



QoS: Per-Session Shaping and Queueing on LNS

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The QoS: Per-Session Shaping and Queueing on LNS feature provides the ability to shape (for example, transmit or drop) or queue (transmit later) the traffic going from an Internet service provider (ISP) to an ISP subscriber over Layer 2 Tunneling Protocol (L2TP) Network Server (LNS). With this feature, the outgoing traffic is shaped or queued on a per-session basis.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the “[Feature Information for Per-Session Shaping and Queueing on LNS](#)” section on [page 16](#).

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

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Prerequisites for Per-Session Shaping and Queueing on LNS

- The Point-to-Point Protocol over Ethernet (PPPoE) or Point-to-Point Protocol over ATM (PPPoA) sessions are enabled
- L2TP resequencing is disabled.
- This feature uses policy maps in which queueing mechanisms (such as class-based weighted fair queueing [CBWFQ]) are configured.

A policy map can be configured for a session and for an outgoing interface. With this feature, a policy map (in which a queueing mechanism is configured) cannot be used for both the session and the outgoing interface simultaneously. If a queueing mechanism is in both policy maps, one of these policy maps must be disabled.

Restrictions for Per-Session Shaping and Queueing on LNS

- This feature does not support L2TP sequencing.

Information About Per-Session Shaping and Queueing on LNS

To use the QoS: Per-Session Shaping and Queueing on LNS feature, you should understand the following concepts:

- [Benefits of Per-Session Shaping and Queueing, page 2](#)
- [Per-Session Shaping and Queueing Sample Topology, page 2](#)
- [Per-Session Traffic Shaping, page 3](#)
- [Per-Session CBWFQ, page 3](#)
- [Two Methods for Configuring Per-Session Shaping and Queueing on LNS, page 4](#)

Benefits of Per-Session Shaping and Queueing

The ability to shape or queue traffic on a per-session basis helps to avoid traffic congestion and allows the ISP to adhere to the Service Level Agreement (SLA) established for handling traffic. Shaping or queueing traffic on a per-session basis provides a higher degree of granularity for managing traffic on the network.

Per-Session Shaping and Queueing Sample Topology

[Figure 1](#) is a sample topology for per-session shaping and queueing on LNS.

Figure 1 *Per-Session Shaping and Queueing Topology (PPP Sessions Forwarded)*



In this simplified topology example, downstream traffic is forwarded from the ISP (the source) to an ISP subscriber (the destination) during a PPP session. From an LNS at the ISP, the traffic is transmitted over an L2TP tunnel to an L2TP access concentrator (LAC) and then to the subscriber.

[Figure 2](#) illustrates per-session shaping and queueing using a PPP termination and aggregation (PTA) topology.

Figure 2 *Per-Session Shaping and Queueing Using a PTA Topology*



In this simplified topology example, the downstream traffic is forwarded from the ISP (the source) over a LAC to an ISP subscriber (the destination) during a PPP session.

Per-Session Traffic Shaping

Traffic shaping allows you to control the traffic going out an interface in order to match its flow to the speed of the remote target interface. Traffic shaping ensures that the traffic conforms to policies contracted for it. Thus, traffic that adheres to a particular profile can be shaped to meet downstream requirements, eliminating bottlenecks in topologies with data-rate mismatches.

A traffic shaper typically delays excess traffic using a buffer, or a similar mechanism, to hold packets and shape the flow when the data rate of the source is higher than expected.

The QoS: Per-Session Shaping and Queueing on LNS feature supports traffic shaping. With this feature, traffic shaping is implemented on a per-session basis (that is, when traffic arrives at the interface).

For more information about traffic shaping, see the [“Policing and Shaping Overview”](#) module.

Per-Session CBWFQ

WFQ offers dynamic, fair queueing that divides bandwidth across queues of traffic based on weights. WFQ ensures that all traffic is treated fairly, given its weight.

CBWFQ extends the standard WFQ functionality to provide support for user-defined traffic classes. For CBWFQ, you define traffic classes based on match criteria including protocols, access control lists (ACLs), and input interfaces. Packets that satisfy the match criteria for a class constitute the traffic for that class. A FIFO queue is reserved for each class, and traffic that belongs to a class is directed to the queue for that class.

