, Session remote ID: 1, Interface unit: 1073741842
    State: Established, Interface: si-2/1/0
    Tunnel switch profile name: ce-lts-profile
    Mode: Dedicated
    Local IP: 10.50.1.1:1701, Remote IP: 192.168.20.3:1701
    Local name: ce-bras-mx240-f, Remote name: testlac

Tunnel local ID: 37060
  Session local ID: 58296, Session remote ID: 1, Interface unit: 1073741843
    State: Established, Interface: si-2/1/0
    Tunnel switch profile name: ce-lts-profile
    Mode: Dedicated
    Local IP: 10.30.1.1:1701, Remote IP: 172.20.1.10:1701
    Local name: lns, Remote name: lns
```

show services l2tp tunnel-switch session extensive

```
user@host> show services l2tp tunnel-switch session extensive
Tunnel local ID: 37602
  Session local ID: 13545, Session remote ID: 1
    Interface unit: 1073741842
    State: Established
    Interface: si-2/1/0
    Tunnel switch profile name: ce-lts-profile
    Mode: Dedicated
    Local IP: 10.50.1.1:1701, Remote IP: 192.168.20.3:1701
    Local name: ce-bras-mx240-f, Remote name: testlac
    Bearer type: 2, Framing type: 1
    LCP renegotiation: On, Authentication: None, Interface ID: si-2/1/0
    Call serial number: 0
    Tx speed: 56000, Rx speed: 0
    Create time: Fri Jan 18 03:01:11 2013, Up time: 00:06:50
    Idle time: N/A, ToS Reflect: Disabled
    Statistics since: Fri Jan 18 03:01:11 2013
                        Packets        Bytes
      Data Tx                85         1031
      Data Rx                 0            0

Tunnel local ID: 37060
  Session local ID: 58296, Session remote ID: 1
    Interface unit: 1073741843
    State: Established
    Interface: si-2/1/0
    Tunnel switch profile name: ce-lts-profile
    Mode: Dedicated
    Local IP: 10.30.1.1:1701, Remote IP: 172.20.1.10:1701
    Local name: lns, Remote name: lns
    Bearer type: 2, Framing type: 1
    LCP renegotiation: N/A, Authentication: None, Interface ID: N/A
    Call serial number: 0
    Tx speed: 56000, Rx speed: 0
    Create time: Fri Jan 18 03:01:14 2013, Up time: 00:06:48
    Idle time: N/A
    Statistics since: Fri Jan 18 03:01:14 2013
```

```
                    Packets          Bytes
Data Tx                   0              0
Data Rx                  84           1014
```

show services l2tp tunnel-switch tunnel

Syntax
show services l2tp tunnel-switch tunnel
<detail | extensive>
<statistics>

Release Information
Command introduced in Junos OS Release 13.2.

Description
Display information about L2TP switched tunnels.

Options
none—Display standard information about all active L2TP tunnels.

detail | extensive—(Default) Display the specified level of output.

statistics—(Optional) Display the number of control packets and bytes transmitted and received for the tunnel. You cannot include this option with either of the level options, **detail** or **extensive**.

Additional Information

Required Privilege Level
view

Related Documentation
- show services l2tp tunnel-switch destination on page 206
- show services l2tp tunnel-switch session on page 210
- show services l2tp tunnel-switch summary on page 220

List of Sample Output
show services l2tp tunnel-switch tunnel on page 217
show services l2tp tunnel-switch tunnel detail on page 218
show services l2tp tunnel-switch tunnel extensive on page 218

Output Fields
Table 17 on page 215 lists the output fields for the **show services l2tp tunnel-switch tunnel** command. Output fields are listed in the approximate order in which they appear.

Table 17: show services l2tp tunnel-switch tunnel Output Fields

Field Name	Field Description	Level of Output
Local ID	On the LNS, number assigned by the LNS that identifies the local endpoint of the tunnel relative to the LNS: the LNS. On the LAC, number assigned by the LAC that identifies the local endpoint of the tunnel relative to the LAC: the LAC.	none
Remote ID	On the LNS, number assigned by the LAC that identifies the remote endpoint of the tunnel relative to the LNS: the LAC. On the LAC, number assigned by the LNS that identifies the remote endpoint of the tunnel relative to the LAC: the LNS.	none
Remote IP	IP address of the peer endpoint of the tunnel.	All levels

Table 17: show services l2tp tunnel-switch tunnel Output Fields *(continued)*

Field Name	Field Description	Level of Output
Sessions	Number of L2TP sessions established through the tunnel.	All levels
Switched-sessions	Number of L2TP sessions established by tunnel switching.	All levels
State	State of the L2TP tunnel: • **cc_responder_accept_new**—The tunnel has received and accepted the start control connection request (SCCRQ). • **cc_responder_reject_new**—The tunnel has received and rejected the SCCRQ. • **cc_responder_idle**—The tunnel has just been created. • **cc_responder_wait_ctl_conn**—The tunnel has sent the start control connection response (SCCRP) and is waiting for the start control connection connected (SCCCN) message. • **clean-up**—The tunnel is being cleaned up. • **closed**—The tunnel is being closed. • **destroyed**—The tunnel is being destroyed. • **Established**—The tunnel is operating. This is the only state supported for the LAC. • **Terminate**—The tunnel is terminating. • **Unknown**—The tunnel is not connected to the router.	All levels
Tunnel local ID	On the LNS, number assigned by the LNS that identifies the local endpoint of the tunnel relative to the LNS: the LNS. On the LAC, number assigned by the LAC that identifies the local endpoint of the tunnel relative to the LAC: the LAC.	**detail extensive**
Tunnel remote ID	On the LNS, number assigned by the LAC that identifies the remote endpoint of the tunnel relative to the LNS: the LAC. On the LAC, number assigned by the LNS that identifies the remote endpoint of the tunnel relative to the LAC: the LNS.	**detail extensive**
Tunnel Name	(LAC only) Name of the created tunnel. This value includes the destination name followed by the value of the RADIUS Tunnel-Assignment-ID VSA [82].	**detail extensive**
Local IP	IP address of the local endpoint of the tunnel.	**detail extensive**
Local name	Name used for local tunnel endpoint during tunnel negotiation.	**detail extensive**
Remote name	Name used for remote tunnel endpoint during tunnel negotiation.	**detail extensive**
Effective Peer Resync Mechanism	(LAC only) Peer resynchronization mechanism (PRM) in effect for the tunnel: • Failover protocol • Silent failover—Recovery takes place in the failed endpoint only using the proprietary silent failover protocol.	**detail extensive**

Table 17: show services l2tp tunnel-switch tunnel Output Fields *(continued)*

Field Name	Field Description	Level of Output
NAS Port Method	(LAC only) Status of interoperation with Cisco LNS devices: • none—NAS port method is not enabled for interoperation. • cisco-avp—NAS port method is enabled for interoperation.	**detail extensive**
Tunnel Logical System	Logical system in which the L2TP tunnel is brought up.	**detail extensive**
Tunnel Routing Instance	Routing instance in which the L2TP tunnel is brought up.	**detail extensive**
Max sessions	Maximum number of sessions that can be established on this tunnel.	**extensive**
Window size	Number of control messages that can be sent without receipt of an acknowledgment.	**extensive**
Hello interval	Interval between the transmission of hello messages, in seconds.	**extensive**
Create time	Date and time when the tunnel was created. While the LNS and LAC are connected, this value should correspond to the router's uptime. If connection to the LAC is severed, the State changes to **Unknown** and the **Create time** value resets.	**extensive**
Up time	Amount of time elapsed since the tunnel became active, in hours, minutes, and seconds.	**extensive**
Idle time	Amount of time elapsed since the tunnel became idle, in hours, minutes, and seconds.	**extensive**
ToS Reflect	Status of IP ToS value reflection, **Disabled** or **Enabled**.	**extensive**
Interface Name	(LNS only) Name of an adaptive services interface.	**extensive**
Tunnel Group Name	(LNS only) Name of a tunnel group.	**extensive**
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.	**extensive**

Sample Output

show services l2tp tunnel-switch tunnel

```
user@host> show services l2tp tunnel-switch tunnel
```

```
  Local ID Remote ID Remote IP              Sessions Switched-sessions State
  37602    1         192.168.20.3:1701            1                 1 Established

  37060    1         172.20.1.10:1701             1                 1 Established
```

show services l2tp tunnel-switch tunnel detail

```
user@host> show services l2tp tunnel-switch tunnel detail
  Tunnel local ID: 37602, Tunnel remote ID: 1
    Remote IP: 192.168.20.3:1701
    Sessions: 1, Switched sessions: 1, State: Established
    Tunnel Name: 1/1
    Local IP: 10.50.1.1:1701
    Local name: ce-bras-mx240-f, Remote name: testlac
    Effective Peer Resync Mechanism: silent failover
    Nas Port Method: none
    Tunnel Logical System: default, Tunnel Routing Instance: default
  Tunnel local ID: 37060, Tunnel remote ID: 1
    Remote IP: 172.20.1.10:1701
    Sessions: 1, Switched sessions: 1, State: Established
    Tunnel Name: 2/1
    Local IP: 10.30.1.1:1701
    Local name: lns, Remote name: lns
    Effective Peer Resync Mechanism: silent failover
    Nas Port Method: none
    Tunnel Logical System: default, Tunnel Routing Instance: default
```

show services l2tp tunnel-switch tunnel extensive

