Congestion Management Commands

This chapter describes the commands used to manage congestion.

To use commands of this module, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using any command, contact your AAA administrator for assistance.

For detailed information about congestion management concepts, configuration tasks and examples, see the Configuring Congestion Management chapter in the *Modular QoS Configuration Guide for Cisco ASR 9000 Series Routers*.

admit cac local

To configure the call admission control (CAC) local flow type and to enter the policy map class cac configuration sub-mode, use the **admit cac local** command in policy map class configuration mode. To delete CAC configuration, use the **no** form of this command.

admit cac local
no admit cac local

Syntax Description	This command has no keywords or arguments.
Command Default	None.
Command Modes	Policy map class configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
qos	read, write

This example shows how to configure the call admission control (CAC) local flow type and to enter the policy map class cac configuration mode.

```
RP/0/RSP0/CPU0:router(config)# policy-map policy1
RP/0/RSP0/CPU0:router(config-cmap)# class class1
RP/0/RSP0/CPU0:router(config-cmap-c)# admit cac local
RP/0/RSP0/CPU0:router(config-cmap-c-cac)# exit
```

flow idle-timeout

To configure the maximum time of inactivity for a flow, use the **flow idle-timeout** command in policy map class cac configuration mode. To remove the configured idle timeout for a flow, use the **no** form of this command.

flow idle-timeout *period*
no flow idle-timeout

Syntax Description

period	Specifies the maximum time the flow can be inactive. The value is in seconds.
	The valid *period* range is between 10s to 2560 seconds. The timeout has a granularity of 10s.

Command Default   Default period of 30s

Command Modes   Policy map class cac configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
qos	read, write

This example shows how to configure the maximum time of inactivity for the flow as 34 seconds.

```
RP/0/RSP0/CPU0:router(config)# policy-map policy1
RP/0/RSP0/CPU0:router(config-cmap)# class class1
RP/0/RSP0/CPU0:router(config-cmap-c)# admit cac local
RP/0/RSP0/CPU0:router(config-cmap-c-cac)# flow idle-timeout 34
RP/0/RSP0/CPU0:router(config-cmap-c-cac)# exit
```

flow rate

To configure the per flow rate for a flow, use the **flow rate** command in policy map class cac configuration mode. To remove the configured flow rate, use the **no** form of this command.

flow rate *rate*
no **flow rate**

Syntax Description	*rate*	Specifies the committed per flow rate. The value ranges from 1-4294967294.

The committed per flow rate allows these options:

- bps: Bits per second

- cellsps: Cells per second

- gbps: Gigabits per second

- kbps: Kilobits per second

- mbps: Megabits per second

Command Default The default unit is Kbps.

Command Modes Policy map class cac configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
qos	read, write

This example shows how to configure flow rate of 100 Kbps.

```
RP/0/RSP0/CPU0:router(config)# policy-map policy1
RP/0/RSP0/CPU0:router(config-cmap)# class class1
RP/0/RSP0/CPU0:router(config-cmap-c)# admit cac local
RP/0/RSP0/CPU0:router(config-cmap-c-cac)# flow rate 100
RP/0/RSP0/CPU0:router(config-cmap-c-cac)# exit
```

rate

To configure the combined rate of all flows, use the **rate** command in policy map class cac configuration mode. To remove the configured rate, use the **no** form of this command.

rate *rate*
no rate

Syntax Description

rate	Specifies the committed aggregate rate for all flows. The value ranges from 1-4294967294.

The committed aggregate rate for all flows allows these options:

- bps: Bits per second

- cellsps: Cells per second

- gbps: Gigabits per second

- kbps: Kilobits per second

- mbps: Megabits per second

Command Default   The default unit is Kbps.

Command Modes   Policy map class cac configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
qos	read, write

This example shows how to configure the per flow rate 896 kbps.

```
RP/0/RSP0/CPU0:router(config)# policy-map policy1
RP/0/RSP0/CPU0:router(config-cmap)# class class1
RP/0/RSP0/CPU0:router(config-cmap-c)# admit cac local
RP/0/RSP0/CPU0:router(config-cmap-c-cac)# rate 896
RP/0/RSP0/CPU0:router(config-cmap-c-cac)# exit
```

hw-module buffer-carve-mode

To enable the static buffer allocation mode, use the **hw-module buffer-carve-mode** command in the XR config mode.

To return to the default buffer value (dynamic), use the **no** form of this command.

hw-module buffer-carve mode location 0/0/CPU0 *mode*

Syntax Description		
mode	Specifies the buffer mode option.	
	• *dynamic*—Sets buffer management to dynamic allocation (default).	
	• *static*—Sets buffer management to static allocation.	

Command Default

Dynamic mode is enabled by default.

Command Modes

XR config mode

Command History

Release	Modification
Release 7.1.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
qos	read, write

Examples

```
RP/0/RSP0/CPU0:router(admin-config)# R2#conf

RP/0/RSP0/CPU0:router(admin-config)# R2(config)#hw-module buffer-carve-mode location 0/0/CPU0
 static

RP/0/RSP0/CPU0:router(admin-config)# R2(config)#commit

RP/0/RSP0/CPU0:router(admin-config)# R2(config)#end
```

hw-module fia-buffer-profile

To increase the virtual output queue (VoQ) buffering capacity on the ingress line card in the event of congestion or traffic bursts towards a small number of ports on the egress line card, use the **hw-module fia-buffer-profile** command in Global Configuration mode.

hw-module   fia-buffer-profile   location   *<lc-location>*   **extra-large**

Syntax Description

location	Specifies the location of a specific ingress line card.
<lc-location>	Location of an ingress line card entered in the *rack/slot/module*.
extra-large	Enables to use extra large profile to increase the VoQ buffering capacity on the ingress line card.

Command Default   None

Command Modes   Global Configuration mode

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Usage Guidelines   The FIA buffer profile value can only be implemented on the ingress line card.

Task ID

Task ID	Operation
root-lr	read, write

This example shows how to use the **hw-module fia-buffer-profile** to increase the VoQ buffering capacity on the ingress line card.

```
RP/0/RSP0/CPU0:router(config)# hw-module fia-buffer-profile location 0/1/CPU0 extra-large
```

hw-module fia-intf-policer disable

To disable the FIA interface policing mechanism on the line cards, which helps prevent the dropping of control packets under high bandwidth conditions without losing any fabric packets, use the **hw-module fia-intf-policer disable** command in Global Configuration mode.

hw-module   fia-intf-policer   disable

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or value.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

The Cisco ASR 9900 series chassis supports the **hw-module fia-intf-policer disable** command.

Configuring the **hw-module fia-intf-policer disable** command on the Cisco ASR 9900 series chassis with both Cisco ASR 9000 series line cards and Cisco ASR 9900 series line cards disables the FIA interface policer only on the Cisco ASR 9900 series line cards.

Before disabling the FIA interface policer, implement a QoS policy to mark and protect priority traffic, as disabling the FIA interface policer can pose risks to critical packets, such as packet drops, if traffic to the LC exceeds fabric switching capacity.

Task ID

Task ID	Operation
root-lr	read, write

Examples

This example illustrates how to use the **hw-module fia-intf-policer disable** command to disable the FIA interface policing mechanism on line cards, preventing the dropping of control packets under high bandwidth conditions without losing any fabric packets.

```
Router# configure
Router(config)# hw-module fia-intf-policer disable
Router(config)# commit
```

hw-module fia-vqi-shaper location

To configure the Virtual Queuing Index (VQI) shaper value and enhance the shaper value, use the **hw-module fia-vqi-shaper location** command in Global Configuration mode. To return to the default shaper value, use the **no** form of this command.

hw-module fia-vqi-shaper location *<lc-location>* **enhance**

Syntax Description

<lc-location>	Specifies the location of a particular egress line card.
enhance	Provides the option to enhance the fabric shaper limit to 18 Gigabit Ethernet from the earlier 13 Gigabit Ethernet mode.

Command Default   The default VQI shape value is 13 Gigabit Ethernet.

Command Modes   Global Configuration mode

Command History

Release	Modification
Release 5.1.0	This command was introduced.

Usage Guidelines   The VQI shaper value can only be implemented on the egress card.

If the shape granularity is not enhanced, a default value of 13 Gigabit Ethernet is applied to all output interfaces belonging to a particular line card.

Using this command does not affect the ingress shaper value of the line card.

Task ID

Task ID	Operation
root-lr	read, write

```
RP/0/RSP0/CPU0:router(config)# hw-module fia-vqi-shaper location enhance
```

hw-module flow-qos location max-flow-count

To configure the required number of policers for the flow-aware QoS feature, use the **hw-module flow-qos location max-flow-count** command in admin configuration mode. If you are running on Cisco IOS XR 64 bit, then use the same command in XR config mode. To remove the configured policers, use the **no** form of this command.

hw-module flow-qos location *node-id* **max-flow-count** *value*
no hw-module flow-qos location *node-id* **max-flow-count** *value*

Syntax Description		
node-id	Physical location of the Shared Interface Processor (SIP). Naming notation is *rack/slot/module;* a slash between values is required as part of the notation.	

- *rack* —Chassis number of the rack.
- *slot* —Physical slot number of the modular services card or line card.
- *module* —Module number. A physical layer interface module (PLIM) is always 0.

value Specify the value in multiples of 1K (1024).

- For Cisco IOS XR from 1 to 256
- For Cisco IOS XR 64 bit from 1 to 368

Command Default None

Command Modes Admin configuration mode - Cisco IOS XR

XR config mode - Cisco IOS XR 64 bit

Command History

Release	Modification
Release 6.1.2	Support for Cisco IOS XR 64 bit bit was added.
Release 5.1.1	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
root-lr	read, write

This example shows how to set the required number of policers for the flow-aware qos feature to 128 at location 0/1/CPU0:

```
RP/0/RSP0/CPU0:router(admin-config)# hw-module flow-qos location 0/1/CPU0 max-flow-count
128
```

This example shows how to set the required number of policers for the flow-aware qos feature to 125 on a line card running on Cisco IOS XR 64 bit:

```
RP/0/RSP0/CPU0:router(config)# hw-module flow-qos location 0/0/0 max-flow-count 125
```

hw-module location qos-mode port-limit-oversubscribe

To enable the port limit oversubscribe mode on a specific line card, use the **hw-module location qos-mode port-limit-oversubscribe** command in the admin configuration mode. If you are running Cisco IOS XR 64 bit, then use the same command in XR config mode. To disable the port limit mode on a specific line card, use the **no** form of this command.

hw-module location *node-id* **qos-mode port-limit-oversubscribe**
no hw-module location *node-id* **qos-mode port-limit-oversubscribe**

Syntax Description	**location**	*node-id*	Specifies location of a particular node. The *node-id* argument is entered in the rack/slot/module notation.