The QoS: Per-Session Shaping and Queueing on LNS feature supports CBWFQ. With this feature, CBWFQ is implemented on a per-session basis (that is, when traffic arrives at the interface).

For more information on CBWFQ, see the [“Configuring Weighted Fair Queueing”](#) module.

Two Methods for Configuring Per-Session Shaping and Queueing on LNS

When you configure the QoS: Per-Session Shaping and Queueing on LNS feature, you can choose one of the following two configuration methods:

- Configure the feature using a virtual template.
This method is considered a “legacy” method. It is of earlier origin and is still an available option for those familiar with virtual templates.
- Configure the feature using a RADIUS server.
This method takes advantage of more recent technology and is the recommended method.

How to Configure Per-Session Shaping and Queueing on LNS

The tasks for configuring the QoS: Per-Session Shaping and Queueing on LNS feature vary according to the configuration method that you are using. You can choose to configure the feature using either a virtual template or a RADIUS server.

Choose one of the following:

- To configure the feature using a virtual template, see the [“Configuring Per-Session Queueing and Shaping Using a Virtual Template”](#) section on page 4.
- To configure the feature using a RADIUS server, see the [“Configuring Per-Session Shaping and Queueing Using a RADIUS Server”](#) section on page 9.

Configuring Per-Session Queueing and Shaping Using a Virtual Template

This section contains the following tasks:

- [Configuring the Policy Map, page 4](#)
- [Associating the Policy Map with a Virtual Template, page 7](#)
- [Verifying the Per-Session Shaping and Queueing on LNS Configuration, page 8](#)

Configuring the Policy Map

A policy map specifies the quality of service (QoS) feature to be applied to network traffic. Examples of features that can be specified in a policy map include class-based weighted fair queueing (CBWFQ) and traffic shaping.

To configure the policy map, complete the following steps.

Hierarchical Policy Maps

Policy maps can be configured in a hierarchical structure. That is, policy maps can be configured in levels subordinate to one another. The policy map at the highest level is referred to as the “parent” policy map. A subordinate policy map is referred to as a “child” policy map.

A typical hierarchical policy map structure consists of a parent policy map and one child policy map. Configure the child policy map first; then configure the parent policy map. Both types of policy maps are configured in the same manner.

The parent policy map typically contains one class—the class called class-default. The child policy map can contain multiple classes.

Prerequisites

Before configuring the policy map, create the traffic classes and specify the match criteria used to classify traffic. To create traffic classes and specify match criteria, use the Modular Quality of Service (QoS) Command-Line Interface (CLI) (MQC).

Restrictions

The following restrictions apply to hierarchical policy maps:

- Specify CBWFQ in the child policy map *only*. CBWFQ cannot be specified in the parent policy map.
- Traffic shaping can be specified in *either* the parent policy map *or* the child policy map.

However, for this feature, you *must* specify traffic shaping in the parent policy map. Specifying traffic shaping in the child policy map is optional.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map** *policy-map-name*
4. **class** { *class-name* | **class-default** }
5. **shape** [**average** | **peak**] *mean-rate* [*burst-size*] [*excess-burst-size*]
6. **bandwidth** { *bandwidth-kbps* | **remaining percent** *percentage* | **percent** *percentage* }
7. **service-policy** { **input** | **output** } *policy-map-name*
8. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>enable</p> <p>Example: Router> enable</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	<p>configure terminal</p> <p>Example: Router# configure terminal</p>	<p>Enters global configuration mode.</p>
Step 3	<p>policy-map <i>policy-map-name</i></p> <p>Example: Router(config)# policy-map child</p>	<p>Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy, and enters policy-map configuration mode.</p> <ul style="list-style-type: none"> Enter the name of the policy map. <p>Note In a hierarchical policy map structure, the policy map can be either the child policy map or the parent policy map.</p>
Step 4	<p>class {<i>class-name</i> class-default}</p> <p>Example: Router(config-pmap)# class class-default</p>	<p>Specifies the name of the class whose policy you want to modify, and enters policy-map class configuration mode.</p> <ul style="list-style-type: none"> Enter the class name or enter the class-default keyword.
Step 5	<p>shape [average peak] <i>mean-rate</i> [burst-size] [<i>excess-burst-size</i>]</p> <p>Example: Router(config-pmap-c)# shape average 128000</p>	<p>(Optional) Shapes traffic to the indicated bit rate according to the algorithm specified.</p> <ul style="list-style-type: none"> Enter the bit rate in bits per second and any optional values. <p>Note In a hierarchical policy map structure, traffic shaping can be enabled in <i>either</i> the parent policy map <i>or</i> the child policy map.</p> <p>However, for this feature, you <i>must</i> specify traffic shaping in the parent policy map. Specifying traffic shaping in the child policy map is optional.</p>
Step 6	<p>bandwidth {<i>bandwidth-kbps</i> remaining percent <i>percentage</i> percent <i>percentage</i>}</p> <p>Example: Router(config-pmap-c)# bandwidth percent 30</p>	<p>(Optional) Specifies or modifies the bandwidth allocated for a class that belongs to a policy map.</p> <ul style="list-style-type: none"> Enter the bandwidth allocated for the class. <p>Note This command configures CBWFQ. In a hierarchical policy map structure, CBWFQ can be configured in the child policy map <i>only</i>. CBWFQ cannot be specified in the parent policy map.</p>

