

# Port-Shaper and LLQ in the Presence of EFPs

The Port-Shaper and LLQ in the Presence of EFPs feature allows network designers to configure port and class policies on ports that contain Ethernet Flow Points (EFPs). These policies support Low Latency Queueing (LLQ) and traffic prioritization across the EFPs.

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# **Restrictions for Port-Shaper and LLQ in the Presence of EFPs**

- If you configure a class-based policy on the port, then you cannot configure service-policies on Ethernet Flow Points (EFPs).
- Attaching a service policy to the BDI is not supported.
- ACL based shaping policy-map cannot be applied to the EFP and/or egress interface.
- Usage of bandwidth remaining percentage (BRP) in the absence of priority class, allocates the available bandwidth in an iterative way. For example, the bandwidth is allocated for the first BRP class as per the percentage of share that is configured in the respective class-map and the remaining bandwidth is iteratively allocated to all other BRP classes until the bandwidth is exhausted.

# Information About Port-Shaper and LLQ in the Presence of EFPs

## **Ethernet Flow Points and LLQ**

An Ethernet Flow Point (EFP) is a forwarding decision point in the provider edge (PE) router, which gives network designers flexibility to make many Layer 2 flow decisions within the interface. Many EFPs can be configured on a single physical port. (The number varies from one device to another.) EFPs are the logical demarcation points of an Ethernet virtual connection (EVC) on an interface. An EVC that uses two or more

User-Network Interfaces (UNIs) requires an EFP on the associated ingress and egress interfaces of every device that the EVC passes through.

The Egress HQoS with Port Level Shaping feature allows network designers to configure port and class policies on ports that contain EFPs. These policies support Low Latency Queueing (LLQ) and traffic prioritization across the EFPs.

For information on how to configure LLQ, see the QoS Congestion Management Configuration Guide.

# How to Configure Port-Shaper and LLQ in the Presence of EFPs

To configure the Port-Shaper and LLQ in the Presence of EFPs feature, you first create either a hierarchical or flat policy map that supports Low Latency Queueing (LLQ), which you then attach to an EFP interface.

## **Configuring Hierarchical Policy Maps**

To configure hierarchical policy maps, you create child policies which you then attach to a parent policy. The parent policy is then attached to an interface.

## Procedure

Step 1	enable
	Example:
	Device> enable
	Enables privileged EXEC mode.
	• Enter your password if prompted.
Step 2	configure terminal
	Example:
	Device# configure terminal
	Enters global configuration mode.
Step 3	policy-map policy-map-name
	Example:
	Device(config)# policy-map child-llq
	Creates or modifies the child policy and enters QoS policy-map configuration mode.
	• child-llq is the name of the child policy map.
Step 4	class class-map-name
	Example:

Device	(config-pmap)	#	class	precedenc-1
	( = = -) =			

Assigns the traffic class you specify to the policy map and enters QoS policy-map class configuration mode.

• precedenc-1 is the name of a previously configured class map and is the traffic class for which you want to define QoS actions.

Ste	p 5	set c	os valu	le

### **Example:**

Device(config-pmap-c) # set cos 5

(Optional) Sets the Layer 2 class of service (CoS) value of an outgoing packet.

• The value is a specific IEEE 802.1Q CoS value from 0 to 7.

## Step 6 bandwidth percent percent

#### Example:

Device(config-pmap-c) # bandwidth percent 20

(Optional) Specifies a bandwidth percent for class-level queues to be used during congestion to determine the amount of excess bandwidth (unused by priority traffic) to allocate to nonpriority queues.

## Step 7 exit

## Example:

Device(config-pmap-c)# exit

Exits QoS policy-map class configuration mode.

#### **Step 8 class** *class-map-name*

#### Example:

Device(config-pmap) # class precedenc-2

Assigns the traffic class you specify to the policy map and enters QoS policy-map class configuration mode.

• precedenc-2 is the name of a previously configured class map and is the traffic class for which you want to define QoS actions.

## Step 9 bandwidth percent percent

## Example:

Device(config-pmap-c)# bandwidth percent 80

(Optional) Specifies a bandwidth percent for class-level queues to be used during congestion to determine the amount of excess bandwidth (unused by priority traffic) to allocate to nonpriority queues.

## Step 10 exit

Example:

Device(config-pmap-c)# exit

Exits QoS policy-map class configuration mode.

Step 11 policy-map policy-map-name Example:

Device(config-pmap)# policy-map parent-llq

Creates or modifies the parent policy.

• parent-llq is the name of the parent policy map.

Step 12 class class-default

## Example:

Device(config-pmap) # class class-default

Configures or modifies the parent class-default class and enters QoS policy-map class configuration mode.

• You can configure only the class-default class in a parent policy. Do not configure any other traffic class.

## Step 13 service-policy policy-map-name Example:

Device(config-pmap-c)# service-policy child-llq

Applies the child policy to the parent class-default class.

• child-llq is the name of the child policy map configured in step 1.