Command Default

No default behavior or values.

Command Modes

Admin configuration mode - Cisco IOS XR

XR config mode - Cisco IOS XR 64 bit

Command History

Release	Modification
Release 6.2.2	Support for Cisco IOS XR 64 bit was added.
Release 5.1.1	This command was introduced.

Usage Guidelines

This command is available only on the ASR 9000 Enhanced Ethernet Line Card.

You must reload LCs for configuration changes to take effect.

Note   Due to hardware limitations and different port buffer sizes, the traffic is processed differently on the following LCs:

- Cisco ASR 9000 Enhanced Ethernet Line Card - The command is ignored and has no effect.

- Cisco ASR 9000 High Density 100GE Ethernet line cards - The command doubles the per port buffer limit on SE linecards and is ignored on TR linecards.

- Cisco ASR 9000 Series 24-port and 48-port dual-rate 10GE/1GE line cards - The command doubles the per port buffer limit on SE linecards and is ignored on TR linecards.

Task ID

Task ID	Operation
qos	read, write
root-lr	read, write

Example

This example shows how to enable port limit on a line card:

```
RP/0/RSP0/CPU0:router(admin-config)# hw-module location 0/1/CPU0 qos-mode
port-limit-oversubscribe
RP/0/RSP0/CPU0:router(admin-config)# commit
```

This example shows how to enable port limit on a line card running on Cisco IOS XR 64 bit:

```
RP/0/RSP0/CPU0:router(config)# hw-module location 0/0/0 qos-mode port-limit-oversubscribe

RP/0/RSP0/CPU0:router(config)# commit
```

interface-taps

Configures the policer rate on the interface.

interface-taps 2gig
no interface-taps 2gig

This command has no arguments.

| **Command Default** | None. |

| **Command Modes** | Global configuration mode. |

Command History

Release	Modification
Release 6.0.1	This command was introduced.

Usage Guidelines

Configuring the interface-taps 2gig command changes the default policer rate on the interface to 2Gbps (bidirectional 1Gbps).

✎

Note   The default policer rate is 512 Mbps on Typhoon line cards and 1Gbps on Tomahawk line cards.

Task ID

Task ID	Operation
qos	read, write

The following example shows how you can configure the policer rate to 2Gbps (bidirectional 1Gbps).

```
RP/0/RSP0/CPU0:router(config)# interface-taps 2gig
RP/0/RSP0/CPU0:router(config)# commit
```

police rate

To configure traffic policing and enter policy map police configuration mode, use the **police rate** command in policy map class configuration mode. To remove traffic policing from the configuration, use the **no** form of this command.

police rate {*value* [*units*] | **percent** *percentage* | **per-thousand** *value* | **per-million** *value*} [**burst** *burst-size* [*burst-units*]] [**peak-rate** {*value* [*units*] | **percent** *percentage*}] [**peak-burst** *peak-burst* [*burst-units*]]

no police rate {*value* [*units*] | **percent** *percentage* | **per-thousand** *value* | **per-million** *value*} [**burst** *burst-size* [*burst-units*]] [**peak-rate** {*value* [*units*] | **percent** *percentage*}] [**peak-burst** *peak-burst* [*burst-units*]]

Syntax Description

value	Committed information rate (CIR). Range is from 1 to 4294967295.
units	(Optional) Unit of measurement for the CIR. Values can be: • **bps** —bits per second (default) • **gbps** —gigabits per second • **kbps** —kilobits per second • **mbps** —megabits per second • **pps** —packets per second **Note** QOS offload on satellite feature does not support **pps** unit.
percent *percentage*	Specifies the police rate as a percentage of the CIR. Range is from 1 to 100. See the Usage Guidelines for information on how to use this keyword.
per-thousand *value*	Specifies the committed information rate in per thousand of the link bandwidth.
per-million *value*	Specifies the committed information rate in per million of the link bandwidth.
burst *burst-size*	(Optional) Specifies the burst size (in the specified *burst-units*). Range is from 1 to 4294967295.
burst-units	(Optional) Unit of measurement for the burst values. Values can be: • **bytes** —bytes (default) • **gbytes** —gigabytes • **kbytes** —kilobytes • **mbytes** —megabytes • **ms** —milliseconds • **us** —microseconds • **packets** —packets
peak-rate *value*	(Optional) Specifies the Peak Information Rate (PIR) in the specified *units*. Range is from 1 to 4294967295.
peak-burst *peak-burst*	(Optional) Specifies the peak burst size in the specified *burst-units*. The range is from 1 to 4294967295.

Command Default   No restrictions on the flow of data are applied to any interface.

Command Modes   Policy map class configuration

Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 4.0.1	The **pps** and **packets** keywords were added.

Usage Guidelines   The **police rate** can set the DSCP, the precedence, or the discard class for IP packets, and experimental and discard-class values for MPLS packets.

Policing can be applied in both ingress and egress directions.

The parameters set by the action keywords are rounded by the hardware. To check the actual values programmed in the hardware use the **show qos interface** command.

For **police rate** commands, interpret the **percent** keyword in this way:

- For a one-level policy, the **percent** keyword specifies the CIR as a percentage of the link rate. For example, the command **police rate percent 35** configures the CIR as 35% of the link rate.

- For a two-level policy, in the parent policy, the **percent** keyword specifies the parent CIR as a percentage of the link rate. In the child policy, the percent keyword specifies the child CIR as a percentage of the maximum policing or shaping rate of the parent. If traffic policing or shaping is not configured on the parent, the parent inherits the interface policing or shaping rate.

Hierarchical policing is also supported. In such a configuration, both parent and child policies have class-maps containing policing statements, as in this example:

```
!
policy-map child
 class gold
  police rate percent 50
  conform-action set precedence immediate
  exceed-action drop
 !
!
policy-map parent
 class match_all
  police rate 10000 kbps burst 15000
  exceed-action drop
  service-policy child
 !
```

The router supports hierarchical ingress policing, which consists of a two-level hierarchical policy-map. The two levels are:

- Parent level: Consists of a class-default or match-vlan class (in nCmD model) only and has policing with only transmit/drop actions.
- Child level: Consists of a flat policy that can be configured with any action other than the queuing action. This level does not contain configurations that require a continuous bit support.

You can police the ingress interface while applying different classification submodels on the ingress interfaces. The order of the actions within the hierarchical policy-map is from child to parent as specified by the Modular Quality of Service command-line interface (MQC). This is with the exception of the queuing action (shape),

which is executed after any police/set actions. If a police action is configured in a child policy, the child police action is executed before the parent police action.

The police action is invoked with only transmit/drop actions under the conform-action and exceed-action options specified for class-default traffic.

This example explains a hierarchical policer configuration:

```
!
policy-map parent
 class class-default

service-policy child
  police rate percent 50
  conform-action transmit
  exceed-action drop
 !
```

Note If you use conform-action drop in the class default of the input qos policy, then it can lead to dropping of DHCP packets. Therefore, there should be a separate class for DHCP packets. You can use the following ACL configuration in the class-map:

```
ipv4 access-list test-ipv4
10 permit udp any host 255.255.255.255 eq bootps
 !
```

Note Configured values take into account the Layer 2 encapsulation applied to traffic. This applies to both ingress and egress policing. For Ethernet transmission, the encapsulation is considered to be 14 bytes, whereas for IEEE 802.1Q, the encapsulation is 18 bytes.

The policer uses an incremental step size of 64 kbps. The configured value is rounded down to the nearest 64 kbps. The value shown in the output of the running-configuration shows the configured value as entered by the user.

If the burst value is not configured, it is automatically set to 100 msec-worth of the CIR value. For example, if a CIR value of 1,000,000 kbps is entered, the burst value is calculated to be 12,500,000 bytes. The maximum burst value supported depends on the line card (LC) on which the QoS policy is applied:

- For ASR 9000 Enhanced Ethernet Line Card, the maximum allowed burst value is 4294967295.

- For A9K-SIP-700 Line Card, the maximum allowed burst value is 4294967295.

- For ASR 9000 Ethernet Line Card, the maximum supported burst value is dependent on the Policer rate and is calculated by the formula:

  Maximum supported burst value = ((16 * Policer rate in Bytes Per Second) * 67108864) / (250 * 1000000))

  However, if no Policer rate is specified, the maximum supported burst value is taken as 2147483647.

When you define policers, for optimum performance use these formulas to calculate the burst values:

Committed Burst (Bc) = CIR bps * (1 byte / 8 bits) * 1.5 seconds

Excess Burst (Be) =2 * Bc

For example, if CIR = 2,000,000 bps, the calculated burst value is 2,000,000 * (1/8) * 1.5 = 375,000 bytes.

For more information, see the "Committed Bursts and Excess Bursts" section in the *Modular QoS Configuration Guide for Cisco ASR 9000 Series Routers*.

> **Note**
> • Set the peak-burst value according to the formula peak-burst = 2 * burst.
> • A police rate minimum of 8 pps and a granularity of 8 pps is supported.

Task ID

Task ID	Operations
qos	read, write

In this example for MPLS, traffic policing is configured with the average rate at 250 kbps, and the normal burst size at 50 bytes for all packets leaving GigabitEthernet interface 0/1/0/9:

```
RP/0/RSP0/CPU0:router(config)# class-map class1
RP/0/RSP0/CPU0:router(config-cmap)# match mpls experimental topmost 0
RP/0/RSP0/CPU0:router(config-cmap)# exit

RP/0/RSP0/CPU0:router(config)# policy-map policy1
RP/0/RSP0/CPU0:router(config-pmap)# class class1
RP/0/RSP0/CPU0:router(config-pmap-c)# police rate 250 kbps burst 50
RP/0/RSP0/CPU0:router(config-pmap-c-police)#conform-action set mpls experimental topmost 4
RP/0/RSP0/CPU0:router(config-pmap-c)# exit
RP/0/RSP0/CPU0:router(config-pmap)# exit

RP/0/RSP0/CPU0:router(config)# interface gigabitethernet 0/1/0/9
RP/0/RSP0/CPU0:router(config-if) service-policy input policy1
```

In this example, traffic policing is configured with an average rate of 200 pps, and a normal burst size of 50 packets, for all packets in class-map class1, leaving GigabitEthernet interface 0/1/0/9:

```
RP/0/RSP0/CPU0:router(config)# policy-map pps-1r2c
RP/0/RSP0/CPU0:router(config-pmap)# class class1
RP/0/RSP0/CPU0:router(config-pmap-c)# police rate 200 pps burst 50 packets
RP/0/RSP0/CPU0:router(config-pmap-c)# exit
RP/0/RSP0/CPU0:router(config-pmap)# exit

RP/0/RSP0/CPU0:router(config)# interface gigabitethernet 0/1/0/9
RP/0/RSP0/CPU0:router(config-if) service-policy output policy1
```

Related Commands

Command	Description
child-conform-aware	Prevents the parent policer from dropping any ingress traffic that conforms to the maximum rate specified in the child policer.
policy-map, on page 25	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.