	Command or Action	Purpose
Step 7	<pre>service-policy {input output} policy-map-name</pre> <p>Example: <pre>Router(config-pmap-c)# service-policy output child</pre></p>	<p>(Optional) Attaches the policy map to an input or output interface to be used as the service policy for that interface.</p> <ul style="list-style-type: none"> Enter the name of the child policy map. <p>Note This command applies to a hierarchical policy map structure <i>only</i>. The service-policy command attaches the child policy map to the interface.</p>
Step 8	<pre>end</pre> <p>Example: <pre>Router(config-pmap-c)# exit</pre></p>	<p>(Optional) Returns to privileged EXEC mode.</p>

What to Do Next?

So far, you have created and configured a policy map. If you want to configure additional policy maps (for example, a parent policy map for use in a hierarchical policy map structure), repeat the steps in [“Configuring the Policy Map” section on page 4](#) to configure any additional policy maps.

Otherwise, advance to the [“Associating the Policy Map with a Virtual Template” section on page 7](#).



Note

If you are using a RADIUS server, after configuring a policy map, advance to the [“Adding the Cisco QoS AV Pairs to the User Profile on the RADIUS Server” section on page 9](#).

Associating the Policy Map with a Virtual Template

To associate the policy map (where the QoS features are specified) with the virtual template, complete the following steps.

Virtual Templates and Policy Maps

A virtual template is a logical interface configured with generic configuration information for a specific purpose or with configuration information common to specific users, plus router-dependent information. The template takes the form of a list of Cisco IOS interface commands that are applied to virtual access interfaces, as needed.

A virtual template is configured (defined) on an interface. When a session is enabled (that is, when a packet arrives at the interface), the virtual template inherits the QoS features specified in the policy map for use during the session.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface virtual-template** *number*
4. **service-policy** {input | output} *policy-map-name*
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: Router# configure terminal	Enters global configuration mode.
Step 3	<code>interface virtual-template number</code> Example: Router(config)# interface virtual-template 1	Creates a virtual template and enters interface configuration mode. <ul style="list-style-type: none">Enter the virtual template number.
Step 4	<code>service-policy {input output} policy-map-name</code> Example: Router(config-if)# service-policy output parent	Attaches the policy map to an input or output interface to be used as the service policy for that interface. <ul style="list-style-type: none">Enter the name of the policy map. Note If you are using a hierarchical policy map structure, this policy map can be either the parent policy map or the child policy map. Note This features does not support the input keyword. Enter the output keyword <i>only</i> .
Step 5	<code>end</code> Example: Router(config-if)# exit	(Optional) Returns to privileged EXEC mode.

Verifying the Per-Session Shaping and Queueing on LNS Configuration

After configuring the policy maps (as many as needed) and associating the policy maps with the virtual template on the interface, you may want to verify the configuration. The verification task allows you to see whether the policy maps are configured the way that you intended.

To verify the configuration, complete the follows steps.