```
user@host> show services l2tp tunnel-switch tunnel extensive
Waiting for statistics...
  Tunnel local ID: 37602, Tunnel remote ID: 1
    Remote IP: 192.168.20.3:1701
    Sessions: 1, Switched sessions: 1, State: Established
    Tunnel Name: 1/1
    Local IP: 10.50.1.1:1701
    Local name: ce-bras-mx240-f, Remote name: testlac
    Effective Peer Resync Mechanism: silent failover
    Nas Port Method: none
    Tunnel Logical System: default, Tunnel Routing Instance: default
    Max sessions: 128100, Window size: 4, Hello interval: 60
    Create time: Fri Jan 18 03:01:11 2013, Up time: 00:07:49
    Idle time: 00:00:00, ToS Reflect: Disabled
    Interface Name: si-2/1/0, Tunnel Group Name: ce-l2tp-tunnel-group
    Statistics since: Fri Jan 18 03:01:11 2013
                        Packets        Bytes
      Control Tx              7          259
      Control Rx              7          279
      Data Tx                97         1175
      Data Rx                 0            0
      Errors Tx               0
      Errors Rx               0
  Tunnel local ID: 37060, Tunnel remote ID: 1
    Remote IP: 172.20.1.10:1701
    Sessions: 1, Switched sessions: 1, State: Established
    Tunnel Name: 2/1
    Local IP: 10.30.1.1:1701
    Local name: lns, Remote name: lns
    Effective Peer Resync Mechanism: silent failover
    Nas Port Method: none
```

```
Tunnel Logical System: default, Tunnel Routing Instance: default
Max sessions: 128100, Window size: 4, Hello interval: 60
Create time: Fri Jan 18 03:01:14 2013, Up time: 00:07:46
Idle time: 00:00:00
Statistics since: Fri Jan 18 03:01:14 2013
                    Packets        Bytes
  Control Tx              8          482
  Control Rx              7          183
  Data Tx                 0            0
  Data Rx                96         1158
  Errors Tx               0
  Errors Rx               0
```

show services l2tp tunnel-switch summary

Syntax show services l2tp tunnel-switch summary
<statistics>

Release Information Command introduced in Junos OS Release 13.2.

Description Display L2TP tunnel switch summary information.

Options **none**—Display complete L2TP switched tunnel summary information.

statistics—(Optional) Display the number of control packets and bytes transmitted and received for all switched tunnels and sessions.

Additional Information

Required Privilege Level view

Related Documentation

- show services l2tp tunnel-switch destination on page 206
- show services l2tp tunnel-switch session on page 210
- show services l2tp tunnel-switch tunnel on page 215

List of Sample Output show services l2tp tunnel-switch summary on page 221

Output Fields Table 18 on page 220 lists the output fields for the **show services l2tp tunnel-switch summary** command. Output fields are listed in the approximate order in which they appear.

Table 18: show services l2tp tunnel-switch summary Output Fields

Field Name	Field Description
Tunnel switch profile name	Name of a tunnel switch profile.
LNS local session id	Identifier assigned by the LNS function on the LTS to the local endpoint of the L2TP session originating on a remote LAC (the first session)
LAC local session id	Identifier assigned by the LAC function on the LTS to the local endpoint of the L2TP session originating on the LTS (the second session).
LNS state	State of the L2TP session (the first session) between a remote LAC and the LNS function on the LTS.
LAC state	State of the L2TP session (the second session) between the LAC function on the LTS and a remote LNS.

Sample Output

show services l2tp tunnel-switch summary

```
user@host> show services l2tp tunnel-switch summary
Tunnel switch profile name: ce-lts-profile
  LNS local   LAC local   LNS state      LAC state      Interface
  session ID  session ID                               name
  13545       58296       established    established    si-2/1/0
```

show services l2tp summary

Syntax

show services l2tp summary
<statistics>
<interface sp-*fpc/pic/port*>

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 224
show services l2tp summary (LAC on MX Series routers) on page 225
show services l2tp summary (LNS on MX Series routers) on page 225
show services l2tp summary (LNS on M Series routers) on page 225
show services l2tp summary statistics (MX Series routers) on page 225

Output Fields

Table 19 on page 222 lists the output fields for the **show services l2tp summary** command. Output fields are listed in the approximate order in which they appear.

Table 19: show services l2tp summary Output Fields

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.

Table 19: show services l2tp summary Output Fields *(continued)*

Field Name	Field Description
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.
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: • **ancp** • **pppoe-ia-tag** • **static**
Rx speed avp when equal	Indicates if the Rx connect speed when equal configuration is **enabled** or **disabled**.
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.

Table 19: show services l2tp summary Output Fields *(continued)*

Field Name	Field Description
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.
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.
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
Failover within a preference level is Disabled
Weighted load balancing is Enabled
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
Failover within a preference level is Disabled
  Weighted load balancing is Disabled
  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 assignment id format is assignment-id
  Tunnel Tx Address Change is Accept
  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
Destinations: 0, Tunnels: 0, Sessions: 0, Switched sessions: 0
```

show services l2tp summary (LNS on MX Series routers)

```
user@host show services l2tp summary
  Failover within a preference level is Disabled
  Weighted load balancing is Disabled
  Tunnel authentication challenge is Enabled
  Calling number avp is Enabled
  Failover Protocol is Enabled
  Tx Connect speed method is static
  Destinations: 4, Tunnels: 19, Sessions: 65, Switched sessions: 2
```

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
Failover within a preference level is Disabled
Weighted 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
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
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
```

show services l2tp tunnel

Syntax

show services l2tp tunnel
<brief | detail | extensive>
<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*>
<statistics>
<tunnel-group *group-name*>

Release Information

Command introduced before Junos OS Release 7.4.

Description

(M10i and M7i routers only) Display information about active Layer 2 Tunneling Protocol (L2TP) tunnels for LNS.

(MX Series routers only) Display information about L2TP tunnels for LAC and LNS.

Options

none—Display standard information about all active L2TP tunnels.

brief | detail | extensive—(Default) Display the specified level of output.

interface sp-*fpc/pic/port*—(Optional) Display L2TP tunnel information for only the specified adaptive services interface. This option is not available for L2TP on MX Series routers.

local-gateway *gateway-address*—(Optional) Display L2TP tunnel information for only the specified local gateway address.

local-gateway-name *gateway-name*—(Optional) Display L2TP tunnel information for only the specified local gateway name.

local-tunnel-id *tunnel-id*—(Optional) Display L2TP tunnel information for only the specified local tunnel identifier.

peer-gateway *gateway-address*—(Optional) Display L2TP tunnel information for only the specified peer gateway address.

peer-gateway-name *gateway-name*—(Optional) Display L2TP tunnel information for only the specified peer gateway name.

statistics—(Optional) Display the number of control packets and bytes transmitted and received for the tunnel. You cannot include this option with any of the level options, **brief**, **detail**, or **extensive**.

tunnel-group *group-name*—(Optional) Display L2TP tunnel information for only the specified tunnel group.

Required Privilege Level

view

Related Documentation

- *L2TP Services Configuration Overview*
- *L2TP Minimum Configuration*

List of Sample Output

show services l2tp tunnel (LAC) on page 230
show services l2tp tunnel detail (LAC) on page 230
show services l2tp tunnel detail (LAC on MX Series Routers) on page 230
show services l2tp tunnel detail (LNS on MX Series Routers) on page 230
show services l2tp tunnel extensive (LAC) on page 231
show services l2tp tunnel extensive (LNS on M Series Routers) on page 231
show services l2tp tunnel extensive (LNS on MX Series Routers) on page 231
show services l2tp tunnel statistics (MX Series Routers) on page 232

Output Fields

Table 20 on page 228 lists the output fields for the **show services l2tp tunnel** command. Output fields are listed in the approximate order in which they appear.

Table 20: show services l2tp tunnel Output Fields

Field Name	Field Description
Interface	(LNS only) Name of an adaptive services interface.
Tunnel group	(LNS only) Name of a tunnel group.
Local ID	On the LNS, number assigned by the LNS that identifies the local endpoint of the tunnel relative to the LNS: the LNS. On the LAC, number assigned by the LAC that identifies the local endpoint of the tunnel relative to the LAC: the LAC.
Remote ID	On the LNS, number assigned by the LAC that identifies the remote endpoint of the tunnel relative to the LNS: the LAC. On the LAC, number assigned by the LNS that identifies the remote endpoint of the tunnel relative to the LAC: the LNS.
Remote IP	IP address of the peer endpoint of the tunnel.
Sessions	Number of L2TP sessions established through the tunnel.

Table 20: show services l2tp tunnel Output Fields *(continued)*

Field Name	Field Description
State	State of the L2TP tunnel: • **cc_responder_accept_new**—The tunnel has received and accepted the start control connection request (SCCRQ). • **cc_responder_reject_new**—The tunnel has received and rejected the SCCRQ. • **cc_responder_idle**—The tunnel has just been created. • **cc_responder_wait_ctl_conn**—The tunnel has sent the start control connection response (SCCRP) and is waiting for the start control connection connected (SCCCN) message. • **clean-up**—The tunnel is being cleaned up. • **closed**—The tunnel is being closed. • **destroyed**—The tunnel is being destroyed. • **Established**—The tunnel is operating. This is the only state supported for the LAC. • **Terminate**—The tunnel is terminating. • **Unknown**—The tunnel is not connected to the router.
Tunnel Name	(LAC only) Name of the created tunnel. This value includes the destination name followed by the value of the RADIUS Tunnel-Assignment-ID VSA [82].
Local IP	IP address of the local endpoint of the tunnel.
Local name	Name used for local tunnel endpoint during tunnel negotiation.
Remote name	Name used for remote tunnel endpoint during tunnel negotiation.
Effective Peer Resync Mechanism	(LAC only) Peer resynchronization mechanism (PRM) in effect for the tunnel: • Failover protocol • Silent failover—Recovery takes place in the failed endpoint only using the proprietary silent failover protocol.
Tunnel Logical System	Logical system in which the L2TP tunnel is brought up.
Tunnel Routing Instance	Routing instance in which the L2TP tunnel is brought up.
Max sessions	Maximum number of sessions that can be established on this tunnel.
Window size	Number of control messages that can be sent without receipt of an acknowledgment.
Hello interval	Interval between the transmission of hello messages, in seconds.
Create time	Date and time when the tunnel was created. While the LNS and LAC are connected, this value should correspond to the router's uptime. If connection to the LAC is severed, the State changes to **Unknown** and the **Create time** value resets.
Up time	Amount of time elapsed since the tunnel became active, in hours, minutes, and seconds.

Table 20: show services l2tp tunnel Output Fields *(continued)*

Field Name	Field Description
Idle time	Amount of time elapsed since the tunnel became idle, in hours, minutes, and seconds.
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.

Sample Output

show services l2tp tunnel (LAC)