Command	Description
show policy-map interface, on page 53	Displays policy configuration information for all classes configured for all service policies on the specified interface.

police bucket

To configure traffic policing and share policer bucket, use the **police bucket shared** command in policy map class configuration mode. To refer policer bucket, use the **police bucket referred** command in policy map class configuration mode.

police bucket {**referred** *policer-instance-name* | **shared** *policer-instance-name* **rate** {*value* [*units*] | **percent** *percentage* | **per-thousand** *value* | **per-million** *value*} [**burst** *burst-size* [*burst-units*]] [**peak-rate** {*value* [*units*] | **percent** *percentage*}] [**peak-burst** *peak-burst* [*burst-units*]]}

Syntax Description		
referred		Specifies referred policer bucket.
shared		Defines and shares policer bucket.
policer instance name		Specifies shared or referred policer bucket instance name. The maximum length for *policer instance name* is 64 characters.
rate		Specifies police rate.
value		Committed information rate (CIR). Range is from 1 to 4294967295.
units		(Optional) Unit of measurement for the CIR. Values can be: • **bps** —bits per second (default) • **gbps** —gigabits per second • **kbps** —kilobits per second • **mbps** —megabits per second • **pps** —packets per second
percent *percentage*		Specifies the police rate as a percentage of the CIR. Range is from 1 to 100. See the Usage Guidelines for information on how to use this keyword.
per-thousand *value*		Specifies the committed information rate in for every thousand of the link bandwidth.
per-million *value*		Specifies the committed information rate in for every million of the link bandwidth.
burst *burst-size*		(Optional) Specifies the burst size (in the specified *burst-units*). Range is from 1 to 4294967295.

burst-units	(Optional) Unit of measurement for the burst values. Values can be: • **bytes** —bytes (default) • **gbytes** —gigabytes • **kbytes** —kilobytes • **mbytes** —megabytes • **ms** —milliseconds • **us** —microseconds • **packets** —packets
peak-rate *value*	(Optional) Specifies the Peak Information Rate (PIR) in the specified *units*. Range is from 1 to 4294967295.
peak-burst *peak-burst*	(Optional) Specifies the peak burst size in the specified *burst-units*. The range is from 1 to 4294967295.

Command Default   None.

Command Modes   Policy map configuration.

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

✎

Note   The policer actions (conform, exceed and violet) under shared and referred policers may be different for different classes that share and refer a policer.

The parameters set by the action keywords are rounded by the hardware. To check the actual values programmed in the hardware use the **show qos interface** command.

For **police bucket** commands, interpret the **percent** keyword in this way:

- For a one-level policy, the **percent** keyword specifies the CIR as a percentage of the link rate. For example, the command **police rate percent 35** configures the CIR as 35% of the link rate.

- For a two-level policy, in the parent policy, the **percent** keyword specifies the parent CIR as a percentage of the link rate. In the child policy, the percent keyword specifies the child CIR as a percentage of the maximum policing or shaping rate of the parent. If traffic policing or shaping is not configured on the parent, the parent inherits the interface policing or shaping rate.

✎

Note Configured values take into account the Layer 2 encapsulation applied to traffic. This applies to both ingress and egress policing. For Ethernet transmission, the encapsulation is considered to be 14 bytes, whereas for IEEE 802.1Q, the encapsulation is 18 bytes.

The policer uses an incremental step size of 64 kbps. The configured value is rounded down to the nearest 64 kbps. The value shown in the output of the running-configuration shows the configured value as entered by the user.

If the burst value is not configured, it is automatically set to 100 msec-worth of the CIR value. For example, if a CIR value of 1,000,000 kbps is entered, the burst value is calculated to be 12,500,000 bytes. The maximum burst value supported depends on the line card (LC) on which the QoS policy is applied:

- For ASR 9000 Enhanced Ethernet Line Card, the maximum allowed burst value is 4294967295.

- For A9K-SIP-700 Line Card, the maximum allowed burst value is 4294967295.

- For ASR 9000 Ethernet Line Card, the maximum supported burst value is dependent on the Policer rate and is calculated by the formula:

  Maximum supported burst value = ((16 * Policer rate in Bytes Per Second) * 67108864) / (250 * 1000000))

  However, if no Policer rate is specified, the maximum supported burst value is taken as 2147483647.

When you define policers, for optimum performance use these formulas to calculate the burst values:

Committed Burst (Bc) = CIR bps * (1 byte / 8 bits) * 1.5 seconds

Excess Burst (Be) =2 * Bc

For example, if CIR = 2,000,000 bps, the calculated burst value is 2,000,000 * (1/8) * 1.5 = 375,000 bytes.

✎

Note
- Set the peak-burst value according to the formula peak-burst = 2 * burst.
- A police rate minimum of 8 pps and a granularity of 8 pps is supported.

Task ID

Task ID	Operation
qos	read, write

In this example for dual ingress traffic, traffic policing is configured with the average rate at 2 Mbps, and the policer bucket to police traffic at rate 1Mbps is shared:

```
RP/0/RSP0/CPU0:router#(config-pmap-c) policy-map parent
  RP/0/RSP0/CPU0:router#(config-pmap-c) class voip
    RP/0/RSP0/CPU0:router#(config-pmap-c) police rate 2 mbps
    RP/0/RSP0/CPU0:router#(config-pmap-c) priority level 1
    RP/0/RSP0/CPU0:router#(config-pmap-c) service-policy voip-child
 RP/0/RSP0/CPU0:router#(config-pmap-c) class long-distance
    RP/0/RSP0/CPU0:router#(config-pmap-c) police bucket shared sp1 rate 1 mbps
RP/0/RSP0/CPU0:router#(config-pmap-c) end policy-map
```

In this example for dual ingress traffic, policer bucket is referred to police traffic at rate 1Mbps:

```
RP/0/RSP0/CPU0:router#(config-pmap-c) policy-map voip-child
  RP/0/RSP0/CPU0:router#(config-pmap-c) class long-distance-voip
    RP/0/RSP0/CPU0:router#(config-pmap-c) police bucket referred sp1
    RP/0/RSP0/CPU0:router#(config-pmap-c) class class-default
    RP/0/RSP0/CPU0:router#(config-pmap-c) end policy-map
```

policy-map

To create or modify a policy map that can be attached to one or more interfaces to specify a service policy, use the **policy-map** command in Global Configuration mode mode. To delete a policy map, use the **no** form of this command.

policy-map [**type qos**] *policy-name*
no policy-map [**type qos**] *policy-name*
policy-map [**type pbr**] *policy-name*
no policy-map [**type pbr**] *policy-name*

Syntax Description	**type qos**	(Optional) Specifies type of the service policy.
	qos	(Optional) Specifies a quality-of-service (QoS) policy map.
	pbr	(Optional) Specifies a policy-based routing (PBR) policy map.
	policy-name	Name of the policy map.

Command Default

A policy map does not exist until one is configured. Because a policy map is applied to an interface, no restrictions on the flow of data are applied to any interface until a policy map is created.

Type is QoS when not specified.

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 5.2.0	The **pbr** keyword was added.

Usage Guidelines

Use the **policy-map** command to specify the name of the policy map to be created, added to, or modified before you can configure policies for classes whose match criteria are defined in a class map. Entering the **policy-map** command enables policy map configuration mode in which you can configure or modify the class policies for that policy map.

You can configure class policies in a policy map only if the classes have match criteria defined for them. Use the **class-map** and **match** commands to configure the match criteria for a class. You can configure a maximum of 1024 classes in one policy map, no policy map can contain more than 1024 class policies. The maximum number of 1024 classes per policy includes the implicit default class and its child policies.

When using Policy-Based Routing (PBR) in a policy map, you can easily guide certain traffic to different paths instead of its usual route.

A single policy map can be attached to multiple interfaces concurrently.

The maximum number of policy maps supported is 2000.

Note When a policy map is applied on a physical port, all subinterfaces under the same physical port inherit the same policy.

Task ID

Task ID	Operations
qos	read, write

Examples

These examples show how to create a policy map called policy1 and configures two class policies included in that policy map. The policy map is defined to contain policy specification for class1 and the default class (called class-default) to which packets that do not satisfy configured match criteria are directed. Class1 specifies policy for traffic that matches access control list 136.

```
RP/0/RSP0/CPU0:router(config)# class-map class1
RP/0/RSP0/CPU0:router(config-cmap)# match access-group ipv4 136

RP/0/RSP0/CPU0:router(config)# policy-map policy1
RP/0/RSP0/CPU0:router(config-pmap)# class class1

RP/0/RSP0/CPU0:router(config-pmap-c)# police cir 250
RP/0/RSP0/CPU0:router(config-pmap-c)# set precedence 3
RP/0/RSP0/CPU0:router(config-pmap-c)# exit

RP/0/RSP0/CPU0:router(config-pmap)# class class-default
RP/0/RSP0/CPU0:router(config-pmap-c)# queue-limit bytes 1000000
```

priority (QoS)

To assign priority to a traffic class based on the amount of available bandwidth within a traffic policy, use the **priority** command in policy map class configuration mode. To remove a previously specified priority for a class, use the **no** form of this command.

priority [**level** *priority-level*]
no priority

Syntax Description	**level** *priority-level*	(Optional) Sets multiple levels of priority to a traffic class. Values are 1, 2, 3, 4, 5, 6 and 7. Default level is 1. Level 1 traffic has higher priority.

Command Default   No default action.

Command Modes   Policy map class configuration

Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 5.0.0	This command was introduced.
Release 5.3.2	Priority levels 4, 5, 6 and 7 are added.

Usage Guidelines   The **priority** command configures low-latency queueing (LLQ), providing strict priority queueing (PQ). Strict PQ allows delay-sensitive data such as voice to be dequeued and sent before packets in other queues are dequeued. When a class is marked as high priority using the **priority** command, we recommend that you configure a policer to limit the priority traffic. This policer ensures that the priority traffic does not starve all other traffic on the line card, which protects low-priority traffic from starvation. Use the **police rate** to explicitly configure the policer.

The **priority** command sets up classes based on a variety of criteria (not just User Datagram Protocol [UDP] ports) and assigns a priority to them.

The **bandwidth** and **priority** commands cannot be used in the same class, within the same policy map. These commands can be used together in the same policy map .

Within a policy map, you can give one or more classes priority status. When multiple classes within a single policy map are configured as priority classes, all traffic from these classes is queued to the same, single, priority queue.