SUMMARY STEPS

1. `enable`
2. `show policy-map session [uid uid-number] [input | output [class class-name]]`
3. `exit`

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	show policy-map session [uid <i>uid-number</i>] [input output [class <i>class-name</i>]] Example: Router# show policy-map session uid 401 output	Displays the information about the session identified by the unique ID.
Step 3	exit Example: Router# exit	(Optional) Exits privileged EXEC mode.

What to Do Next?

After verifying the configuration, advance to the [“Configuration Examples for Per-Session Shaping and Queuing on LNS”](#) section on page 11.

Configuring Per-Session Shaping and Queuing Using a RADIUS Server

This section contains the following tasks:

- [Adding the Cisco QoS AV Pairs to the User Profile on the RADIUS Server, page 9](#)
- [Verifying the Per-Session Shaping and Queuing Using a RADIUS Server Configuration, page 11](#)

Adding the Cisco QoS AV Pairs to the User Profile on the RADIUS Server

To configure QoS on the RADIUS server, you must add two Cisco QoS AV pairs to the subscriber’s user profile on the RADIUS server. To add the Cisco QoS AV pairs to the subscriber’s user profile, complete the following steps on the RADIUS server.

Cisco AV Pairs and VSAs

Cisco AV pairs are part of vendor-specific attributes (VSAs) that allow a policy map to be applied to the LNS. Cisco AV pairs are a combination of an attribute and a value. The purpose of Cisco VSA (attribute 26) is to communicate vendor-specific information between the LNS and the RADIUS server. The Cisco VSA encapsulates vendor-specific attributes that allow vendors such as Cisco to support their own extended attributes.

For this configuration, one of two Cisco AV pairs can be used (formatted as shown below):

- `lcp:interface-config=service-policy output/input <policy name>`
This Cisco AV pair is considered a “legacy” AV pair. It is of earlier origin but is still an available choice.
- `sub-qos-policy-in/out=<policy name>`
This Cisco AV pair takes advantage of more recent technology and is the recommended choice. This Cisco AV pair is the one shown in the configuration task and example.

The Cisco AV pair is added to the subscriber’s user file on the RADIUS server. A subscriber’s user file contains an entry for each user that the RADIUS server will authenticate. Each entry establishes an attribute that the user can access.

When looking at a user file, the data to the left of the equal sign (=) is an attribute defined in the dictionary file, and the data to the right of the equal sign is the configuration data.

The Cisco AV pair identifies the policy map that was used to configure the specific QoS features. When the LNS requests the policy map name (specified in the Cisco AV pair), the policy map is pulled to the LNS from the RADIUS server when the session is established. The Cisco AV pair applies the appropriate policy map (and, therefore, the QoS feature) directly to the LNS from the RADIUS server.

Prerequisites

- Authentication, authorization, and accounting (AAA) must be enabled.
- The RADIUS server must be configured.
- The subscriber’s user profile on the RADIUS server must be created.
- The PPP session must be established.
- A policy map must be configured. To configure the policy map, complete the procedure in the [“Configuring the Policy Map” section on page 4](#).

SUMMARY STEPS

1. `sub-qos-policy-in/out=<policy name>`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>sub-qos-policy-in/out=<policy name></code> Example: <pre>userid Password = "cisco" Service-Type = Framed, Framed-Protocol = PPP, cisco-avpair = "sub-qos-policy-in/out=parent"</pre>	<p>Enters the Cisco QoS AV pairs for policy maps on the RADIUS server in the subscriber’s user file. When the LNS requests the policy name, the information in the subscriber’s user file is used.</p> <ul style="list-style-type: none"> • Add the Cisco QoS AV pair to the subscriber’s user file. <p>Note The first three lines of the subscriber’s user profile contain the user password, the service type, and the protocol type. This information is entered into the subscriber’s user profile when the profile is first created.</p>

Verifying the Per-Session Shaping and Queueing Using a RADIUS Server Configuration

After adding the Cisco QoS AV pair to the subscriber's user profile, you may want to verify the configuration. The verification task allows you to see whether the policy maps are configured the way you intended.

To verify the configuration, complete the following steps.

SUMMARY STEPS

1. `enable`
2. `show policy-map session [uid uid-number] [input | output [class class-name]]`
3. `exit`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: Router> <code>enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	<code>show policy-map session [uid <i>uid-number</i>] [input output [class <i>class-name</i>]]</code> Example: Router# <code>show policy-map session uid 401 output</code>	Displays the information about the session identified by the unique ID.
Step 3	<code>exit</code> Example: Router# <code>exit</code>	(Optional) Exits privileged EXEC mode.