```
user@host> show services l2tp tunnel
  Local ID  Remote ID  Remote IP               Sessions  State
     17185          1  10.10.1.1:1701                 1  Established
```

show services l2tp tunnel detail (LAC)

```
user@host> show services l2tp tunnel detail
  Tunnel local ID: 31889, Tunnel remote ID:     1
    Remote IP: 100.1.1.1:1701
    Sessions: 1, State: Established
    Tunnel Name: 1/tunnel-to-LNS-1
    Local IP: 100.1.1.2:1701
    Local name: ce-lac, Remote name: ce-lns
    Effective Peer Resync Mechanism: silent failover
```

show services l2tp tunnel detail (LAC on MX Series Routers)

```
user@host> show services l2tp tunnel detail
Tunnel local ID: 17301, Tunnel remote ID: 1
    Remote IP: 10.10.1.1:1701
    Sessions: 1, State: Established
    Tunnel Name: 2/tunnel-to-LNS-2
    Local IP: 100.1.1.2:1701
    Local name: ce-lac, Remote name: ce-lns
    Effective Peer Resync Mechanism: silent failover
    Tunnel Logical System: default, Tunnel Routing Instance: default
```

show services l2tp tunnel detail (LNS on MX Series Routers)

```
user@host> show services l2tp tunnel detail
Tunnel local ID: 17301, Tunnel remote ID: 1
    Remote IP: 12.1.1.15:1701
    Sessions: 1, State: Established
    Tunnel Name: 2/2
    Local IP: 12.1.1.5:1701
    Local name: ce-bras-mx240-e, Remote name: testlac2
```

```
    Effective Peer Resync Mechanism: silent failover
    Tunnel Logical System: default, Tunnel Routing Instance: vrf1
```

show services l2tp tunnel extensive (LAC)

```
user@host> show services l2tp tunnel extensive
  Tunnel local ID: 17185, Tunnel remote ID:     1
    Remote IP: 10.10.1.1:1701
    Sessions: 1, State: Established
    Tunnel Name: 2/tunnel-to-LNS-2
    Local IP: 100.1.1.2:1701
    Local name: ce-lac, Remote name: ce-lns
    Effective Peer Resync Mechanism: failover protocol
    Max sessions: 32000, Window size: 4, Hello interval: 60
    Create time: Tue Nov  9 15:23:29 2010, Up time: 00:00:26
    Idle time: 00:00:00
```

show services l2tp tunnel extensive (LNS on M Series Routers)

```
user@host> show services l2tp tunnel extensive
Interface: sp-1/2/0, Tunnel group: group1
  Tunnel local ID: 62746, Tunnel remote ID: 16930
    Remote IP: 10.128.1.2:1701
    Sessions: 1, State: Established
    Local IP: 10.128.1.1:1701
    Local name: router-1, Remote name: router-2
    Max sessions: 50, Window size: 32, Hello interval: 60
    Create time: Tue Mar 23 14:13:15 2004, Up time: 01:14:58
    Idle time: 00:00:07
    Statistics since: Tue Mar 23 14:13:13 2004
                        Packets        Bytes
      Control Tx             80         1152
      Control Rx              3          272
      Data Tx                 0            0
      Data Rx               450        28.0k
      Errors Tx               0
      Errors Rx               0

Interface: sp-1/2/0, Tunnel group: group_company_dns
  Tunnel local ID: 37266, Tunnel remote ID: 36217
    Remote IP: 10.128.11.2:1701
    Sessions: 1, State: Established
    Local IP: 10.128.11.1:1701
    Local name: router-1, Remote name: router-2
    Max sessions: unlimited, Window size: 32, Hello interval: 60
    Create time: Tue Mar 23 14:13:15 2004, Up time: 01:14:59
    Idle time: 01:14:55
    Statistics since: Tue Mar 23 14:13:13 2004
                        Packets        Bytes
      Control Tx             81         1164
      Control Rx              3          273
      Data Tx                 0            0
      Data Rx                 1           80
      Errors Tx               0
      Errors Rx               0
```

show services l2tp tunnel extensive (LNS on MX Series Routers)

```
user@host> show services l2tp tunnel extensive
Tunnel local ID: 40553, Tunnel remote ID: 1
    Remote IP: 192.168.1.3:1701
    Sessions: 1, State: Established
```

```
Tunnel Name: 3/1838
Local IP: 10.1.1.2:1701
Local name: lns-mx960, Remote name: testlac
Effective Peer Resync Mechanism: silent failover
Tunnel Logical System: default, Tunnel Routing Instance: vrf1
Max sessions: 60000, Window size: 4, Hello interval: 60
Create time: Mon Apr 25 20:27:50 2011, Up time: 00:01:11
Idle time: 00:00:00, ToS Reflect: Enabled
Tunnel Group Name: tg1
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                 6           64
  Errors Tx               0
  Errors Rx
```

show services l2tp tunnel statistics (MX Series Routers)