## **Configuring an LLQ Policy Map**

## Procedure

Step 1	enable
	Example:
	Device> enable
	Enables privileged EXEC mode.
	• Enter your password if prompted.
Step 2	configure terminal
	Example:
	Device# configure terminal
	Enters global configuration mode.

Step 3	policy-map policy-map-name
	Example:
	Device(config)# policy-map llq-flat
	Creates a policy and enters QoS policy-map configuration mode.
Step 4	class class-map-name
	Example:
	Assigns the traffic class you specify to the policy map and enters policy-map class configuration mode.
Step 5	priority
	Example:
	Device(config-pmap-c)# priority
	Configures LLQ, providing strict priority queueing (PQ) for class-based weighted fair queueing (CBWFQ).
Step 6	exit
	Example:
	Device(config-pmap-c)# exit
	Exits QoS policy-map class configuration mode.
Step 7	class class-map-name
	Example:
	Assigns the traffic class you specify to the policy map and enters QoS policy-map class configuration mode.
Step 8	shape average value
	Example:
	Device(config-pmap-c)# shape average 20000000
	Configures a shape entity with a Comitted Information Rate of 200 Mb/s.
Step 9	exit
	Example:
	Device(config-pmap-c)# exit
	Exits QoS policy-map class configuration mode.
Step 10	class class-map-name
	Example:
	Assigns the traffic class you specify to the policy map and enters QoS policy-map class configuration mode.
Step 11	bandwidth percent
	Example:

Device(config-pmap-c)# bandwidth 4000000

(Optional) Specifies a bandwidth percent for class-level queues to be used during congestion to determine the amount of excess bandwidth (unused by priority traffic) to allocate to non-priority queues.

## Step 12 exit

## Example:

Device(config-pmap-c)# exit

Exits QoS policy-map class configuration mode.

## Configuring Port Level Shaping on the Main Interface with Ethernet Flow Points

To configure port level shaping on the main interface with EFPS, first you enable the autonegotiation protocol on the interface, then you attach a policy map to the interface and finally you configure the Ethernet service instance.

## Procedure

Step 1	enable
	Example:
	Device> enable
	Enables privileged EXEC mode.
	• Enter your password if prompted.
Step 2	configure terminal
	Example:
	Device# configure terminal
	Enters global configuration mode.
Step 3	interface type number
	Example:
	Device(config)# interface GigabitEthernet 0/0/1
	Configures an interface type and enters interface configuration mode.
	• Enter the interface type number.
Step 4	no ip address
	Example:

	Device(config-if)# no ip address
	Disables IP routing on the interface.
Step 5	negotiation auto
	Example:
	Device(config-if)# negotiation auto
	Enables the autonegotiation protocol to configure the speed, duplex, and automatic flow control of the Gigabit Ethernet interface.
Step 6	service-policy output policy-map-name
	Example:
	Device(config-if)# service-policy output parent-llq
	Specifies the name of the policy map to be attached to the input or output direction of the interface.
	• You can enter the name of a hierarchical or a flat policy map.
Step 7	service instance <i>id</i> ethernet
	Example:
	Device(config-if)# service instance 1 ethernet
	Configures an Ethernet service instance on an interface and enters service instance configuration mode.
Step 8	encapsulation dot1q vlan-id
	Example:
	Device(config-if-srv)# encapsulation dot1q 100
	Defines the matching criteria to map 802.1Q frames' ingress on an interface to the service instance.
Step 9	bridge-domain bridge-domain-id
	Example:
	Device(config-if-srv)# bridge-domain 100
	Binds the bridge domain to the service instance.
Step 10	exit
	Example:
	Device(config-if-serv)# exit
	Exits service instance configuration mode.
Step 11	service instance <i>id</i> ethernet
	Example:

Device(config-if) # service instance 2 ethernet

Configures an Ethernet service instance on an interface and enters service instance configuration mode.