Configuration Examples for Per-Session Shaping and Queueing on LNS

This section contains the following examples:

- [Configuring the Policy Map: Example, page 11](#)
- [Associating the Policy Map with a Virtual Template: Example, page 12](#)
- [Adding the Cisco QoS AV Pairs to the User Profile on the RADIUS Server: Example, page 12](#)
- [Verifying the Per-Session Shaping and Queueing on LNS Configuration: Example, page 12](#)

Configuring the Policy Map: Example

This section contains an example of a hierarchical policy map configuration. In this example, two policy maps, one called "parent" (the primary or parent policy map) and one called "child" (the secondary or child policy map), have been configured.

In this example, traffic shaping has been enabled in the parent policy map, and CBWFQ has been enabled in the child policy map. The **service-policy** command has been used to attach the policy map called child to the virtual template interface in the outgoing direction of the interface.

```
Router> enable
Router# configure terminal
Router(config)# policy-map child
Router(config-pmap)# class class1
Router(config-pmap-c)# bandwidth percent 30
Router(config-pmap-c)# end

Router> enable
Router# configure terminal
Router(config)# policy-map parent
Router(config-pmap)# class class-default
Router(config-pmap-c)# shape average 128000
Router(config-pmap-c)# service-policy output child
Router(config-pmap-c)# end
```

Associating the Policy Map with a Virtual Template: Example

This section contains an example of associating a policy map with a virtual template. In this example, the policy map called “parent” is associated with virtual template 1. For a hierarchical policy map structure, the policy map can be either the parent policy map or the child policy map.

```
Router> enable
Router# configure terminal
Router(config)# interface virtual-template 1
Router(config-if)# service-policy output parent
Router(config-if)# end
```

Adding the Cisco QoS AV Pairs to the User Profile on the RADIUS Server: Example

The following is an example of a subscriber’s user profile in which the Cisco QoS AV pairs have been added. The first three lines contain the user password, the service type, and the protocol type. This information is entered into the subscriber’s user profile when the user profile is first created. The last line is an example of the Cisco QoS AV pair added to the user profile.

```
userid Password = "cisco"
Service-Type = Framed,
Framed-Protocol = PPP,
cisco-avpair = "sub-qos-policy-in/out=parent"
```

Verifying the Per-Session Shaping and Queueing on LNS Configuration: Example

The following is sample output of the **show policy-map session** command used to verify the configuration. The sample output allows you to verify the content of the policy maps to ensure that the policy maps are configured the way that you intended (that is, that traffic shaping and traffic queueing are enabled and reporting statistics as expected).

```
Router# show policy-map session

SSS session identifier 1 -

Service-policy output: parent

Class-map: class-default (match-any)
 0 packets, 0 bytes
 30 second offered rate 0 bps, drop rate 0 bps
Match: any
 0 packets, 0 bytes
 30 second rate 0 bps
Queueing
queue limit 128 packets
(queue depth/total drops/no-buffer drops) 0/0/0
(pkts output/bytes output) 0/0
shape (average) cir 512000, bc 12800, be 12800
target shape rate 512000

Service-policy : child

Class-map: prec0 (match-all)
 0 packets, 0 bytes
 30 second offered rate 0 bps, drop rate 0 bps
Match: ip precedence 0
Queueing
queue limit 38 packets
(queue depth/total drops/no-buffer drops) 0/0/0
(pkts output/bytes output) 0/0
bandwidth 30% (153 kbps)

Class-map: prec2 (match-all)
 0 packets, 0 bytes
 30 second offered rate 0 bps, drop rate 0 bps
Match: ip precedence 2
Queueing
queue limit 44 packets
(queue depth/total drops/no-buffer drops) 0/0/0
(pkts output/bytes output) 0/0
shape (average) cir 212000, bc 7632, be 7632
target shape rate 212000

Class-map: class-default (match-any)
 0 packets, 0 bytes
 30 second offered rate 0 bps, drop rate 0 bps
Match: any
 0 packets, 0 bytes
 30 second rate 0 bps

queue limit 44 packets
(queue depth/total drops/no-buffer drops) 0/0/0
(pkts output/bytes output) 0/0
```

Additional References

The following sections provide references related to the QoS: Per-Session Shaping and Queueing on LNS feature.