Fabric QoS is configured using the **priority** command in the ingress service policy.

Task ID

Task ID	Operations
qos	read, write

Examples

This example shows how to configure priority queuing for the policy map named policy1:

```
RP/0/RSP0/CPU0:router(config)# policy-map policy1
RP/0/RSP0/CPU0:router(config-pmap)# class class1
RP/0/RSP0/CPU0:router(config-pmap-c)# priority level 2
```

Related Commands

Command	Description
bandwidth (QoS)	Specifies the minimum bandwidth allocated to a class belonging to a policy map.
policy-map, on page 25	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.
show policy-map interface, on page 53	Displays policy configuration information for all classes configured for all service policies on the specified interface.

random-detect ecn

To enable ECN-based (Explicit Congestion Notification) WRED, use the **random-detect ecn** command in policy-map configuration mode. To remove WRED, use the **no** form of the command.

random-detect ecn
norandom-detect ecn

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or value.

Command Modes

Policy-map configuration mode.

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

ECN-based WRED can be enabled only on ASR9000 SIP-700 linecards.

Task ID

Task ID	Operation
qos	read, write

Example

This example shows how to use the **random-detect ecn**command:

```
RP/0/RSP0/CPU0:router(config-pmap-c)#random-detect ecn
```

show qos interface

To display QoS information for a specific interface, use the **show qos interface** command in the EXEC mode.

show qos interface *type interface-path-id* {**input**|**output**} {**member** *type interface-path-id*}[**host-link** *interface-path-id*| **location** *node-id*]

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.

interface-path-id	Either a physical interface instance or a virtual interface instance as follows:
	
	 • Physical interface instance. Naming notation is *rack/slot/module/port* and a slash between values is required as part of the notation.
	
	     • *rack* : Chassis number of the rack.
	
	     • *slot* : Physical slot number of the modular services card or line card.
	
	     • *module* : Module number. A physical layer interface module (PLIM) is always 0.
	
	     • *port* : Physical port number of the interface.
	
	 Note
	 In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RSP0 RP0 or RP1) and the module is CPU0. Example: interface MgmtEth0/ RSP0 RP1 /CPU0/0.
	
	 • Virtual interface instance. Number range varies depending on interface type.
	
	 For more information about the syntax for the router, use the question mark (?) online help function.

input	Attaches the specified policy map to the input interface.
output	Attaches the specified policy map to the output interface.
member	Specifies member of bundle interface or pin-down (generic list) interface of PWHE interface. **Note** This keyword is applicable only for bundle and PWHE interface.

host-link	(Optional) Specifies the host-link.
	Note
	This keyword is applicable only for satellite information.
location *node-id*	(Optional) Displays detailed QoS information for the designated node. The *node-id* argument is entered in the rack/slot/module notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 4.3.0	The command was supported in dynamic template configuration mode in BNG.
Release 5.1.1	The **show qos interface** command output was updated to display Flow Aware call admission control (CAC) and user based rate limiting (UBRL) information.
	The **show qos interface** command output was updated to display QoS Offload on satellite information.
	PWHE interface type **PW-Ether** and **PW-IW** were added.
	The show output was updated for PWHE interface details.

Usage Guidelines

The **show qos interface** command displays configuration for all classes in the service policy that is attached to an interface.

Use this command to check the actual values programmed in the hardware from the action keywords in the **police rate** command.

(Only BNG) To enter the dynamic template configuration mode, run **dynamic-template** command in the Global Configuration mode.

Task ID

Task ID	Operations
qos	read

Examples

This is the sample output which shows the QoS information on a Ten Gigabit Ethernet interface, applicable for the releases 5.3.2 onwards:

```
RP/0/RSP0/CPU0:tardis1-pwhe-spe#show qos interface tenGigE 0/0/0/0/0 output
Interface: TenGigE0_0_0_0_0 output
Bandwidth configured: 10000000 kbps Bandwidth programed: 10000000 kbps
ANCP user configured: 0 kbps ANCP programed in HW: 0 kbps
Port Shaper programed in HW: 0 kbps
Policy: EGRESS_CHILD_POLICY Total number of classes: 8
-----------------------------------------------------------------------
```

```
Level: 0 Policy: EGRESS_CHILD_POLICY Class: cp1
QueueID: 525248 (Priority 1)
Queue Limit: 126976 kbytes Abs-Index: 179 Template: 0 Curve: 7
Shape CIR Profile: INVALID
-------------------------------------------------------------------
Level: 0 Policy: EGRESS_CHILD_POLICY Class: cp2
QueueID: 525249 (Priority 2)
Queue Limit: 13824 kbytes (54443 packets) Abs-Index: 129 Template: 0 Curve: 6
Shape CIR Profile: INVALID
-------------------------------------------------------------------
Level: 0 Policy: EGRESS_CHILD_POLICY Class: cp3
QueueID: 525251 (Priority 3)
Queue Limit: 13824 kbytes (54443 packets) Abs-Index: 129 Template: 0 Curve: 5
Shape CIR Profile: INVALID
-------------------------------------------------------------------
Level: 0 Policy: EGRESS_CHILD_POLICY Class: cp4
QueueID: 525252 (Priority 4)
Queue Limit: 13824 kbytes (54443 packets) Abs-Index: 129 Template: 0 Curve: 0
Shape CIR Profile: INVALID
-------------------------------------------------------------------
Level: 0 Policy: EGRESS_CHILD_POLICY Class: cp5
QueueID: 525253 (Priority 5)
Queue Limit: 13824 kbytes (54443 packets) Abs-Index: 129 Template: 0 Curve: 0
Shape CIR Profile: INVALID
-------------------------------------------------------------------
Level: 0 Policy: EGRESS_CHILD_POLICY Class: cp6
QueueID: 525254 (Priority 6)
Queue Limit: 13824 kbytes (54443 packets) Abs-Index: 129 Template: 0 Curve: 0
Shape CIR Profile: INVALID
-------------------------------------------------------------------
Level: 0 Policy: EGRESS_CHILD_POLICY Class: cp7
QueueID: 525255 (Priority 7)
Queue Limit: 13824 kbytes (54443 packets) Abs-Index: 129 Template: 0 Curve: 0
Shape CIR Profile: INVALID
-------------------------------------------------------------------
Level: 0 Policy: EGRESS_CHILD_POLICY Class: class-default
QueueID: 525250 (Priority Normal)
Queue Limit: 13824 kbytes (54443 packets) Abs-Index: 129 Template: 0 Curve: 0
Shape CIR Profile: INVALID
WFQ Profile: 0/206 Committed Weight: 906 Excess Weight: 906
Bandwidth: 0 kbps, BW sum for Level 0: 0 kbps, Excess Ratio: 900
```

This is the sample output shows the QoS information on a GigabitEthernet interface:

```
RP/0/RSP0/CPU0:router# show qos interface gig0/0/0/11.1 output

Wed Mar 18 18:25:20.140 UTC
Interface: GigabitEthernet0_0_0_11.1 output Bandwidth: 1000000 kbps ANCP: 999936 kbps
Policy: parent-3play-subscriber-line Total number of classes: 5
-------------------------------------------------------------------
Level: 0 Policy: parent-3play-subscriber-line Class: class-default
QueueID: N/A
Shape Profile: 1 CIR: 200000 kbps (200 mbps)
CBS: 100352 bytes PIR: 999936 kbps PBS: 12517376 bytes
WFQ Profile: 1 Committed Weight: 51 Excess Weight: 100
Bandwidth: 200000 kbps, BW sum for Level 0: 1000000 kbps, Excess Ratio: 100
-------------------------------------------------------------------
Level: 1 Policy: child-3play Class: 3play-voip
Parent Policy: parent-3play-subscriber-line Class: class-default
QueueID: 136 (Priority 1)
Queue Limit: 16 kbytes Profile: 3 Scale Profile: 0
Policer Profile: 0 (Single)
Conform: 65 kbps (65 kbps) Burst: 1598 bytes (0 Default)
Child Policer Conform: TX
Child Policer Exceed: DROP
```

```
Child Policer Violate: DROP
-----------------------------------------------------------------------
Level: 1 Policy: child-3play Class: 3play-video
Parent Policy: parent-3play-subscriber-line Class: class-default
QueueID: 137 (Priority 2)
Queue Limit: 8 kbytes (11 Unknown) Profile: 4 Scale Profile: 0
Policer Profile: 24 (Single)
Conform: 128 kbps (128 kbps) Burst: 1598 bytes (0 Default)
Child Policer Conform: TX
Child Policer Exceed: DROP
Child Policer Violate: DROP
WRED Type: COS based Table: 0 Profile: 4 Scale Profile: 0 Curves: 3
Default RED Curve Thresholds Min : 8 kbytes Max: 8 kbytes
WRED Curve: 1 Thresholds Min : 8 kbytes Max: 8 kbytes
 Match: 3
WRED Curve: 2 Thresholds Min : 8 kbytes Max: 8 kbytes
 Match: 4
-----------------------------------------------------------------------
Level: 1 Policy: child-3play Class: 3play-premium
Parent Policy: parent-3play-subscriber-line Class: class-default
QueueID: 138 (Priority Normal)
Queue Limit: 2097 kbytes Profile: 2 Scale Profile: 0
WFQ Profile: 6 Committed Weight: 1020 Excess Weight: 1020
Bandwidth: 200000 kbps, BW sum for Level 1: 200000 kbps, Excess Ratio: 1
-----------------------------------------------------------------------
Level: 1 Policy: child-3play Class: class-default
Parent Policy: parent-3play-subscriber-line Class: class-default
QueueID: 139 (Priority Normal)
Queue Limit: 65 kbytes Profile: 1 Scale Profile: 3
WFQ Profile: 0 Committed Weight: 1 Excess Weight: 1020
Bandwidth: 0 kbps, BW sum for Level 1: 200000 kbps, Excess Ratio: 1
-----------------------------------------------------------------------
```