```
user@host>show services l2tp tunnel statistics
Tunnel local ID: 17185, Tunnel remote ID: 1
Sessions: 31.8k, State: Established
Statistics since: Mon Aug 1 13:21:38 2011
     Packets   Bytes
Control Tx     90.3k    9.0M
Control Rx     32.0k    1296.9k
Data Tx       127.3k   1591.6k
Data Rx       100.8k   1273.4k
Errors Tx      0
Errors Rx      0
```

show subscribers

Syntax

show subscribers
<detail | extensive | terse>
<aci-interface-set-name *aci-interface-set-name*>
<address *address*>
<agent-circuit-identifier *agent-circuit-identifier-substring*>
<client-type *client-type*>
<count>
<interface *interface*>
<logical-system *logical-system*>
<mac-address *mac-address*>
<physical-interface *physical-interface-name*>
<profile-name *profile-name*>
<routing-instance *routing-instance*>
<stacked-vlan-id *stacked-vlan-id*>
<subscriber-state *subscriber-state*>
<user-name *user-name*>
<vci *vci-identifier*>
<vpi *vpi-identifier*>
<vlan-id *vlan-id*>

Release Information

Command introduced in Junos OS Release 9.3.
Command introduced in Junos OS Release 9.3 for EX Series switches.
client-type, **mac-address**, **subscriber-state**, and **extensive** options introduced in Junos OS Release 10.2.
count option usage with other options introduced in Junos OS Release 10.2.
Command introduced in Junos OS Release 11.1 for the QFX Series.
Options **aci-interface-set-name** and **agent-circuit-identifier** introduced in Junos OS Release 12.2.
The **physical-interface** and **user-name** options introduced in Junos OS Release 12.3.
Options **vci** and **vpi** introduced in Junos OS Release 12.3R3 and supported in later 12.3R*x* releases.
Options **vci** and **vpi** supported in Junos OS Release 13.2 and later releases. (Not supported in Junos OS Release 13.1.)

Description

Display information for active subscribers.

Options

detail | extensive | terse—(Optional) Display the specified level of output.

aci-interface-set-name—(Optional) Display all dynamic subscriber sessions that use the specified agent circuit identifier (ACI) interface set. Use the ACI interface set name generated by the router, such as aci-1003-ge-1/0/0.4001, and not the actual ACI value found in the DHCP or PPPoE control packets.

address—(Optional) Display subscribers whose IP address matches the specified address. You must specify the IPv4 or IPv6 address prefix without a netmask (for example, 192.168.17.1). If you specify the IP address as a prefix with a netmask (for example, 192.168.17.1/32), the router displays a message that the IP address is invalid, and rejects the command.

agent-circuit-identifier-substring—(Optional) Display all dynamic subscriber sessions whose ACI value matches the specified substring.

client-type—(Optional) Display subscribers whose client type matches the specified client type (DHCP, L2TP, PPP, PPPOE, VLAN, or static).

count—(Optional) Display the count of total subscribers and active subscribers for any specified option. You can use the **count** option alone or with the **address**, **client-type**, **interface**, **logical-system**, **mac-address**, **profile-name**, **routing-instance**, **stacked-vlan-id**, **subscriber-state**, or **vlan-id** options.

id—(Optional) Display a specific subscriber session whose session id matches the specified subscriber ID. You can display subscriber IDs by using the **show subscribers extensive** or the **show subscribers interface extensive** commands.

interface—(Optional) Display subscribers whose interface matches the specified interface.

logical-system—(Optional) Display subscribers whose logical system matches the specified logical system.

mac-address—(Optional) Display subscribers whose MAC address matches the specified MAC address.

physical-interface-name—(M120, M320, and MX Series routers only) (Optional) Display subscribers whose physical interface matches the specified physical interface.

profile-name—(Optional) Display subscribers whose dynamic profile matches the specified profile name.

routing-instance—(Optional) Display subscribers whose routing instance matches the specified routing instance.

subscriber-state—(Optional) Display subscribers whose subscriber state matches the specified subscriber state (ACTIVE, CONFIGURED, INIT, TERMINATED, or TERMINATING).

user-name—(M120, M320, and MX Series routers only) (Optional) Display subscribers whose username matches the specified subscriber name.

vci-identifier—(MX Series routers with MPCs and ATM MICs with SFP only) (Optional) Display active ATM subscribers whose ATM virtual circuit identifier (VCI) matches the specified VCI identifier. The range of values is **0** through **255**.

vpi-identifier—(MX Series routers with MPCs and ATM MICs with SFP only) (Optional) Display active ATM subscribers whose ATM virtual path identifier (VPI) matches the specified VPI identifier. The range of values is **0** through **65535**.

vlan-id—(Optional) Display subscribers whose VLAN ID matches the specified VLAN ID.

stacked-vlan-id—(Optional) Display subscribers whose stacked VLAN ID matches the specified stacked VLAN ID.

NOTE: Due to display limitations, logical system and routing instance output values are truncated when necessary.

Required Privilege Level view

Related Documentation

- show subscribers summary on page 251
- *Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration*

List of Sample Output

show subscribers vlan-id detail on page 250
show subscribers vpi vci extensive (PPPoE-over-ATM Subscriber Session) on page 250

Output Fields Table 21 on page 236 lists the output fields for the **show subscribers** command. Output fields are listed in the approximate order in which they appear.

Table 21: show subscribers Output Fields

Field Name	Field Description
Interface	Interface associated with the subscriber. The router or switch displays subscribers whose interface matches or begins with the specified interface. The * character indicates a continuation of addresses for the same session.
IP Address/VLAN ID	Subscriber IP address or VLAN ID associated with the subscriber in the form *tpid.vlan-id* No IP address or VLAN ID is assigned to an L2TP tunnel-switched session. For these subscriber sessions the value is **Tunnel-switched**.
User Name	Name of subscriber.
LS:RI	Logical system and routing instance associated with the subscriber.
Type	Subscriber client type (DHCP, L2TP, PPP, PPPoE, STATIC-INTERFACE, VLAN).
IP Address	Subscriber IPv4 address.
IP Netmask	Subscriber IP netmask.
Primary DNS Address	IP address of primary DNS server.
Secondary DNS Address	IP address of secondary DNS server.
Primary WINS Address	IP address of primary WINS server.
Secondary WINS Address	IP address of secondary WINS server.
IPv6 Address	Subscriber IPv6 address, or multiple addresses.
IPv6 Prefix	Subscriber IPv6 prefix. If you are using DHCPv6 prefix delegation, this is the delegated prefix.
IPv6 User Prefix	IPv6 prefix obtained through ND/RA.
IPv6 Address Pool	Subscriber IPv6 address pool. The IPv6 address pool is used to allocate IPv6 prefixes to the DHCPv6 clients.
IPv6 Network Prefix Length	Length of the network portion of the IPv6 address.
IPv6 Prefix Length	Length of the subscriber IPv6 prefix.

Table 21: show subscribers Output Fields *(continued)*

Field Name	Field Description
Logical System	Logical system associated with the subscriber.
Routing Instance	Routing instance associated with the subscriber.
Interface Type	Whether the subscriber interface is **Static** or **Dynamic**.
Interface Set	Internally generated name of the dynamic ACI interface set used by the subscriber session.
Interface Set Type	Interface type of the ACI interface set: **Dynamic**. This is the only ACI interface set type currently supported.
Interface Set Session ID	Identifier of the dynamic ACI interface set entry in the session database.
Underlying Interface	Name of the underlying interface for the subscriber session.
Dynamic Profile Name	Dynamic profile used for the subscriber.
Dynamic Profile Version	Version number of the dynamic profile used for the subscriber.
MAC Address	MAC address associated with the subscriber.
State	Current state of the subscriber session (**Init**, **Configured**, **Active**, **Terminating**, **Tunneled**).
L2TP State	Current state of the L2TP session, **Tunneled** or **Tunnel-switched**. When the value is **Tunnel-switched**, two entries are displayed for the subscriber; the first entry is at the LNS interface on the LTS and the second entry is at the LAC interface on the LTS.
Tunnel switch Profile Name	Name of the L2TP tunnel switch profile that initiates tunnel switching.
Local IP Address	IP address of the local gateway (LAC).
Remote IP Address	IP address of the remote peer (LNS).
VLAN Id	VLAN ID associated with the subscriber in the form *tpid.vlan-id*.
Stacked VLAN Id	Stacked VLAN ID associated with the subscriber in the form *tpid.vlan-id*.
RADIUS Accounting ID	RADIUS accounting ID associated with the subscriber.
Agent Circuit ID	Option 82 agent circuit ID associated with the subscriber. The ID is displayed as an ASCII string unless the value has nonprintable characters, in which case it is displayed in hexadecimal format.
Agent Remote ID	Option 82 agent remote ID associated with the subscriber. The ID is displayed as an ASCII string unless the value has nonprintable characters, in which case it is displayed in hexadecimal format.
DHCP Relay IP Address	IP address used by the DHCP relay agent.

Table 21: show subscribers Output Fields *(continued)*

Field Name	Field Description
ATM VPI	(MX Series routers with MPCs and ATM MICs with SFP only) ATM virtual path identifier (VPI) on the subscriber's physical interface.
ATM VCI	(MX Series routers with MPCs and ATM MICs with SFP only) ATM virtual circuit identifier (VCI) for each VPI configured on the subscriber interface.
Login Time	Date and time at which the subscriber logged in.
Effective shaping-rate	Actual downstream traffic shaping rate for the subscriber, in kilobits per second.
IPv4 rpf-check Fail Filter Name	Name of the filter applied by the dynamic profile to IPv4 packets that fail the RPF check.
IPv6 rpf-check Fail Filter Name	Name of the filter applied by the dynamic profile to IPv6 packets that fail the RPF check.
DHCP Options	**len** = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCP options, as defined in RFC 2132.
Session ID	ID number for a subscriber service session.
Underlying Session ID	For DHCPv6 subscribers on a PPPoE network, displays the session ID of the underlying PPPoE interface.
Service Sessions	Number of service sessions (that is, a service activated using RADIUS CoA) associated with the subscribers.
Service Session Name	Service session profile name.
Session Timeout (seconds)	Number of seconds of access provided to the subscriber before the session is automatically terminated.
Idle Timeout (seconds)	Number of seconds subscriber can be idle before the session is automatically terminated.
IPv6 Delegated Address Pool	Name of the pool used for DHCPv6 prefix delegation.
IPv6 Delegated Network Prefix Length	Length of the prefix configured for the IPv6 delegated address pool.
IPv6 Interface Address	Address assigned by the Framed-Ipv6-Prefix AAA attribute.
IPv6 Framed Interface Id	Interface ID assigned by the Framed-Interface-Id AAA attribute.
ADF IPv4 Input Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv4 input filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.

Table 21: show subscribers Output Fields *(continued)*

Field Name	Field Description
ADF IPv4 Output Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv4 output filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv6 Input Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv6 input filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv6 Output Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv6 output filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
IPv4 Input Filter Name	Name assigned to the IPv4 input filter (client or service session).
IPv4 Output Filter Name	Name assigned to the IPv4 output filter (client or service session).
IPv6 Input Filter Name	Name assigned to the IPv6 input filter (client or service session).
IPv6 Output Filter Name	Name assigned to the IPv6 output filter (client or service session).
IFL Input Filter Name	Name assigned to the logical interface input filter (client or service session).
IFL Output Filter Name	Name assigned to the logical interface output filter (client or service session).

Sample Output

show subscribers (IPv4)

```
user@host> show subscribers
Interface               IP Address/VLAN ID   User Name         LS:RI
ge-1/3/0.1073741824     100                                    default:default
demux0.1073741824       100.0.0.10           WHOLESALER-CLIENT default:default
demux0.1073741825       101.0.0.3            RETAILER1-CLIENT  test1:retailer1
demux0.1073741826       102.0.0.3            RETAILER2-CLIENT  test1:retailer2
```

show subscribers (IPv6)

```
user@host> show subscribers
Interface          IP Address/VLAN ID   User Name           LS:RI
ge-1/0/0.0         2001::c0:0:0:0/74    WHOLESALER-CLIENT   default:default
     *             2002::1/128          subscriber-25       default:default
```

show subscribers (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers
Interface           IP Address/VLAN ID         User Name
LS:RI
demux0.1073741834   0x8100.1002 0x8100.1
default:default
demux0.1073741835   0x8100.1001 0x8100.1
default:default
pp0.1073741836      61.1.1.1                   dualstackuser1@ISP1.com
```

```
default:ASP-1
*                   2041:1:1::/48
*                   2061:1:1:1::/64
pp0.1073741837      23.1.1.3                dualstackuser2@ISP1.com
default:ASP-1
*                   2001:1:2:5::/64
```

show subscribers (LNS on MX Series Routers)

```
user@host> show subscribers
Interface          IP Address/VLAN ID   User Name         LS:RI
si-4/0/0.1         192.168.4.1          xyz@example.com   default:default
```

show subscribers (L2TP Switched Tunnels)

```
user@host> show subscribers
Interface           IP Address/VLAN ID    User Name             LS:RI
si-2/1/0.1073741842 Tunnel-switched       ap@lts.com        default:default

si-2/1/0.1073741843 Tunnel-switched       ap@lts.com        default:default
```

show subscribers client-type dhcp detail

```
user@host> show subscribers client-type dhcp detail
Type: DHCP
IP Address: 100.20.9.7
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:10:95:00:00:98
State: Active
Radius Accounting ID: jnpr :2304
Login Time: 2009-08-25 14:43:52 PDT

Type: DHCP
IP Address: 100.20.10.7
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744383
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:10:94:00:01:f3
State: Active
Radius Accounting ID: jnpr :2560
Login Time: 2009-08-25 14:43:56 PDT
```

