



## 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 Queuing (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 port level shaper with the policy applied at EFP level then port shaper does not work. However, 3 level HQoS policy with port and logical shaper can be applied at the EFP level. Logical shaper configured at logical level does work but port shaper does not work.
- If you configure a class-based HQoS or LLQ policy on the port, you cannot configure service-policies on Ethernet Flow Points (EFPs). The only exception to this is the class-default shaper policy and match EFP policy.
- If you configure a class-based policy on the port, you cannot configure service-policies on EFPs.
- If you configure a class-default port-shaper based policy on the port, you can configure service-policy on EFPs.
- 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 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.

**Step 5**     **set cos** *value***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.

**Note**     match on qos-group is supported on the Cisco RSP3 Module.

**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.

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## Configuring Class-default Port-Shaper Policy Maps

To configure hierarchical policy maps, first create the child policies and then attach it to a parent policy. The parent policy must be attached to an interface.

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b>  Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b>  Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>policy-map</b> <i>policy-map-name</i> <b>Example:</b>  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.
<b>Step 4</b>	<b>class</b> <i>class-default</i> <b>Example:</b>  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.
<b>Step 5</b>	<b>shape-average</b> <i>shape-value</i> <b>Example:</b>  Device(config-pmap-c)#shape average 200000000	Configures a shape entity with a Comitted Information Rate of 200 Mb/s.
<b>Step 6</b>	<b>exit</b> <b>Example:</b>  Device(config-pmap-c)# exit	Exits QoS policy-map class configuration mode.

## Configuring Port-Shaper Policy Maps

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b>  Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.

	Command or Action	Purpose
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b>  Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>policy-map <i>policy-map-name</i></b> <b>Example:</b>  Device(config)# policy-map def	Creates or modifies the child policy and enters QoS policy-map configuration mode.
<b>Step 4</b>	<b>class <i>class-default</i></b> <b>Example:</b>  Device(config-pmap)# class class-default	Assigns the traffic class you specify to the policy map and enters QoS policy-map class configuration mode.
<b>Step 5</b>	<b>shape-average <i>shape-value</i></b> <b>Example:</b>  Device(config-pmap-c)#shape average 200000000	Configures a shape entity with a Comitted Information Rate of 200 Mb/s.
<b>Step 6</b>	<b>service-policy <i>policy-map-name</i></b> <b>Example:</b>  Device(config-pmap-c)# service-policy child-llq	Applies the child policy to the parent class-default class. <ul style="list-style-type: none"> <li>child-llq is the name of the child policy map configured in <a href="#">Configuring Class-default Port-Shaper Policy Maps, on page 4</a>.</li> </ul>

## 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 200000000
```

Configures a shape entity with a Committed 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.

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## 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

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**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 *id* 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 *id* ethernet****Example:**

```
Device(config-if)# service instance 2 ethernet
```

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

**Step 12**     **encapsulation dot1q** *vlan-id*

**Example:**

```
Device(config-if-srv)# encapsulation dot1q 101
```

Defines the matching criteria to map 802.1Q frames' ingress on an interface to the service instance.

**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
```

(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
    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 dot1q 100
    bridge-domain 100
  !
  service instance 2 ethernet
    encapsulation dot1q 101
    bridge-domain 101

```




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

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## Configuration Example: Class-default Port-Shaper and EFP policy

The following example shows how to configure class-default port-shaper and EFP policy, where the main interface can have the class-default shaper policy and EFP can have the HQOS policies.

```

policy-map co12
  class class-default
  shape average 50m

policy-map def
  class class-default
  shape average 500m
  service-policy co12

```

## 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 200000000
  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 dot1q 100
  bridge-domain 100
!
service instance 2 ethernet
  encapsulation dot1q 101
  bridge-domain 101

```

## Additional References

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	<a href="#">Cisco IOS QoS Command Reference</a>
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	<a href="#">QoS Congestion Management Configuration Guide</a>

### Standards and RFCs

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

### MIBs

MIB	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:  <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**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.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

Additional References