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.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

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.

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.

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.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map** *policy-map-name*
4. **class** *class-map-name*
5. **set cos** *value*
6. **bandwidth percent** *percent*
7. **exit**
8. **class** *class-map-name*
9. **bandwidth percent** *percent*
10. **exit**
11. **policy-map** *policy-map-name*
12. **class** *class-default*
13. **service-policy** *policy-map-name*

DETAILED STEPS

	Command or Action	**Purpose**
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.

	Command or Action	Purpose
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

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map** *policy-map-name*
4. **class** *class-map-name*
5. **priority**
6. **exit**
7. **class** *class-map-name*
8. **shape average** *value*
9. **exit**
10. **class** *class-map-name*
11. **bandwidth** *percent*
12. **exit**

DETAILED STEPS

	Command or Action	**Purpose**
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:** `Device(config-pmap)# class dscp-af1`	Assigns the traffic class you specify to the policy map and enters policy-map class configuration mode.

	Command or Action	**Purpose**
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:** Device(config-pmap)# class dscp-af2	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 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:** Device(config-pmap)# class dscp-af3	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.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **no ip address**
5. **negotiation auto**
6. **service-policy output** *policy-map-name*
7. **service instance** *id* **ethernet**
8. **encapsulation dot1q** *vlan-id*
9. **bridge-domain** *bridge-domain-id*
10. **exit**
11. **service instance** *id* **ethernet**
12. **encapsulation dot1q** *vlan-id*
13. **bridge-domain** *bridge-domain-id*
14. **exit**
15. **end**

DETAILED STEPS

	Command or Action	**Purpose**
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.

	Command or Action	Purpose
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.

	Command or Action	Purpose
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
```

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 class_policy_cla
 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	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

Related Topic	Document Title
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

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: 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 LLQ in the Presence of EFPs

Feature Name	Releases	Feature Information
Port-Shaper and LLQ in the Presence of EFPs	Cisco IOS Release XE 3.6S	The Port-Shaper and LLQ in the Presence of EFPs feature provides support for LLQ and traffic prioritization across all EFPs on a port. In Cisco IOS XE Release 3.6S, support was added for the Cisco ASR 903 router.