show subscribers count

```
user@host> show subscribers count
Total Subscribers: 188, Active Subscribers: 188
```

show subscribers address detail (IPv6)

```
user@host> show subscribers address 100.16.12.137 detail
```

```
Type: PPPoE
User Name: pppoeTerV6User1Svc
IP Address: 100.16.12.137
IP Netmask: 255.0.0.0
IPv6 User Prefix: 1016:0:0:c88::/64
Logical System: default
Routing Instance: default
Interface: pp0.1073745151
Interface type: Dynamic
Underlying Interface: demux0.8201
Dynamic Profile Name: pppoe-client-profile
MAC Address: 00:0d:02:01:00:01
Session Timeout (seconds): 31622400
Idle Timeout (seconds): 86400
State: Active
Radius Accounting ID: jnpr demux0.8201:6544
Session ID: 6544
Agent Circuit ID: ifl3720
Agent Remote ID: ifl3720
Login Time: 2012-05-21 13:37:27 PDT
Service Sessions: 1
```

show subscribers detail (IPv4)

```
user@host> show subscribers detail
Type: DHCP
IP Address: 100.20.9.7
IP Netmask: 255.255.0.0
Primary DNS Address: 192.168.17.1
Secondary DNS Address: 192.168.17.2
Primary WINS Address: 192.168.22.1
Secondary WINS Address: 192.168.22.2
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:10:95:00:00:98
State: Active
Radius Accounting ID: jnpr :2304
Session Timeout (seconds): 3600
Idle Timeout (seconds): 600
Login Time: 2009-08-25 14:43:52 PDT
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 08 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 36 2f
33 2d 37 2d 30 37 05 01 06 0f 21 2c
Service Sessions: 2
```

show subscribers detail (IPv6)

```
user@host> show subscribers detail
Type: DHCP
User Name: pd-user1
IPv6 Prefix: 2002:db2:ffff:1::/64
Logical System: default
Routing Instance: default
Interface: ge-3/1/3.2
Interface type: Static
MAC Address: 00:51:ff:ff:00:03
State: Active
```

```
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-08-25 12:12:26 PDT
DHCP Options: len 42
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 51 ff ff 00 03
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00
```

show subscribers detail (IPv6 Static Demux Interface)

```
user@host> show subscribers detail
Type: STATIC-INTERFACE
User Name: demux0.1@jnpr.net
IPv6 Prefix: 1:2:3:4:5:6:7:aa/128
Logical System: default
Routing Instance: default
Interface: demux0.1
Interface type: Static
Dynamic Profile Name: junos-default-profile
State: Active
Radius Accounting ID: 185
Login Time: 2010-05-18 14:33:56 EDT
```

show subscribers detail (L2TP LNS Subscribers on MX Series Routers)

```
user@host> show subscribers detail
Type: L2TP
User Name: user1@jnpr.net
IP Address: 10.1.32.58
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: si-5/2/0.1073749824
Interface type: Dynamic
Dynamic Profile Name: dyn-lns-profile2
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 8001
Session ID: 8001
Login Time: 2011-04-25 20:27:50 IST
```

show subscribers detail (L2TP Switched Tunnels)

```
user@host> show subscribers detail
Type: L2TP
User Name: ap@example.com
Logical System: default
Routing Instance: default
Interface: si-2/1/0.1073741842
Interface type: Dynamic
Dynamic Profile Name: dyn-lts-profile
State: Active
L2TP State: Tunnel-switched
Tunnel switch Profile Name: ce-lts-profile
Local IP Address: 10.50.1.1
Remote IP Address: 192.168.20.3
Radius Accounting ID: 21
Session ID: 21
Login Time: 2013-01-18 03:01:11 PST

Type: L2TP
User Name: ap@example.com
```

```
Logical System: default
Routing Instance: default
Interface: si-2/1/0.1073741843
Interface type: Dynamic
Dynamic Profile Name: dyn-lts-profile
State: Active
L2TP State: Tunnel-switched
Tunnel switch Profile Name: ce-lts-profile
Local IP Address: 10.30.1.1
Remote IP Address: 172.20.1.10
Session ID: 22
Login Time: 2013-01-18 03:01:14 PST
```

show subscribers detail (Tunneled Subscriber)

```
user@host> show subscribers detail
Type: PPPoE
User Name: user1@example.com
Logical System: default
Routing Instance: default
Interface: pp0.1
State: Active, Tunneled
Radius Accounting ID: 512
```

show subscribers detail (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlanProfile
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.1001
VLAN Id: 0x8100.1
Login Time: 2011-11-30 00:18:04 PST

Type: PPPoE
User Name: dualstackuser1@ISP1.com
IP Address: 61.1.1.1
IPv6 Prefix: 2041:1:1::/48
IPv6 User Prefix: 2061:1:1:1::/64
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Dynamic
Dynamic Profile Name: dualStack-Profile1
MAC Address: 00:00:64:03:01:02
State: Active
Radius Accounting ID: 2
Session ID: 2
Login Time: 2011-11-30 00:18:05 PST

Type: DHCP
IPv6 Prefix: 2041:1:1::/48
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Static
```

```
MAC Address: 00:00:64:03:01:02
State: Active
Radius Accounting ID: jnpr :3
Session ID: 3
Underlying Session ID: 2
Login Time: 2011-11-30 00:18:35 PST
DHCP Options: len 42
00 08 00 02 0b b8 00 01 00 0a 00 03 00 01 00 00 64 03 01 02
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00
```

show subscribers detail (ACI Interface Set Session)

```
user@host> show subscribers detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0
Interface Set: aci-1001-ge-1/0/0.2800
Interface Set Session ID: 0
Underlying Interface: ge-1/0/0.2800
Dynamic Profile Name: aci-vlan-set-profile-2
Dynamic Profile Version: 1
State: Active
Session ID: 1
Agent Circuit ID: aci-ppp-dhcp-20
Login Time: 2012-05-26 01:54:08 PDT
```

show subscribers detail (PPPoE Subscriber Session with ACI Interface Set)

```
user@host> show subscribers detail
Type: PPPoE
User Name: ppphint2
IP Address: 10.10.1.5
Logical System: default
Routing Instance: default
Interface: pp0.1073741825
Interface type: Dynamic
Interface Set: aci-1001-demux0.1073741824
Interface Set Type: Dynamic
Interface Set Session ID: 2
Underlying Interface: demux0.1073741824
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:64:39:01:02
State: Active
Radius Accounting ID: 3
Session ID: 3
Agent Circuit ID: aci-ppp-dhcp-dvlan-50
Login Time: 2012-03-07 13:46:53 PST
```

show subscribers extensive

```
user@host> show subscribers extensive
Type: DHCP
User Name: pd-user1
IPv6 Prefix: 2002:db2:ffff:1::/64
Logical System: default
Routing Instance: default
Interface: ge-3/1/3.2
Interface type: Static
```

```
MAC Address: 00:51:ff:ff:00:03
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-08-25 12:12:26 PDT
DHCP Options: len 42
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 51 ff ff 00 03
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00
IPv6 Address Pool: pd_pool
IPv6 Network Prefix Length: 48
```

show subscribers extensive (RPF Check Fail Filter)

```
user@host> show subscribers extensive
...
Type: VLAN
  Logical System: default
  Routing Instance: default
  Interface: ae0.1073741824
  Interface type: Dynamic
  Dynamic Profile Name: vlan-prof
  State: Active
  Session ID: 9
  VLAN Id: 100
  Login Time: 2011-08-26 08:17:00 PDT
  IPv4 rpf-check Fail Filter Name: rpf-allow-dhcp
  IPv6 rpf-check Fail Filter Name: rpf-allow-dhcpv6
...
```

show subscribers extensive (L2TP LNS Subscribers on MX Series Routers)

```
user@host> show subscribers extensive
Type: L2TP
User Name: user1@jnpr.net
IP Address: 10.1.32.58
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: si-5/2/0.1073749824
Interface type: Dynamic
Dynamic Profile Name: dyn-lns-profile2
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 8001
Session ID: 8001
Login Time: 2011-04-25 20:27:50 IST
IPv4 Input Filter Name: classify-si-5/2/0.1073749824-in
IPv4 Output Filter Name: classify-si-5/2/0.1073749824-out
```

show subscribers extensive (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers extensive
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlanProfile
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.1001
```

```
VLAN Id: 0x8100.1
Login Time: 2011-11-30 00:18:04 PST

Type: PPPoE
User Name: dualstackuser1@ISP1.com
IP Address: 61.1.1.1
IPv6 Prefix: 2041:1:1::/48
IPv6 User Prefix: 2061:1:1:1::/64
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Dynamic
Dynamic Profile Name: dualStack-Profile1
MAC Address: 00:00:64:03:01:02
State: Active
Radius Accounting ID: 2
Session ID: 2
Login Time: 2011-11-30 00:18:05 PST
IPv6 Delegated Network Prefix Length: 48
IPv6 Interface Address: 2061:1:1:1::1/64
IPv6 Framed Interface Id: 1:1:2:2
IPv4 Input Filter Name: FILTER-IN-pp0.1073741825-in
IPv4 Output Filter Name: FILTER-OUT-pp0.1073741825-out
IPv6 Input Filter Name: FILTER-IN6-pp0.1073741825-in
IPv6 Output Filter Name: FILTER-OUT6-pp0.1073741825-out

Type: DHCP
IPv6 Prefix: 2041:1:1::/48
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Static
MAC Address: 00:00:64:03:01:02
State: Active
Radius Accounting ID: jnpr :3
Session ID: 3
Underlying Session ID: 2
Login Time: 2011-11-30 00:18:35 PST
DHCP Options: len 42
00 08 00 02 0b b8 00 01 00 0a 00 03 00 01 00 00 64 03 01 02
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00
IPv6 Delegated Network Prefix Length: 48
```