Example:         Device (config-if-srv) # encapsulation dotlq 101         Defines the matching criteria to map 802.1Q frames' ingress on an interface to the service instate         Step 13       bridge-domain bridge-domain-id         Example:         Device (config-if-srv) # bridge-domain 101         Binds the bridge domain to the service instance.         Step 14       exit         Example:         Device (config-if-srv) # exit         Exits QoS policy-map class configuration mode.         Step 15       end         Example:         Device (config-if) # end	Step 12	encapsulation dot1q vlan-id
Device (config-if-srv) # encapsulation dotlq 101         Defines the matching criteria to map 802.1Q frames' ingress on an interface to the service insta         Step 13       bridge-domain bridge-domain-id         Example:       Device (config-if-srv) # bridge-domain 101         Binds the bridge domain to the service instance.       Better the service instance.         Step 14       exit         Example:       Device (config-if-srv) # exit         Device (config-if-srv) # exit       Exits QoS policy-map class configuration mode.         Step 15       end         Example:       Device (config-if) # end		Example:
Defines the matching criteria to map 802.1Q frames' ingress on an interface to the service instat         Step 13       bridge-domain bridge-domain-id         Example:       Device(config-if-srv) # bridge-domain 101         Binds the bridge domain to the service instance.       Example:         Step 14       exit         Example:       Device(config-if-srv) # exit         Device(config-if-srv) # exit       Exits QoS policy-map class configuration mode.         Step 15       end         Example:       Device(config-if) # end		Device(config-if-srv)# encapsulation dot1q 101
Step 13       bridge-domain bridge-domain-id         Example:       Device (config-if-srv) # bridge-domain 101         Binds the bridge domain to the service instance.       Binds the bridge domain to the service instance.         Step 14       exit         Example:       Device (config-if-srv) # exit         Exits QoS policy-map class configuration mode.       Binds the bridge domain to the service instance.         Step 15       end         Example:       Device (config-if-srv) # exit         Device (config-if) # end       Device (config-if) # end		Defines the matching criteria to map 802.1Q frames' ingress on an interface to the service instance
Example:         Device (config-if-srv) # bridge-domain 101         Binds the bridge domain to the service instance.         Step 14       exit         Example:         Device (config-if-srv) # exit         Exits QoS policy-map class configuration mode.         Step 15       end         Example:         Device (config-if) # end	Step 13	bridge-domain bridge-domain-id
<pre>Device (config-if-srv) # bridge-domain 101 Binds the bridge domain to the service instance. Step 14     exit     Example:     Device (config-if-srv) # exit     Exits QoS policy-map class configuration mode. Step 15     end     Example:     Device (config-if) # end</pre>		Example:
Binds the bridge domain to the service instance.         Step 14       exit         Example:         Device (config-if-srv) # exit         Exits QoS policy-map class configuration mode.         Step 15       end         Example:         Device (config-if) # end		Device(config-if-srv)# bridge-domain 101
Step 14       exit         Example:       Device (config-if-srv) # exit         Exits QoS policy-map class configuration mode.       Exits QoS policy-map class configuration mode.         Step 15       end         Example:       Device (config-if) # end         Device (config-if) # end       Device (config-if) # end		Binds the bridge domain to the service instance.
Example:         Device (config-if-srv) # exit         Exits QoS policy-map class configuration mode.         Step 15       end         Example:         Device (config-if) # end	Step 14	exit
<pre>Device(config-if-srv)# exit Exits QoS policy-map class configuration mode. Step 15 end Example: Device(config-if)# end</pre>		Example:
Exits QoS policy-map class configuration mode.  Step 15 end Example: Device (config-if) # end		Device(config-if-srv)# exit
Step 15 end Example: Device(config-if)# end		Exits QoS policy-map class configuration mode.
Example: Device(config-if)# end	Step 15	end
Device(config-if)# end		Example:
		Device(config-if)# end

(Optional) Exits interface configuration mode.

# Configuration Examples for Port-Shaper and LLQ in the Presence of EFPs

# Example: Configuring Hierarchical QoS Port Level Shaping on the Main Interface with EFPs

The following example shows how to configure hierarchical QoS port level shaping on a main physical interface to support traffic prioritization and Low Level Queueing across all EFPs configured on the interface:

```
policy-map parent-llq
class class-default
  service-policy child-llq
policy-map child-llq
class precedenc-1
  set cos 5
```

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```
bandwidth percent 20
class precedenc-2
bandwidth percent 80
interface GigabitEthernet 0/0/1
no ip address
negotiation auto
service-policy output parent-llq
service instance 1 ethernet
encapsulation dotlq 100
bridge-domain 100
!
service instance 2 ethernet
encapsulation dotlq 101
bridge-domain 101
```

```
Note Only match EFP and match qos-group is supported on RSP3 in egress policy map.
```

## Example: Configuring Port Level Shaping on the Main Interface with EFPs

The following example shows how to configure port level shaping on a main physical interface to support traffic prioritization and Low Level Queueing across all Ethernet Flow Points (EFPs) configured on the interface:

```
policy-map llq flat
 class dscp-af1
 priority
  class dscp-af2
  shape average 20000000
  class dscp-af3
   bandwidth 400000
interface GigabitEthernet 0/0/1
no ip address
negotiation auto
 service-policy output llq flat
 service instance 1 ethernet
 encapsulation dotlg 100
 bridge-domain 100
 1
 service instance 2 ethernet
 encapsulation dot1q 101
 bridge-domain 101
```

# **Additional References**

## **Related Documents**

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	Cisco IOS QoS Command Reference
Policing and shaping	"Policing and Shaping Overview" module
Class maps	"Applying QoS Features Using the MQC" module
Policy maps	"Applying QoS Features Using the MQC" module
Low Latency Queueing	QoS Congestion Management Configuration Guide

## **Standards and RFCs**

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

## MIBs

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

## **Technical Assistance**

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

# Feature Information for Port-Shaper and LLQ in the Presence of EFPs

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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

Table 1: Feature Information for Port-Shaper and LLO in the Presence of EFPs

Feature Information for Port-Shaper and LLQ in the Presence of EFPs