This example shows the L2VPN QoS information on TenGigE 0/4/0/0/7 interface:

```
RP/0/RSP0/CPU0:router# show qos interface TenGigE 0/4/0/0/7 output
Thu Sep  5 10:02:14.217 UTC
NOTE:- Configured values are displayed within parentheses
Interface TenGigE0/4/0/0/7 ifh 0x2000048  -- output policy
NPU Id:        0
Total number of classes:       8
Interface Bandwidth:           10000000 kbps
Accounting Type:               Layer2 (Include Layer 2 encapsulation and above)
----------------------------------------------
Level1 Class                       =   prec-1
Schedule entry ID                  =   0x32 (0x10001)
Egressq Queue ID                   =   50 (LP queue)
Queue Max. BW.                     =   100000 kbps (1 %)
Queue Min. BW.                     =   0 kbps (default)
Weight                             =   25 (BWR not configured)
Guaranteed service rate            =   100000 kbps
TailDrop Threshold                 =   1250000 bytes / 100 ms (default)
Policer not configured for this class
WRED not configured for this class

Level1 Class (HP2)                 =   prec-2
Schedule entry ID                  =   0x33 (0x10002)
Egressq Queue ID                   =   51 (HP2 queue)
Guaranteed service rate            =   10000000 kbps
TailDrop Threshold                 =   12500000 bytes / 10 ms (default)

Policer Bucket Id                  =   0x9000100095103
Policer committed rate             =   99968 kbps (1 %)
```

```
Policer conform burst              =    124928 bytes (default)
Policer conform action             =    Just TX
Policer exceed action              =    DROP PKT
WRED not configured for this class

Level1 Class                       =    prec-3
Schedule entry ID                  =    0x36 (0x10003)
Egressq Queue ID                   =    54 (LP queue)
Queue Max. BW.                     =    100000 kbps (1 %)
Queue Min. BW.                     =    100000 kbps (1 %)
Weight                             =    25 (BWR not configured)
Guaranteed service rate            =    100000 kbps
TailDrop Threshold                 =    13750 bytes / 1 ms (1100 us)
Policer not configured for this class
WRED not configured for this class

Level1 Class                       =    prec-5
Schedule entry ID                  =    0x37 (0x10004)
Egressq Queue ID                   =    55 (LP queue)
Queue Max. BW.                     =    100000 kbps (1 %)
Queue Min. BW.                     =    0 kbps (default)
Weight                             =    25 (BWR not configured)
Guaranteed service rate            =    100000 kbps
TailDrop Threshold                 =    1250000 bytes / 100 ms (default)
Policer not configured for this class

WRED table handle                  =    0x0

RED profile
WRED Min. Threshold                =    249856 bytes (20 ms)
WRED Max. Threshold                =    374784 bytes (30 ms)
WRED First Segment                 =    1334
WRED Segment Size                  =    11

Level1 Class (HP1)                 =    prec-6
Schedule entry ID                  =    0x3a (0x10005)
Egressq Queue ID                   =    58 (HP1 queue)
Guaranteed service rate            =    10000000 kbps
TailDrop Threshold                 =    12500000 bytes / 10 ms (default)

Policer Bucket Id                  =    0x90001000a5103
Policer committed rate             =    99968 kbps (1 %)
Policer conform burst              =    124928 bytes (default)
Policer conform action             =    Just TX
Policer exceed action              =    DROP PKT
WRED not configured for this class

Level1 Class (HP1)                 =    prec-7
Schedule entry ID                  =    0x3b (0x10006)
Egressq Queue ID                   =    59 (HP1 queue)
Guaranteed service rate            =    10000000 kbps
TailDrop Threshold                 =    12500000 bytes / 10 ms (default)

Policer Bucket Id                  =    0x90001000b5103
Policer committed rate             =    99968 kbps (1 %)
Policer conform burst              =    124928 bytes (default)
Policer conform action             =    Just TX
Policer exceed action              =    DROP PKT
WRED not configured for this class

Level1 Class                       =    prec-0
Egressq Queue ID                   =    62 (Default LP queue)

Policer Bucket Id                  =    0x90001000c5103
```

```
Policer committed rate                 =    99968 kbps (1 %)
Policer conform burst                  =    1245184 bytes (default)
Policer conform action                 =    Just TX
Policer exceed action                  =    DROP PKT
WRED not configured for this class

Level1 Class                           =    class-default
Schedule entry ID                      =    0x3e (0x10008)
Egressq Queue ID                       =    62 (Default LP queue)
Queue Max. BW.                         =    100000 kbps (1 %)
Queue Min. BW.                         =    0 kbps (default)
Weight                                 =    25 (BWR not configured)
Guaranteed service rate                =    100000 kbps
TailDrop Threshold                     =    1250000 bytes / 100 ms (default)
Policer not configured for this class
WRED not configured for this class
```

Use the **host-link** option to display the output for the desired Bundle ICL. In cases when the Satellite is hosted on a redundant (Bundle ICL), the qos command to check for the qos programming also needs to include the host-link option.

The host-link is the underlying ICL Bundle member, this output can be executed for all the members belonging to the ICL Bundle via the host-link option.

For eg, Bundle ICL, Bundle-ether 2, hosting the sat-ether interface gig 100/0/0/34 has a member tengige 0/3/0/7. The qos command to check for the qos programming would be:

```
RP/0/RSP0/CPU0:router # sh qos inter gigabitEthernet 100/0/0/34 output host-link tenGigE
0/3/0/7 location 0/3/CPU0

Interface: GigabitEthernet100_0_0_34 output
Bandwidth configured: 500000 kbps Bandwidth programed: 500000 kbps
ANCP user configured: 0 kbps ANCP programed in HW: 0 kbps
Port Shaper programed in HW: 500000 kbps
Policy: grand Total number of classes: 10
----------------------------------------------------------------------
Level: 0 Policy: grand Class: class-default
QueueID: N/A
Shape CIR : ALL
Shape PIR Profile : 2/4(S) Scale: 488 PIR: 499712 kbps  PBS: 6246400 bytes
WFQ Profile: 2/9 Committed Weight: 10 Excess Weight: 10
Bandwidth: 0 kbps, BW sum for Level 0: 0 kbps, Excess Ratio: 1
----------------------------------------------------------------------
Level: 1 Policy: parent Class: class-default
Parent Policy: grand Class: class-default
QueueID: N/A
Shape CIR : NONE
Shape PIR Profile : 2/4(S) Scale: 244 PIR: 249856 kbps  PBS: 3123200 bytes
WFQ Profile: 2/9 Committed Weight: 10 Excess Weight: 10
Bandwidth: 0 kbps, BW sum for Level 1: 0 kbps, Excess Ratio: 1
----------------------------------------------------------------------
Level: 2 Policy: child Class: prec1
Parent Policy: parent Class: class-default
QueueID: 131264 (Priority 1)
Queue Limit: 2496 kbytes Abs-Index: 89 Template: 0 Curve: 6
Shape CIR Profile: INVALID
Policer Profile: 54 (Single)
Conform: 50000 kbps (20 percent) Burst: 625000 bytes (0 Default)
Child Policer Conform: set dscp 46  set cos 7
Child Policer Exceed: DROP
Child Policer Violate: DROP
----------------------------------------------------------------------
Level: 2 Policy: child Class: prec2
```

```
Parent Policy: parent Class: class-default
QueueID: 131265 (Priority 2)
Queue Limit: 624 kbytes (100 ms) Abs-Index: 59 Template: 0 Curve: 6
Shape CIR Profile: INVALID
Shape PIR Profile : 2/0(E) PIR: 50000 kbps PBS: 624992 bytes
Child Mark: set dscp 46  set cos 7
------------------------------------------------------------------------
Level: 2 Policy: child Class: prec3
Parent Policy: parent Class: class-default
QueueID: 131267 (Priority 3)
Queue Limit: 472 kbytes (100 ms) Abs-Index: 53 Template: 0 Curve: 6
Shape CIR Profile: INVALID
Shape PIR Profile : 2/1(E) PIR: 37496 kbps PBS: 468736 bytes
Child Mark: set dscp 46  set cos 7
------------------------------------------------------------------------
Level: 2 Policy: child Class: prec4
Parent Policy: parent Class: class-default
QueueID: 131266 (Priority Normal)
Queue Limit: 60 kbytes Abs-Index: 18 Template: 0 Curve: 0
Shape CIR Profile: INVALID
Child Mark: set dscp 46  set cos 7
WFQ Profile: 2/39 Committed Weight: 40 Excess Weight: 40
Bandwidth: 0 kbps, BW sum for Level 2: 0 kbps, Excess Ratio: 4
------------------------------------------------------------------------
Level: 2 Policy: child Class: prec5
Parent Policy: parent Class: class-default
QueueID: 131268 (Priority Normal)
Queue Limit: 44 kbytes Abs-Index: 15 Template: 0 Curve: 0
Shape CIR Profile: INVALID
WFQ Profile: 2/29 Committed Weight: 30 Excess Weight: 30
Bandwidth: 0 kbps, BW sum for Level 2: 0 kbps, Excess Ratio: 3
------------------------------------------------------------------------
Level: 2 Policy: child Class: prec6
Parent Policy: parent Class: class-default
QueueID: 131269 (Priority Normal)
Queue Limit: 28 kbytes Abs-Index: 11 Template: 0 Curve: 0
Shape CIR Profile: INVALID
WFQ Profile: 2/19 Committed Weight: 20 Excess Weight: 20
Bandwidth: 0 kbps, BW sum for Level 2: 0 kbps, Excess Ratio: 2
------------------------------------------------------------------------
Level: 2 Policy: child Class: prec7
Parent Policy: parent Class: class-default
QueueID: 131270 (Priority Normal)
Queue Limit: 16 kbytes Abs-Index: 8 Template: 0 Curve: 0
Shape CIR Profile: INVALID
Child Mark: set cos 5
WFQ Profile: 2/9 Committed Weight: 10 Excess Weight: 10
Bandwidth: 0 kbps, BW sum for Level 2: 0 kbps, Excess Ratio: 1
------------------------------------------------------------------------
Level: 2 Policy: child Class: class-default
Parent Policy: parent Class: class-default
QueueID: 131271 (Priority Normal)
Queue Limit: 16 kbytes Abs-Index: 8 Template: 0 Curve: 0
Shape CIR Profile: INVALID
WFQ Profile: 2/9 Committed Weight: 10 Excess Weight: 10
Bandwidth: 0 kbps, BW sum for Level 2: 0 kbps, Excess Ratio: 1
```