show subscribers extensive (Effective Shaping-Rate)

```
user@host> show subscribers extensive
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741837
Interface type: Dynamic
Interface Set: ifset-1
Underlying Interface: ae1
Dynamic Profile Name: svlan-dhcp-test
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.201
VLAN Id: 0x8100.201
Login Time: 2011-11-30 00:18:04 PST
```

```
Effective shaping-rate: 31000000k
...
```

show subscribers aci-interface-set-name detail (Subscriber Sessions Using Specified ACI Interface Set)

```
user@host> show subscribers aci-interface-set-name aci-1003-ge-1/0/0.4001 detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-set-profile
Dynamic Profile Version: 1
State: Active
Session ID: 13
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:56 PDT

Type: PPPoE
User Name: ppphint2
IP Address: 10.10.1.7
Logical System: default
Routing Instance: default
Interface: pp0.1073741834
Interface type: Dynamic
Interface Set: aci-1003-ge-1/0/0.4001
Interface Set Type: Dynamic
Interface Set Session ID: 13
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:65:26:01:02
State: Active
Radius Accounting ID: 14
Session ID: 14
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:57 PDT
```

show subscribers agent-circuit-identifier detail (Subscriber Sessions Using Specified ACI Substring)

```
user@host> show subscribers agent-circuit-identifier aci-ppp-vlan detail
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-set-profile
Dynamic Profile Version: 1
State: Active
Session ID: 13
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:56 PDT

Type: PPPoE
User Name: ppphint2
IP Address: 10.10.1.7
Logical System: default
Routing Instance: default
Interface: pp0.1073741834
Interface type: Dynamic
Interface Set: aci-1003-ge-1/0/0.4001
```

```
Interface Set Type: Dynamic
Interface Set Session ID: 13
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:65:26:01:02
State: Active
Radius Accounting ID: 14
Session ID: 14
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:57 PDT
```

show subscribers interface extensive

```
user@host> show subscribers interface demux0.1073741826 extensive
Type: VLAN
User Name: test1@test.com
Logical System: default
Routing Instance: testnet
Interface: demux0.1073741826
Interface type: Dynamic
Dynamic Profile Name: profile-vdemux-relay-23qos
MAC Address: 00:00:6e:56:01:04
State: Active
Radius Accounting ID: 12
Session ID: 12
Stacked VLAN Id: 0x8100.1500
VLAN Id: 0x8100.2902
Login Time: 2011-10-20 16:21:59 EST

Type: DHCP
User Name: test1@test.com
IP Address: 172.16.200.6
IP Netmask: 255.255.255.0
Logical System: default
Routing Instance: testnet
Interface: demux0.1073741826
Interface type: Static
MAC Address: 00:00:6e:56:01:04
State: Active
Radius Accounting ID: 21
Session ID: 21
Login Time: 2011-10-20 16:24:33 EST
Service Sessions: 2

Service Session ID: 25
Service Session Name: SUB-QOS
State: Active

Service Session ID: 26
Service Session Name: service-cb-content
State: Active
IPv4 Input Filter Name: content-cb-in-demux0.1073741826-in
IPv4 Output Filter Name: content-cb-out-demux0.1073741826-out
```

show subscribers logical-system terse

```
user@host> show subscribers logical-system test1 terse
```

```
Interface           IP Address/VLAN ID   User Name         LS:RI
demux0.1073741825     101.0.0.3            RETAILER1-CLIENT  test1:retailer1
demux0.1073741826     102.0.0.3            RETAILER2-CLIENT  test1:retailer2
```

show subscribers physical-interface count

```
user@host> show subscribers physical-interface ge-1/0/0 count
Total subscribers: 3998, Active Subscribers: 3998
```

show subscribers routing-instance inst1 count

```
user@host> show subscribers routing-instance inst1 count
Total Subscribers: 188, Active Subscribers: 183
```

show subscribers stacked-vlan-id detail

```
user@host> show subscribers stacked-vlan-id 101 detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers stacked-vlan-id vlan-id detail (Combined Output)

```
user@host> show subscribers stacked-vlan-id 101 vlan-id 100 detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers stacked-vlan-id vlan-id interface detail (Combined Output for a Specific Interface)

```
user@host> show subscribers stacked-vlan-id 101 vlan-id 100 interface ge-1/2/0.* detail
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers user-name detail

```
user@host> show subscribers user-name larry1 detail
Type: DHCP
User Name: larry1
IP Address: 100.0.0.37
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.1
Interface type: Static
Dynamic Profile Name: foo
```

```
MAC Address: 00:10:94:00:00:01
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-11-07 08:25:59 PST
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 01 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 32 2f
37 2d 30 2d 30 37 05 01 06 0f 21 2c
```

show subscribers vlan-id

```
user@host> show subscribers vlan-id 100
Interface           IP Address                              User Name
ge-1/0/0.1073741824
ge-1/2/0.1073741825
```

show subscribers vlan-id detail

```
user@host> show subscribers vlan-id 100 detail
Type: VLAN
Interface: ge-1/0/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT

Type: VLAN
Interface: ge-1/2/0.1073741825
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT
```

show subscribers vpi vci extensive (PPPoE-over-ATM Subscriber Session)

```
user@host> show subscribers vpi 40 vci 50 extensive
Type: PPPoE
User Name: testuser
IP Address: 100.0.0.2
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: pp0.0
Interface type: Static
MAC Address: 00:00:65:23:01:02
State: Active
Radius Accounting ID: 2
Session ID: 2
ATM VPI: 40
ATM VCI: 50
Login Time: 2012-12-03 07:49:26 PST
IP Address Pool: pool_1
IPv6 Framed Interface Id: 200:65ff:fe23:102
```

show subscribers summary

Syntax

show subscribers summary
< detail | extensive | terse>
<count>
physical-interface *physical-interface-name*
<all | logical-system *logical-system* pic | port | routing-instance *routing-instance* |slot>

Release Information

Command introduced in Junos OS Release 10.2.

Description

Display summary information for subscribers.

Options

detail | extensive | terse—(Optional) Display the specified level of output.

count—(Optional) Display the count of total subscribers and active subscribers for any specified option.

logical-system—(Optional) Display subscribers whose logical system matches the specified logical system.

physical-interface-name—(M120, M320, and MX Series routers only) (Optional) Display a count of subscribers whose physical interface matches the specified physical interface, by subscriber state, client type and LS:RI.

pic—(M120, M320, and MX Series routers only) (Optional) Display a count of subscribers by PIC number and the total number of subscribers.

port—(M120, M320, and MX Series routers only) (Optional) Display a count of subscribers by port number and the total number of subscribers.

routing-instance—(Optional) Display subscribers whose routing instance matches the specified routing instance.

slot—(M120, M320, and MX Series routers only) (Optional) Display a count of subscribers by FPC slot number and the total number of subscribers.

NOTE: **Due to display limitations, logical system and routing instance output values are truncated when necessary.**

Required Privilege Level

view

Related Documentation

- show subscribers on page 233

List of Sample Output

show subscribers summary physical-interface port on page 254
show subscribers summary physical-interface slot on page 254
show subscribers summary pic on page 254
show subscribers summary pic (Aggregated Ethernet Interfaces) on page 255
show subscribers summary port on page 255
show subscribers summary slot on page 255
show subscribers summary terse on page 255

Output Fields Table 22 on page 252 lists the output fields for the **show subscribers** command. Output fields are listed in the approximate order in which they appear.

Table 22: show subscribers Output Fields

Field Name	Field Description
Subscribers by State	Number of subscribers summarized by state. The summary information includes the following: • Init—Number of subscriber currently in the initialization state. • Configured—Number of configured subscribers. • Active—Number of active subscribers. • Terminating—Number of subscribers currently terminating. • Terminated—Number of terminated subscribers. • Total—Total number of subscribers for all states.
Subscribers by Client Type	Number of subscribers summarized by client type. Client types can include DHCP, L2TP, PPP, PPPOE, STATIC-INTERFACE, and VLAN. Also displays the total number of subscribers for all client types (Total).
Subscribers by LS:RI	Number of subscribers summarized by logical system:routing instance (LS:RI) combination. Also displays the total number of subscribers for all LS:RI combinations (Total).
Interface	Interface associated with the subscriber. The router or switch displays subscribers whose interface matches or begins with the specified interface. The * character indicates a continuation of addresses for the same session. For aggregated Ethernet interfaces, the output of the **summary (pic | port | slot)** options prefixes the interface name with **ae0:**.
Count	Count of subscribers displayed for each PIC, port, or slot when those options are specified with the **summary** option. For an aggregated Ethernet configuration, the total subscriber count does not equal the sum of the individual PIC, port, or slot counts, because each subscriber can be in more than one aggregated Ethernet link.
Total Subscribers	Total number of subscribers for all physical interfaces, all PICS, all ports, or all LS:RI slots.
IP Address/VLAN ID	Subscriber IP address or VLAN ID associated with the subscriber in the form *tpid.vlan-id*
User Name	Name of subscriber.
LS:RI	Logical system and routing instance associated with the subscriber.

Sample Output

show subscribers summary

```
user@host> show subscribers summary

Subscribers by State
 Init      3
 Configured    2
 Active   183
 Terminating    2
 Terminated    1