Related Documents

Related Topic	Document Title
QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	Cisco IOS Quality of Service Solutions Command Reference
Traffic shaping	“Policing and Shaping Overview” module
Packet classification	“Classifying Network Traffic” module
Class maps, policy maps, hierarchical policy maps, and MQC	“Applying QoS Features Using the MQC” module
CBWFQ	“Configuring Weighted Fair Queueing” module
Virtual templates	“Configuring Virtual Template Interaces” module
RADIUS attributes	“RADIUS Attributes Overview” module
RADIUS servers, AAA, and AV pairs	“Define Interface Policy-Map AV Pairs AAA” module
Classification, policing, and marking on LAC	“QoS: Classification, Policing, and Marking on LAC” module

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/techsupport</p>

Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS Quality of Service Solutions Command Reference* at http://www.cisco.com/en/US/docs/ios/qos/command/reference/qos_book.html. For information about all Cisco IOS commands, use the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or a Cisco IOS master commands list.

- **show policy-map session**

Feature Information for Per-Session Shaping and Queueing on LNS

Table 1 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



Note

Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for Per-Session Shaping and Queueing on LNS

Feature Name	Releases	Feature Information
QoS: Per-Session Shaping and Queueing on LNS	12.2(27)SBA	The QoS: Per-Session Shaping and Queueing on LNS feature provides the ability to shape (for example, transmit or drop) or queue (transmit later) the traffic going from an Internet service provider (ISP) to an ISP subscriber over LNS. With this feature, the outgoing traffic is shaped or queued on a per-session basis. In Release 12.2(27)SBA, this feature was introduced.

Glossary

L2TP—Layer 2 Tunneling Protocol. An IETF standards track protocol defined in RFC 2661 that provides tunneling of PPP. Based upon the best features of L2F and PPTP, L2TP provides an industry-wide interoperable method of implementing a virtual private dialup network (VPDN).

LAC—L2TP access concentrator. A node that acts as one side of an L2TP tunnel endpoint and that is a peer to the L2TP network server (LNS). The LAC sits between an LNS and a remote system and forwards packets to and from each. Packets sent from the LAC to the LNS require tunneling with the L2TP protocol. The connection from the LAC to the remote system is either local or a PPP link.

LNS—L2TP network server. A node that acts as one side of an L2TP tunnel endpoint and that is a peer to the L2TP access concentrator (LAC). The LNS is the logical termination point of a PPP session that is being tunneled from the remote system by the LAC.

PPP—Point-to-Point Protocol. A protocol that provides router-to-router and host-to-network connections over synchronous and asynchronous circuits. PPP is designed to work with several network layer protocols, such as IP, Internetwork Packet Exchange (IPX), and AppleTalk Remote Access (ARA).

PPPoA—Point-to-Point Protocol over ATM. A feature that allows a PPP session to be initiated on a simple bridging ATM connected client. PPPoA provides the ability to connect a network of hosts over a simple bridging access device to a remote access concentrator or aggregation concentrator.

PPPoE—Point-to-Point Protocol over Ethernet. A feature that allows a PPP session to be initiated on a simple bridging Ethernet connected client. PPPoE provides the ability to connect a network of hosts over a simple bridging access device to a remote access concentrator or aggregation concentrator.

PTA—PPP Termination and Aggregation. A network architecture that indicates that after a PPP session is terminated, the network traffic is aggregated. For an ISP, the aggregated traffic either remains in the ISP network or routes to the Internet. For a wholesale provider, the aggregated IP traffic will be forwarded to different destinations or domains depending on the service selected.

QoS—quality of service. A measure of performance for a transmission system that reflects its transmission quality and service availability.

SLA—Service Level Agreement. A contract between wholesale service providers and retail service providers.

SSS—Subscriber Service Switch. A switch that provides flexibility on where and how many subscribers are connected to available services and how those services are defined. The primary focus of SSS is to direct PPP from one point to another using a Layer 2 subscriber policy. The policy will manage tunneling of PPP in a policy-based bridging fashion.

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