This is the sample output of the **show qos interface** command for CAC:

```
RP/0/RSP0/CPU0:router# show qos interface gigabitEthernet 0/1/0/0 input

Interface: GigabitEthernet0_1_0_0 input
Bandwidth configured: 1000000 kbps Bandwidth programed: 1000000 kbps
ANCP user configured: 0 kbps ANCP programed in HW: 0 kbps
```

```
Port Shaper programed in HW: 0 kbps
Policy: premium_services (Flow Aware Policy) Total number of classes: 5
------------------------------------------------------------------------
Level: 0 Policy: premium_services Class: dscp_cs5
QueueID: 98 (Port Default)
Policer Profile: 56 (Single)
Conform: 100000 kbps (100 mbps) Burst: 1250000 bytes (0 Default)
Child Policer Conform: TX
Child Policer Exceed: DROP
Child Policer Violate: DROP
------------------------------------------------------------------------
Level: 0 Policy: premium_services Class: dscp_cs6
Flow QoS Info: CAC  Cac Action
CAC Flow Mask Mode: 5-Tuple (0x20)
CAC Flow Rate: 128 kbps
CAC Rate: 896 kbps
CAC Max Flow Count: 7
CAC Flow Age: 20 Seconds
QueueID: N/A
------------------------------------------------------------------------
Level: 1 Policy: video_flows Class: video_admitted
Flow QoS Info: CAC Admit Class
CAC Flow Mask Mode: 5-Tuple (0x20)
CAC Max Flow Count: 7
CAC Flow Age: 20 Seconds
CAC Reject Action: Redirect
Number of CAC flows admitted: 0Parent Policy: premium_services Class: dscp_cs6
QueueID: 98 (Port Default)
Child Mark: set disc 1
------------------------------------------------------------------------
Level: 1 Policy: video_flows Class: class-default
Flow QoS Info: CAC Redirect Class
Parent Policy: premium_services Class: dscp_cs6
QueueID: 98 (Port Default)
Child Mark: set dscp 32
------------------------------------------------------------------------
Level: 0 Policy: premium_services Class: class-default
QueueID: 98 (Port Default)
Policer Profile: 54 (Single)
Conform: 30000 kbps (30 mbps) Burst: 375000 bytes (0 Default)
Child Policer Conform: TX
Child Policer Exceed: DROP
Child Policer Violate: DROP
------------------------------------------------------------------------
```

This is the sample output of the **show qos interface** command for UBRL:

```
RP/0/RSP0/CPU0:router# show qos interface gigabitEthernet 0/1/0/0 input

Interface: GigabitEthernet0_1_0_0 input
Bandwidth configured: 1000000 kbps Bandwidth programed: 1000000 kbps
ANCP user configured: 0 kbps ANCP programed in HW: 0 kbps
Port Shaper programed in HW: 0 kbps
Policy: voice_flow (Flow Aware Policy) Total number of classes: 3
------------------------------------------------------------------------
Level: 0 Policy: voice_flow Class: voice_prec6
QueueID: 98 (Port Default)
Policer Profile: 56 (Single)
Conform: 5000 kbps (5 mbps) Burst: 62500 bytes (0 Default)
Child Policer Conform: set dscp 34
Child Policer Exceed: DROP
Child Policer Violate: DROP
------------------------------------------------------------------------
```

```
Level: 0 Policy: voice_flow Class: ubrl1
Flow QoS Info: UBRL
UBRL Flow Mask Mode: src-ip (0x80)
UBRL Flow Age: 200 Seconds
Number of UBRL flows learnt: 0
QueueID: 98 (Port Default)
Flow Policer Profile: 58 (Single)
Conform: 10000 kbps (10 mbps) Burst: 125000 bytes (0 Default)
Catch-all Policer Profile: 57 (Single)
Conform: 100000000 kbps (100000000 kbps) Burst: 12500000 bytes (12500000 bytes)
Child Policer Conform: set dscp 34
Child Policer Exceed: DROP
Child Policer Violate: DROP
-----------------------------------------------------------------------
Level: 0 Policy: voice_flow Class: class-default
QueueID: 98 (Port Default)
Policer Profile: 54 (Single)
Conform: 30000 kbps (30 mbps) Burst: 375000 bytes (0 Default)
Child Policer Conform: TX
Child Policer Exceed: DROP
Child Policer Violate: DROP
-----------------------------------------------------------------------
```

This is the sample output of the **show qos interface** command for PW-HE subinterfaces.

```
RP/0/RSP0/CPU0:router# show qos interface  pw-ether1.1 input member tengige0/2/0/5
Interface: TenGigE0_2_0_5 input
Bandwidth configured: 10000000 kbps Bandwidth programed: 10000000 kbps
ANCP user configured: 0 kbps ANCP programed in HW: 0 kbps
Port Shaper programed in HW: 0 kbps
Policy: PW-HE-Ingress Total number of classes: 9
-----------------------------------------------------------------------
Level: 0 Policy: PW-HE-Ingress Class: class-default
QueueID: N/A
Policer Profile: 55 (Single)
Conform: 2000000 kbps (2 gbps) Burst: 25000000 bytes (0 Default)
-----------------------------------------------------------------------
Level: 1 Policy: DSCP_CE-PE_ETM Class: 3play-voip
Parent Policy: PW-HE-Ingress Class: class-default
QueueID: 160 (Port Priority 1)
Policer Profile: 56 (Single)
Conform: 20000 kbps (1 percent) Burst: 125000 bytes (50 ms)
Child Policer Conform: TX
Child Policer Exceed: DROP
Child Policer Violate: DROP
-----------------------------------------------------------------------
Level: 1 Policy: DSCP_CE-PE_ETM Class: multicast_limit
Parent Policy: PW-HE-Ingress Class: class-default
QueueID: 161 (Port Priority 2)
Policer Profile: 57 (SrTCM)
Conform: 40000 kbps (2 percent) Burst: 128000 bytes (128000 bytes)
Peak Burst: 128000 bytes (256000 bytes)
Child Policer Conform: set prec 5
Child Policer Exceed: set prec 4
Child Policer Violate: set prec 4
-----------------------------------------------------------------------
Level: 1 Policy: DSCP_CE-PE_ETM Class: dscp_EF_ipprec_5
Parent Policy: PW-HE-Ingress Class: class-default
QueueID: 162 (Port Default)
Policer Profile: 58 (Single)
Conform: 100000 kbps (5 percent) Burst: 256000 bytes (256000 bytes)
Child Policer Conform: set exp-imp 5
Child Policer Exceed: DROP
Child Policer Violate: DROP
```

```
-----------------------------------------------------------------------
Level: 1 Policy: DSCP_CE-PE_ETM Class: dscp_AF4x_ipprec_4
Parent Policy: PW-HE-Ingress Class: class-default
QueueID: 162 (Port Default)
Policer Profile: 59 (Single)
Conform: 200000 kbps (10 percent) Burst: 2500000 bytes (100 ms)
Child Policer Conform: set exp-imp 4
Child Policer Exceed: DROP
Child Policer Violate: DROP
-----------------------------------------------------------------------
Level: 1 Policy: DSCP_CE-PE_ETM Class: dscp_AF3x_ipprec_3_6_7
Parent Policy: PW-HE-Ingress Class: class-default
QueueID: 162 (Port Default)
Policer Profile: 60 (Single)
Conform: 400000 kbps (20 percent) Burst: 5000000 bytes (0 Default)
Child Policer Conform: set exp-imp 3
Child Policer Exceed: DROP
Child Policer Violate: DROP
-----------------------------------------------------------------------
Level: 1 Policy: DSCP_CE-PE_ETM Class: dscp_AF2x_ipprec_2
Parent Policy: PW-HE-Ingress Class: class-default
QueueID: 162 (Port Default)
Policer Profile: 61 (Single)
Conform: 440000 kbps (22 percent) Burst: 5500000 bytes (0 Default)
Child Policer Conform: set exp-imp 2
Child Policer Exceed: DROP
Child Policer Violate: DROP
-----------------------------------------------------------------------
Level: 1 Policy: DSCP_CE-PE_ETM Class: ip_best_effort_BE
Parent Policy: PW-HE-Ingress Class: class-default
QueueID: 162 (Port Default)
Policer Profile: 62 (Single)
Conform: 300000 kbps (15 percent) Burst: 3750000 bytes (0 Default)
Child Policer Conform: set exp-imp 0
Child Policer Exceed: DROP
Child Policer Violate: DROP
-----------------------------------------------------------------------
Level: 1 Policy: DSCP_CE-PE_ETM Class: class-default
Parent Policy: PW-HE-Ingress Class: class-default
QueueID: 162 (Port Default)
Policer Profile: 63 (Single)
Conform: 500000 kbps (25 percent) Burst: 6250000 bytes (0 Default)
Child Policer Conform: TX
Child Policer Exceed: DROP
Child Policer Violate: DROP
```

This table describes the significant fields shown in the display.

Table 1: show QoS interface Field Descriptions

Field	Description
Level 0 class	Level 0 class identifier in hexadecimal format.
Level 1 class	Level 1 class identifier in hexadecimal format.
class name	Name that was assigned to this class with the **class** command.
Conform	Number of conform packets transmitted.
Burst	Configured burst size, expressed in bytes, gigabytes (GB), kilobytes (KB), megabytes (MB), milliseconds (ms), or microseconds (us).

Field	Description
Queue ID	Queue identifier.
Child Policer Conform	Child Policer conform action (transmitted or dropped).
Child Policer Exceed	Child Policer exceed action (transmitted or dropped).
Child Policer Violate	Child Policer violate action (transmitted or dropped).
Flow QoS Info	Information pertaining to CAC actions, and UBRL.
CAC Flow Mask Mode	Configured flow mask for CAC actions.
CAC Flow Rate	Configured rate for CAC actions.
CAC Rate	Configured total bandwidth for CAC admitted flows.
UBRL Flow Mask Mode	Configured flow mask for UBRL.
Flow Age	Configured expiry time to purge out stale flow records set in the flow cache.

show qos-ea interface

To display internal programming information for an interface, use the **show qos-ea interface** command in EXEC mode.

show qos-ea interface *type interface-path-id* { **input** | **output** } { **detail** | **member** } *interface-type interface-path-id* [**location** *interface-path-id*]

Syntax Description

type	Interface type.
	For interface type **PW-Ether** or **PW-IW** provide interface handle number. The range is from 1 to 32768.
interface-path-id	Physical interface or virtual interface. Use the **show interfaces** command to see a list of configured interfaces.
input	Refers to policy applied in ingress direction.
output	Refers to policy applied egress direction.
detail	Displays detailed output.
member	Specifies member of bundle interface or pin-down (generic list) interface of PWHE interface.
location	(Optional) Specifies the location of the node.

Command Default

None.