 TOTAL        191

Subscribers by Client Type
 DHCP     107
 PPP       76
 VLAN       8

 TOTAL        191
```

show subscribers summary all

```
user@host> show subscribers summary all
Subscribers by State
 Init         3
 Configured       2
 Active      183
 Terminating       2
 Terminated       1

 TOTAL          191

Subscribers by Client Type
 DHCP      107
 PPP          76
 VLAN          8

 TOTAL         191

Subscribers by LS:RI
 default:default   1
 default:ri1     28
 default:ri2     16
 ls1:default    22
 ls1:riA     38
 ls1:riB     44
 logsysX:routinstY  42

 TOTAL     191
```

show subscribers summary physical-interface

```
user@host> show subscribers summary physical-interface ge-1/0/0
Subscribers by State
   Active: 3998
   Total: 3998

Subscribers by Client Type
   DHCP: 3998
```

```
   Total: 3998

Subscribers by LS:RI
   default:default: 3998
   Total: 3998
```

show subscribers summary physical-interface pic

```
user@host> show subscribers summary physical-interface ge-0/2/0 pic
Subscribers by State
   Active: 4825
   Total: 4825

Subscribers by Client Type
   DHCP: 4825
   Total: 4825

Subscribers by LS:RI
   default:default: 4825
   Total: 4825
```

show subscribers summary physical-interface port

```
user@host> show subscribers summary physical-interface ge-0/3/0 port
Subscribers by State
   Active: 4825
   Total: 4825

Subscribers by Client Type
   DHCP: 4825
   Total: 4825

Subscribers by LS:RI
   default:default: 4825
   Total: 4825
```

show subscribers summary physical-interface slot

```
user@host> show subscribers summary physical-interface ge-2/0/0 slot
Subscribers by State
   Active: 4825
   Total: 4825

Subscribers by Client Type
   DHCP: 4825
   Total: 4825

Subscribers by LS:RI
   default:default: 4825
   Total: 4825
```

show subscribers summary pic

```
user@host> show subscribers summary pic
Interface           Count
ge-1/0              1000
ge-1/3              1000

Total Subscribers: 2000
```

show subscribers summary pic (Aggregated Ethernet Interfaces)

```
user@host> show subscribers summary pic
Interface           Count
ae0: ge-1/0         801
ae0: ge-1/3         801

Total Subscribers: 801
```

show subscribers summary port

```
user@host> show subscribers summary port
Interface           Count
ge-1                2000

Total Subscribers: 2000
```

show subscribers summary slot

```
user@host> show subscribers summary slot
Interface           Count
ge-1                2000

Total Subscribers: 2000
```

show subscribers summary terse

```
user@host> show subscribers summary terse
Interface           IP Address/VLAN ID   User Name         LS:RI
ge-1/3/0.1073741824   100                                   default:default
demux0.1073741824     100.0.0.10           WHOLESALER-CLIENT default:default
demux0.1073741825     101.0.0.3            RETAILER1-CLIENT  test1:retailer1
demux0.1073741826     102.0.0.3            RETAILER2-CLIENT  test1:retailer2
```

test services l2tp tunnel

Syntax **test services l2tp tunnel user** *user-name*
<password *user-password***>**
<tunnel-name *name***>**

Release Information Command introduced in Junos OS Release 11.4.

Description (MX Series routers only) Test and verify Layer 2 Tunneling Protocol (L2TP) tunnel configurations from the L2TP access concentrator (LAC). The test determines whether the user can be authenticated and tunneled according to the L2TP configuration. The establishment of all tunnels associated with the user is tested. You can optionally specify a particular tunnel to test for the user.

Options

user *user-name*—Name of the user under test. You must use an existing configured username, although it can be created solely for testing a tunnel configuration.

password *user-password*—(Optional) Authentication password for the specified user. If you omit this option, the test generates a dummy password—*testpass*—for the user.

tunnel-name *name*—(Optional) Name of a tunnel to test.

Required Privilege Level view

Related Documentation

- Testing L2TP Tunnel Configurations from the LAC on page 156

List of Sample Output

test services l2tp tunnel (User authentication fails) on page 257
test services l2tp tunnel (Multiple tunnels tested) on page 257
test services l2tp tunnel (Specific tunnel tested) on page 257

Output Fields Table 23 on page 256 lists the output fields for the **test services l2tp tunnel** command. Output fields are listed in the approximate order in which they appear.

Table 23: test services l2tp tunnel Output Fields

Field Name	Field Description
Tunnel-name	Name of the tunnel as configured in the local tunnel profile.
Tunnel-peer	IP address of the tunnel's remote peer (the L2TP network server [LNS]).
Logical-System	Logical system in which the tunnel is created.
Routing-Instance	Routing instance in which the tunnel is created.
Status	Status of the tunnel.

Sample Output

test services l2tp tunnel (User authentication fails)

```
user@host> test services l2tp tunnel user testuser@example.com
Subscriber: testuser@example.com, authentication failed
```

test services l2tp tunnel (Multiple tunnels tested)

```
user@host> test services l2tp tunnel user testuser@example.com
Subscriber: testuser@example.com, authentication success, l2tp tunneled
  Tunnel-name   Tunnel-peer   Logical-System  Routing-Instance Status
  test1tunnel    192.168.2.3      default         default         Up
  test2tunnel    172.24.3.3      default        default       Peer unresponsive

  test3tunnel    172.24.5.1       default           test          Up
```

test services l2tp tunnel (Specific tunnel tested)

```
user@host> test services l2tp tunnel user testuser@example.com tunnel-name test1tunnel
Subscriber: testuser@example.com, authentication success, l2tp tunneled
  Tunnel-name   Tunnel-peer   Logical-System  Routing-Instance Status
  test1tunnel    192.168.2.3      default         default         Up
```

PART 4

Troubleshooting

CHAPTER 11

Acquiring Troubleshooting Information

Tracing L2TP Operations for Subscriber Access

The Junos OS trace feature tracks L2TP operations and records events in a log file. The error descriptions captured in the log file provide detailed information to help you solve problems.

NOTE: This topic refers to tracing L2TP operations on MX Series routers. To trace L2TP operations on M Series routers, see *Tracing L2TP Operations*.

By default, nothing is traced. When you enable the tracing operation, the default tracing behavior is as follows:

1. Important events are logged in a file located in the **/var/log** directory. By default, the router uses the filename **jl2tpd**. You can specify a different filename, but you cannot change the directory in which trace files are located.
2. When the trace log file ***filename*** reaches 128 kilobytes (KB), it is compressed and renamed ***filename*.0.gz**. Subsequent events are logged in a new file called ***filename***, until it reaches capacity again. At this point, ***filename*.0.gz** is renamed ***filename*.1.gz** and ***filename*** is compressed and renamed ***filename*.0.gz**. This process repeats until the number of archived files reaches the maximum file number. Then the oldest trace file—the one with the highest number—is overwritten.

You can optionally specify the number of trace files to be from 2 through 1000. You can also configure the maximum file size to be from 10 KB through 1 gigabyte (GB). (For more information about how log files are created, see the *Junos OS System Log Messages Reference*.)

By default, only the user who configures the tracing operation can access log files. You can optionally configure read-only access for all users.

To configure L2TP tracing operations:

1. (Optional) Configure a trace log filename.

   See "Configuring the L2TP Trace Log Filename" on page 262.

2. (Optional) Configure the number and size of trace logs.

   See "Configuring the Number and Size of L2TP Log Files" on page 263.

3. (Optional) Configure user access to trace logs.

   See "Configuring Access to the L2TP Log File" on page 263.

4. (Optional) Configure a regular expression to filter the information to be included in the trace log.

   See "Configuring a Regular Expression for L2TP Messages to Be Logged" on page 264.

5. (Optional) Configure flags to specify which events are logged.

   See "Configuring the L2TP Tracing Flags" on page 264.

6. (Optional) Configure a severity level for messages to specify which event messages are logged.

   See "Configuring the Severity Level to Filter Which L2TP Messages Are Logged" on page 264.

Configuring the L2TP Trace Log Filename

By default, the name of the file that records trace output for L2TP is **jl2tpd**. You can specify a different name with the **file** option.

To configure the filename for L2TP tracing operations:

- Specify the name of the file used for the trace output.

```
[edit services l2tp traceoptions]
user@host# set file l2tp_logfile_1
```

Related Documentation

- Tracing L2TP Operations for Subscriber Access on page 261

Configuring the Number and Size of L2TP Log Files

You can optionally specify the number of compressed, archived trace log files to be from 2 through 1000. You can also configure the maximum file size to be from 10 KB through 1 gigabyte (GB); the default size is 128 kilobytes (KB).

The archived files are differentiated by a suffix in the format ***.number*.gz**. The newest archived file is **.0.gz** and the oldest archived file is ***.(maximum number)-1*.gz**. When the current trace log file reaches the maximum size, it is compressed and renamed, and any existing archived files are renamed. This process repeats until the maximum number of archived files is reached, at which point the oldest file is overwritten.

For example, you can set the maximum file size to 2 MB, and the maximum number of files to 20. When the file that receives the output of the tracing operation, ***filename***, reaches 2 MB, ***filename*** is compressed and renamed ***filename*.0.gz**, and a new file called ***filename*** is created. When the new ***filename*** reaches 2 MB, ***filename*.0.gz** is renamed ***filename*.1.gz** and ***filename*** is compressed and renamed ***filename*.0.gz**. This process repeats until there are 20 trace files. Then the oldest file, ***filename*.19.gz**, is simply overwritten when the next oldest file, ***filename*.18.gz** is compressed and renamed to ***filename*.19.gz**.

To configure the number and size of trace files:

- Specify the name, number, and size of the file used for the trace output.

  ```
  [edit services l2tp traceoptions]
  user@host# set file l2tp_1 _logfile_1 files 20 size 2097152
  ```

Related Documentation

- Tracing L2TP Operations for Subscriber Access on page 261

Configuring Access to the L2TP Log File

By default, only the user who configures the tracing operation can access the log files. You can enable all users to read the log file and you can explicitly set the default behavior of the log file.

To specify that all users can read the log file:

- Configure the log file to be world-readable.

  ```
  [edit services l2tp traceoptions]
  user@host# set file l2tp_1 _logfile_1 world-readable
  ```

To explicitly set the default behavior, only the user who configured tracing can read the log file:

- Configure the log file to be no-world-readable.

  ```
  [edit services l2tp traceoptions]
  user@host# set file l2tp_1 _logfile_1 no-world-readable
  ```

Related Documentation
- Tracing L2TP Operations for Subscriber Access on page 261

Configuring a Regular Expression for L2TP Messages to Be Logged

By default, the trace operation output includes all lines relevant to the logged events.

You can refine the output by including regular expressions to be matched.

To configure regular expressions to be matched:

- Configure the regular expression.

  [edit services l2tp traceoptions]
  user@host# **set file l2tp_1 _logfile_1 match *regex***

Related Documentation
- Tracing L2TP Operations for Subscriber Access on page 261

Configuring the L2TP Tracing Flags

By default, only important events are logged. You can specify which events and operations are logged by specifying one or more tracing flags.

To configure the flags for the events to be logged:

- Configure the flags.

  [edit services l2tp traceoptions]
  user@host# **set flag *flag***

Related Documentation
- Tracing L2TP Operations for Subscriber Access on page 261

Configuring the Severity Level to Filter Which L2TP Messages Are Logged

The messages associated with a logged event are categorized according to severity level. You can use the severity level to determine which messages are logged for the event type. A low severity level is less restrictive—filters out fewer messages—than a higher level. When you configure a severity level, all messages at that level and all higher (more restrictive) levels are logged.

The following list presents severity levels in order from lowest (least restrictive) to highest (most restrictive). This order also represents the significance of the messages; for example, **error** messages are of greater concern than **info** messages.

- **verbose**
- **info**
- **notice**

- **warning**
- **error**

The severity level that you configure depends on the issue that you are trying to resolve. In some cases you might be interested in seeing all messages relevant to the logged event, so you specify **all**. You can also specify **verbose** with the same result, because **verbose** is the lowest (least restrictive) severity level; it has nothing to do with the terseness or verbosity of the messages. Either choice generates a large amount of output. You can specify a more restrictive severity level, such as **notice** or **info** to filter the messages. By default, the trace operation output includes only messages with a severity level of **error**.

To configure the type of messages to be logged:

- Configure the message severity level.

  [edit services l2tp traceoptions]
  user@host# **set level** ***severity***

Related Documentation

- Tracing L2TP Operations for Subscriber Access on page 261

Collecting Subscriber Access Logs Before Contacting Juniper Technical Support

Problem When you experience a subscriber access problem in your network, we recommend that you collect certain logs before you contact Juniper Technical Support. This topic shows you the most useful logs for a variety of network implementations. In addition to the relevant log information, you must also collect standard troubleshooting information and send it to Juniper Technical Support in your request for assistance.

Solution To collect standard troubleshooting information:

- Redirect the command output to a file.

  user@host> **request support information | save rsi-1**

To configure logging to assist Juniper Technical Support:

1. Review the following blocks of statements to determine which apply to your configuration.

   ```
   [edit]
   set system syslog archive size 100m files 25
   set system auto-configuration traceoptions file filename
   set system auto-configuration traceoptions file filename size 100m files 25
   set protocols ppp-service traceoptions file filename size 100m files 25
   set protocols ppp-service traceoptions level all
   set protocols ppp-service traceoptions flag all
   set protocols ppp traceoptions file filename size 100m files 25
   set protocols ppp traceoptions level all
   set protocols ppp traceoptions flag all
   set protocols ppp monitor-session all
   set interfaces pp0 traceoptions flag all
   set demux traceoptions file filename size 100m files 25
   set demux traceoptions level all
   set demux traceoptions flag all
   set system processes dhcp-service traceoptions file filename
   set system processes dhcp-service traceoptions file size 100m
   set system processes dhcp-service traceoptions file files 25
   set system processes dhcp-service traceoptions flag all
   set class-of-service traceoptions file filename
   set class-of-service traceoptions file size 100m
   set class-of-service traceoptions flag all
   set class-of-service traceoptions file files 25
   set routing-options traceoptions file filename
   set routing-options traceoptions file size 100m
   set routing-options traceoptions flag all
   set routing-options traceoptions file files 25
   set interfaces traceoptions file filename
   set interfaces traceoptions file size 100m
   set interfaces traceoptions flag all
   set interfaces traceoptions file files 25
   set system processes general-authentication-service traceoptions file filename
   set system processes general-authentication-service traceoptions file size 100m
   set system processes general-authentication-service traceoptions flag all
   set system processes general-authentication-service traceoptions file files 25
   ```

2. Copy the relevant statements into a text file and modify the log filenames as you want.
3. Copy the statements from the text file and paste them into the CLI on your router to configure logging.
4. Commit the logging configuration to begin collecting information.

NOTE: The maximum file size for DHCP local server and DHCP relay log files is 1 GB. The maximum number of log files for DHCP local server and DHCP relay is 1000.

BEST PRACTICE: Enable these logs only to collect information when troubleshooting specific problems. Enabling these logs during normal operations can result in reduced system performance.

Related Documentation

- *Compressing Troubleshooting Logs from /var/logs to Send to Juniper Technical Support*

CHAPTER 12

Troubleshooting Configuration Statement

traceoptions (L2TP)

Syntax

```
traceoptions {
  debug-level level;
  file filename <files number> <match regular-expression > <size maximum-file-size>
    <world-readable | no-world-readable>;
  filter {
    protocol name;
    user-name username;
  }
  flag flag;
  interfaces interface-name {
    debug-level level;
    flag flag;
  }
  level (all | error | info | notice | verbose | warning);
  no-remote-trace;
}
```

Hierarchy Level [edit services l2tp]

Release Information Statement introduced before Junos OS Release 7.4.

Description Define tracing operations for L2TP processes.

Options **debug-level *level***—Trace level for PPP, L2TP, RADIUS, and UDP; this option does not apply to L2TP on MX Series routers:

- **detail**—Trace detailed debug information.
- **error**—Trace error information.
- **packet-dump**—Trace packet decoding information.

file *filename*—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory **/var/log**.

files *number*—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the **size** option.

Range: 2 through 1000

Default: 3 files

filter protocol *name*—Additional filter for the specified protocol; this option does not apply to L2TP on MX Series routers:

- **l2tp**
- **ppp**
- **radius**
- **udp**

filter user-name *username*—Additional filter for the specified username; this option does not apply to L2TP on MX Series routers.

flag ***flag***—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags:

- **all**—Trace all operations.
- **configuration**—Trace configuration events.
- **events**—Trace interface events.
- **general**—Trace general events.
- **gres**—Trace GRES events.
- **init**—Trace daemon initialization.
- **ipc-rx**—Trace IPC receive events.
- **ipc-tx**—Trace IPC transmit events.
- **memory**—Trace memory management code.
- **message**—Trace message processing code.
- **packet-error**—Trace packet error events.
- **parse**—Trace parsing events.
- **protocol**—Trace L2TP events.
- **receive-packets**—Trace received L2TP packets.
- **routing-process**—Trace routing process interactions.
- **routing-socket**—Trace routing socket events.
- **session-db**—Trace session database interactions.
- **states**—Trace state machine events.
- **timer**—Trace timer events.
- **transmit-packets**—Trace transmitted L2TP packets.
- **tunnel**—Trace tunnel events.

interfaces ***interface-name***—Apply L2TP traceoptions to a specific services interface. This option does not apply to L2TP on MX Series routers.

- **debug-level** ***level***—Trace level for the interface; this option does not apply to L2TP on MX Series routers:
  - **detail**—Trace detailed debug information.
  - **error**—Trace error information.
  - **extensive**—Trace all PIC debug information.
- **flag** ***flag***—Tracing operation to perform for the interface. This option does not apply to L2TP on MX Series routers. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags:
  - **all**—Trace everything.
  - **ipc**—Trace L2TP Inter-Process Communication (IPC) messages between the PIC and the Routing Engine.
  - **packet-dump**—Dump each packet content based on debug level.
  - **protocol**—Trace L2TP, PPP, and multilink handling.
  - **system**—Trace packet processing on the PIC.

level—Specify level of tracing to perform. The option you configure enables tracing of events at that level and all higher (more restrictive) levels. You can specify any of the following levels:

- **all**—Match messages of all levels.
- **error**—Match error messages.
- **info**—Match informational messages.
- **notice**—Match notice messages about conditions requiring special handling.
- **verbose**—Match verbose messages. This is the lowest (least restrictive) severity level; when you configure **verbose**, messages at all higher levels are traced. Therefore, the result is the same as when you configure **all**.
- **warning**—Match warning messages.

match ***regular-expression***—(Optional) Refine the output to include lines that contain the regular expression.

no-remote-trace—Disable remote tracing.

no-world-readable—(Optional) Disable unrestricted file access.

size *maximum-file-size*—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

Syntax: ***size*k** to specify KB, ***size*m** to specify MB, or ***size*g** to specify GB

Range: 10240 through 1073741824

world-readable—(Optional) Enable unrestricted file access.

Required Privilege Level

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

Related Documentation

- *Tracing L2TP Operations*
- Tracing L2TP Operations for Subscriber Access on page 261

PART 5

Index

Index

M

N

P

R

S

T

U

V

W