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.1	This command was introduced.
Release 5.1.1	The show outputs were updated for CAC and UBRL details.
	PWHE Ethernet interface type **PW-Ether** and **PW-IW** were added.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
qos	read

Examples

This is the sample output which shows the QoS information on a Ten Gigabit Ethernet interface, applicable for the releases 5.3.2 onwards:

```
RP/0/RSP0/CPU0:tardis1-pwhe-spe#show qos-ea interface tenGigE 0/0/0/0/0 output
Interface: TenGigE0_0_0_0_0 output policy: EGRESS_CHILD_POLICY
```

```
Total number of classes: 8
Total number of UBRL classes: 0
Total number of CAC classes: 0
-------------------------------------------------------
Policy name: EGRESS_CHILD_POLICY
Hierarchical depth 1
Interface type TenGigE
Interface rate 10000000 kbps
Port Shaper rate 0 kbps
Interface handle 0x00000100
ul_ifh 0x00000000, ul_id 0x00000080
uidb index 0x0002
qos_ifh 0x8108020800002
Local port 0, NP 0
Policy map id 0x1420, format 17, uidb index 0x0002
-------------------------------------------------------
Index 0 Level 0 Class name cp1 service_id 0x0 Policy name EGRESS_CHILD_POLICY
Node flags: LEAF Q_LEAF
Stats flags: Queuing enabled
Node Config: Priority: 1
Queue limit 125000000 Guarantee 1
Node Result: Class-based stats:Stat ID 0x00C68E0B
Queue: Q-ID 0x000803c0 Stat ID(Commit/Excess/Drop): 0x000813C0/0x00000000/0x00A69700
-------------------------------------------------------
Index 1 Level 0 Class name cp2 service_id 0x0 Policy name EGRESS_CHILD_POLICY
Node flags: LEAF Q_LEAF
Stats flags: Queuing enabled
Node Config: Priority: 2
Queue limit 13937408 Guarantee 1
Node Result: Class-based stats:Stat ID 0x00C68E0C
Queue: Q-ID 0x000803c1 Stat ID(Commit/Excess/Drop): 0x000813C1/0x00000000/0x00A69704
-------------------------------------------------------
Index 2 Level 0 Class name cp3 service_id 0x0 Policy name EGRESS_CHILD_POLICY
Node flags: LEAF Q_LEAF
Stats flags: Queuing enabled
Node Config: Priority: 3
Queue limit 13937408 Guarantee 1
Node Result: Class-based stats:Stat ID 0x00C68E0D
Queue: Q-ID 0x000803c3 Stat ID(Commit/Excess/Drop): 0x000813C3/0x00000000/0x00A6970C
-------------------------------------------------------
Index 3 Level 0 Class name cp4 service_id 0x0 Policy name EGRESS_CHILD_POLICY
Node flags: LEAF Q_LEAF
Stats flags: Queuing enabled
Node Config: Priority: 4
Queue limit 13937408 Guarantee 1
Node Result: Class-based stats:Stat ID 0x00C68E0E
Queue: Q-ID 0x000803c4 Stat ID(Commit/Excess/Drop): 0x000813C4/0x00000000/0x00A69710
-------------------------------------------------------
Index 4 Level 0 Class name cp5 service_id 0x0 Policy name EGRESS_CHILD_POLICY
Node flags: LEAF Q_LEAF
Stats flags: Queuing enabled
Node Config: Priority: 5
Queue limit 13937408 Guarantee 1
Node Result: Class-based stats:Stat ID 0x00C68E0F
Queue: Q-ID 0x000803c5 Stat ID(Commit/Excess/Drop): 0x000813C5/0x00000000/0x00A69714
-------------------------------------------------------
Index 5 Level 0 Class name cp6 service_id 0x0 Policy name EGRESS_CHILD_POLICY
Node flags: LEAF Q_LEAF
Stats flags: Queuing enabled
Node Config: Priority: 6
Queue limit 13937408 Guarantee 1
Node Result: Class-based stats:Stat ID 0x00C68E10
Queue: Q-ID 0x000803c6 Stat ID(Commit/Excess/Drop): 0x000813C6/0x00000000/0x00A69718
-------------------------------------------------------
```

```
Index 6 Level 0 Class name cp7 service_id 0x0 Policy name EGRESS_CHILD_POLICY
Node flags: LEAF Q_LEAF
Stats flags: Queuing enabled
Node Config: Priority: 7
Queue limit 13937408 Guarantee 1
Node Result: Class-based stats:Stat ID 0x00C68E11
Queue: Q-ID 0x000803c7 Stat ID(Commit/Excess/Drop): 0x000813C7/0x00000000/0x00A6971C
-----------------------------------------------------------
Index 7 Level 0 Class name class-default service_id 0x0 Policy name EGRESS_CHILD_POLICY
Node flags: LEAF Q_LEAF DEFAULT DEFAULT-ALL
Stats flags: Queuing enabled
Node Config:
WFQ: BW/Sum of BW/Excess ratio: 0kbps/0kbps/900
Queue limit 13937408 Guarantee 0
Node Result: Class-based stats:Stat ID 0x00C68E12
Queue: Q-ID 0x000803c2 Stat ID(Commit/Excess/Drop): 0x000813C2/0x00000000/0x00A69708
```

This is the sample output of the show qos-ea interface command (Applicable until Release 5.1.1):

```
RP/0/RSP0/CPU0:router# show qos-ea interface gigabitEthernet 0/0/0/30 output
Interface: TenGigE0_3_0_34.3 output policy: two
Total number of classes: 18
-----------------------------------------------------
Policy name: two
Hierarchical depth 2
Interface type VLAN Subif
Interface rate 10000000 kbps
Port Shaper rate 0 kbps
Interface handle 0x0A001DC0
ul_ifh 0x00000000, ul_id 0x00000040
uidb index 0x002D
qos_ifh 0x15800040002d
Local port 34, NP 5
Policy map id 0x2008, format 15, uidb index 0x002D
-----------------------------------------------------
Index 0 Level 0 Class name p1 service_id 0x0 Policy name two
Node flags: None
Stats flags: Queuing enabled
Node Config:
Shape: CIR/CBS/PIR/PBS: 0kbps/62500000B/5000000kbps/62500000B
WFQ: BW/Sum of BW/Excess ratio: 0kbps/0kbps/1
Node Result: Class-based stats:Stat ID 0x005102DD mode: 16Q
Queue: N/A Stat ID(Commit/Excess/Drop): 0x006E01E0/0x00000000/0x006E01E1
Index 1 Level 1 Class name c1 service_id 0x0 Policy name p16
-----------------------------------------------------
Index 17 Level 0 Class name class-default service_id 0x0 Policy name two
Node flags: LEAF Q_LEAF DEFAULT DEFAULT-ALL
Stats flags: Queuing enabled
Node Config:
WFQ: BW/Sum of BW/Excess ratio: 0kbps/0kbps/1
Queue limit 62500000 Guarantee 0
Node Result: Class-based stats:Stat ID 0x005102F4
Queue: Q-ID 0x00030082 Stat ID(Commit/Excess/Drop): 0x006E028A/0x00000000/0x006E028B
```

This is the sample output of the show qos-ea interface command (Applicable from Release 5.1.1):

```
RP/0/# show qos-ea interface gigabitEthernet 0/1/0/0 input
Interface: GigabitEthernet0_1_0_0 input policy: premium_services (Flow Aware Policy)
Total number of classes: 5
Total number of UBRL classes: 0
Total number of CAC classes: 1
-----------------------------------------------------------
Policy name: premium_services
Hierarchical depth 2
```

```
Interface type GigE
Interface rate 1000000 kbps
Port Shaper rate 0 kbps
Interface handle 0x060000C0
ul_ifh 0x00000000, ul_id 0x00000080
uidb index 0x0002
qos_ifh 0x8100000800002
Local port 0, NP 0
Policy map id 0x2018, format 16, uidb index 0x0002
--------------------------------------------------------
Index 0 Level 0 Class name dscp_cs5 service_id 0x0 Policy name premium_services
Node flags: LEAF
Stats flags: Policer type 1 Max category 0
Node Config:
Police Color aware 0 Type 1 CIR/CBS/PIR/PBS: 100000kbps/1250000B/0kbps/0B
Node Result: Class-based stats:Stat ID 0x005102DD
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
Police ID (Token/Conform/Exceed/Violate): 0x00001803/0x005102DD/0x005102DE/0x005102DF
--------------------------------------------------------
Index 1 Level 0 Class name dscp_cs6 service_id 0x0 Policy name premium_services
Flow QoS Info: CAC Cac Action
CAC Flow Mask Mode: 5-Tuple (0x20)
CAC Flow Rate: 128 kbps
CAC Rate: 896 kbps
CAC Max Flow Count: 7
CAC Flow Age: 20 Seconds
Node flags: None
Stats flags:
Node Config: None
Node Result: Class-based stats:Stat ID 0x005102E0
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
--------------------------------------------------------
Index 2 Level 1 Class name video_admitted service_id 0x0 Policy name video_flows
Flow QoS Info: CAC Admit Class
CAC Flow Mask Mode: 5-Tuple (0x20)
CAC Max Flow Count: 7
CAC Flow Age: 20 Seconds
CAC Reject Action: Redirect
CAC Flow Counter ID: 0xf41e61
CAC Flow Counter Value: 0
Number of CAC flows admitted: 0
Parent policy premium_services Class dscp_cs6
Node flags: LEAF
Stats flags:
Node Config: Mark
Node Result: Class-based stats:Stat ID 0x005102E1
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
--------------------------------------------------------
Index 3 Level 1 Class name class-default service_id 0x0 Policy name video_flows
Flow QoS Info: CAC Redirect Class
Parent policy premium_services Class dscp_cs6
Node flags: LEAF DEFAULT
Stats flags:
Node Config: Mark
Node Result: Class-based stats:Stat ID 0x005102E2
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
--------------------------------------------------------
Index 4 Level 0 Class name class-default service_id 0x0 Policy name premium_services
Node flags: LEAF DEFAULT DEFAULT-ALL
Stats flags: Policer type 1 Max category 0
Node Config:
Police Color aware 0 Type 1 CIR/CBS/PIR/PBS: 30000kbps/375000B/0kbps/0B
Node Result: Class-based stats:Stat ID 0x005102E3
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
```

```
Police ID (Token/Conform/Exceed/Violate): 0x00001804/0x005102E3/0x005102E4/0x005102E5
---------------------------------------------------------
```

This is the sample output of the show qos-ea interface command with the flow related information for CAC:

```
RP/0/# show qos-ea interface gigabitEthernet 0/1/0/0 input
Interface: GigabitEthernet0_1_0_0 input policy: premium-services (Flow Aware Policy)
Total number of classes: 3
Total number of UBRL classes: 0
Total number of CAC classes: 1
Interface rate 1000000 kbps
-------------------------------------------------------
Policy name: premium-services
Hierarchical depth 1
Interface type GigE
Port Shaper rate 0 kbps
Interface handle 0x060000C0
ul_ifh 0x00000000, ul_id 0x00000080
uidb index 0x0002
qos_ifh 0x8100000800002
Local port 0, NP 0
Policy map id 0x2014, format 18, uidb index 0x0002
-------------------------------------------------------
Index 0 Level 0 Class name prec5 service_id 0x0 Policy name premium-services
Node flags: LEAF
Stats flags: Policer type 1 Max category 0
Node Config:
Police Color aware 0 Type 1 CIR/CBS/PIR/PBS: 100000kbps/1250000B/0kbps/0B
Node Result: Class-based stats:Stat ID 0x005102DD
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
Police ID (Token/Conform/Exceed/Violate): 0x00001803/0x005102DD/0x005102DE/0x005102DF
---------------------------------------------------------
Index 1 Level 0 Class name video service_id 0x0 Policy name premium-services
Flow QoS Info: CAC Admit Class
CAC Flow Mask Mode: 5-Tuple (0x20)
CAC Flow Rate: 128 kbps
CAC Rate: 896 kbps
CAC Max Flow Count: 7
CAC Flow Age: 20 Seconds
CAC Reject Action: DROP
CAC Flow Counter ID: 0xf41e61
CAC Flow Counter Value: 0
Number of CAC flows admitted: 0
Node flags: LEAF
Stats flags: CAC Reject Drop enabled
Node Config: Mark
Node Result: Class-based stats:Stat ID 0x005102E0
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
---------------------------------------------------------
Index 2 Level 0 Class name class-default service_id 0x0 Policy name premium-services
Node flags: LEAF DEFAULT DEFAULT-ALL
Stats flags: Policer type 1 Max category 0
Node Config:
Police Color aware 0 Type 1 CIR/CBS/PIR/PBS: 30000kbps/375000B/0kbps/0B
Node Result: Class-based stats:Stat ID 0x005102E2
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
Police ID (Token/Conform/Exceed/Violate): 0x00001804/0x005102E2/0x005102E3/0x005102E4
---------------------------------------------------------
```

This is the sample output of the show qos-ea interface command with the flow related information for UBRL:

```
RP/0/ # show qos-ea interface gigabitEthernet 0/1/0/0 input
Interface: GigabitEthernet0_1_0_0 input policy: voice_flow (Flow Aware Policy)
```

```
Total number of classes: 3
Total number of UBRL classes: 1
Total number of CAC classes: 0
-------------------------------------------------------
Policy name: voice_flow
Hierarchical depth 1
Interface type GigE
Interface rate 1000000 kbps
Port Shaper rate 0 kbps
Interface handle 0x060000C0
ul_ifh 0x00000000, ul_id 0x00000080
uidb index 0x0002
qos_ifh 0x8100000800002
Local port 0, NP 0
Policy map id 0x2008, format 16, uidb index 0x0002
-------------------------------------------------------
Index 0 Level 0 Class name voice_prec6 service_id 0x0 Policy name voice_flow
Node flags: LEAF
Stats flags: Policer type 1 Max category 0
Node Config:
Police Color aware 0 Type 1 CIR/CBS/PIR/PBS: 5000kbps/62500B/0kbps/0B
Node Result: Class-based stats:Stat ID 0x005102DD
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
Police ID (Token/Conform/Exceed/Violate): 0x00001803/0x005102DD/0x005102DE/0x005102DF
-------------------------------------------------------
Index 1 Level 0 Class name ubrl1 service_id 0x0 Policy name voice_flow
Flow QoS Info: UBRL
UBRL Flow Mask Mode: src-ip (0x80)
UBRL Flow Age: 200 Seconds
Number of UBRL flows learnt: 0
Node flags: LEAF
Stats flags: Policer type 1 Max category 0
Node Config:
Flow Police Color aware 0 Type 1 CIR/CBS/PIR/PBS: 10000kbps/125000B/0kbps/0B
Catch-all Police Color aware 0 Type 1 CIR/CBS/PIR/PBS:
100000000kbps/12500000B/100000000kbps/12500000B
Node Result: Class-based stats:Stat ID 0x005102E0
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
Police ID (Token/Conform/Exceed/Violate): 0x00001804/0x005102E0/0x005102E1/0x005102E2
-------------------------------------------------------
Index 2 Level 0 Class name class-default service_id 0x0 Policy name voice_flow
Node flags: LEAF DEFAULT DEFAULT-ALL
Stats flags: Policer type 1 Max category 0
Node Config:
Police Color aware 0 Type 1 CIR/CBS/PIR/PBS: 30000kbps/375000B/0kbps/0B
Node Result: Class-based stats:Stat ID 0x005102E3
Queue: N/A Stat ID(Commit/Excess/Drop): 0x00000000/0x00000000/0x00000000
Police ID (Token/Conform/Exceed/Violate): 0x00001805/0x005102E3/0x005102E4/0x005102E5
-------------------------------------------------------
```

This is the sample output of the show qos-ea interface command for PWHE interface:

```
RP/0/# show qos-ea interface pw-ether 1 output member tenGigE 0/2/0/3
Thu Mar 20 01:46:39.070 UTC
Interface: TenGigE0_2_0_3 output policy: pwhe-egress
Total number of classes: 1
-------------------------------------------------------
Policy name: pwhe-egress
Hierarchical depth 1
Interface type unknown
Interface rate 10000000 kbps
Port Shaper rate 0 kbps
Interface handle 0x000000E0
ul_ifh 0x08000680, ul_id 0x00000040
uidb index 0x0019
```

```
qos_ifh 0x811a00019001e
Local port 3, NP 1
Policy map id 0x2000, format 15, uidb index 0x0019
-------------------------------------------------------
Index 0 Level 0 Class name class-default service_id 0x0 Policy name pwhe-egress
Node flags: LEAF Q_LEAF DEFAULT DEFAULT-ALL
Stats flags: Queuing enabled
Node Config:
Shape: CIR/CBS/PIR/PBS: 0kbps/12500000B/1000000kbps/12500000B
WFQ: BW/Sum of BW/Excess ratio: 0kbps/0kbps/20
Queue limit 12500000 Guarantee 0
Node Result: Class-based stats:Stat ID 0x005102C1
Queue: Q-ID 0x0001000a Stat ID(Commit/Excess/Drop): 0x00640032/0x00000000/0x00640033
-------------------------------------------------------
```

show fmgr interface

To display ternary content addressable memory (TCAM) feature entries for QoS, use the **show fmgr interface** command in EXEC mode.

show fmgr interface *type interface-path-id* **feature** {**policer** | **qos** | **qos-all**} {**input** | **output**} [**all** | **dup-bank** | **hw** | **ipv4-mpls** | **ipv6** | **l2** | **location** *node-id* | **sw**]

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
feature	Displays feature specific information.
policer	Displays policer entries.
qos	Displays QoS entries.
qos-all	Displays entries for both QoS and policer.
input	Specifies the ingress direction.
output	Specifies the egress direction.
all	(Optional) Displays all TCAM entries.
dup-bank	(Optional) Displays entries from the duplicate bank in turbo mode.
hw	(Optional) Reads from the hardware.
ipv4-mpls	(Optional) Displays ipv4-mpls entries.
ipv6	(Optional) Displays ipv6 entries.
l2	(Optional) Displays Layer 2 entries.
location *node-id*	(Optional) Identifies the location of the interface whose TCAM information you want to display. The *node-id* is expressed in the *rack/slot/module* notation. **Note** Use the **show platform** command to see the location of all nodes installed in the router.
sw	(Optional) Reads from the software.

Command Default   No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 3.5.0	The **in** keyword was replaced with the **input** keyword.
	The **out** keyword was replaced with the **output** keyword.
	The **l2** keyword was added.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
qos	read

Examples

The following sample output shows how to display all ingress QoS and policer TCAM entries for a Gigabit Ethernet interface:

```
RP/0/RSP0/CPU0:router# show fmgr interface GigabitEthernet 0/1/5/0 feature qos-all in

QOS ENTRIES
================================================================================
Interface = GigabitEthernet0_1_5_0      Feature = qos      Direction = in
TCAM Fields:
ip/mpls  bndl  vlg_id  cid  dscp  exp  dc  qos-id

CSRAM Fields:
prio sh_q red_ctr qos_grp dc l2_mark l3_mark l3_mark_val max_th seg_size min_th
1st_seg pol_has_hpq
================================================================================
No QoS configured on this interface


POLICER ENTRIES
================================================================================
Interface = GigabitEthernet0_1_5_0      Feature = policer      Direction = in
TCAM Fields:
IPv4: ip/mpls vlg_id l2_cos drid ip_src l4_proto frag dscp ip_dest qos_grp dc d
st_port qos-id
MPLS: ip/mpls vlg_id l2_cos label exp qos_grp dc qos-id

CSRAM Fields:
cid token1 stats_ptr conform1 exceed1 violate1 token2 conform2 exceed2 violate2
================================================================================
No QoS configured on this interface


POLICER ENTRIES
================================================================================
Interface = GigabitEthernet0_1_5_0      Feature = policer      Direction = in
TCAM Fields:
IPv6: ipv6 vlg_id l2_cos dest_port src_port ip_dest ip_src ext_dst ext_rtg ext_
h ext_frag dest_rng_id dc qos_grp l4_proto dscp/prec qos-id
```

```
CSRAM Fields:
cid token1 stats_ptr conform1 exceed1 violate1 token2 conform2 exceed2 violate2
===============================================================================
No QoS configured on this interface

RP/0/RP0/CPU0:router#
```

The following table describes the significant fields shown in the display.

Table 2: show fmgr interface Field Descriptions

Field	Description
QOS ENTRIES	Displays the following QoS information: • Interface—Interface type and identifier. • Feature—Feature currently running on the specified interface. • Direction—Direction of interface (ingress or egress).
CSRAM Fields	General CSRAM information.
POLICER ENTRIES	General policer and TCAM information for the specified interface.

show hw-module qos output shape granularity location

To display shape granular information, use the **show hw-module qos output shape granularity location** command in EXEC mode.

show hw-module qos output shape granularity location {**all***interface-path-id*}

Syntax Description	**all**	Displays shape granularity information for all interfaces.
	interface-path-id	Physical location of the Shared Interface Processor (SIP). Naming notation is *rack/slot/module;* a slash between values is required as part of the notation.

- *rack* —Chassis number of the rack.
- *slot* —Physical slot number of the modular services card or line card.
- *module* —Module number. A physical layer interface module (PLIM) is always 0.

Command Default   None

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.9.2	This command was introduced.

Usage Guidelines   No specific guidelines impact the use of this command.

Example

This sample output shows how to display shape granularity for the output interface at location 0/1/CPU0:

```
RP/0/RSP0/CPU0:router# show hw-module qos output shape granularity location 0/1/CPU0

============= ====================================
              QOS SHAPING GRANULARITY
             ====================================
             Configured   HW           LC
 Location    Shape        Programmed   reload
             Granularity  Granularity  (Y / N)
============= ===========  ============ ========
 0/1/CPU0       ---         256Kbps        N
--------------------------------------------------
```

Table 3: show hw-module qos output shape granularity location Field Descriptions, on page 51 describes the significant fields shown in the display.

Table 3: show hw-module qos output shape granularity location Field Descriptions

Field	Description
Configured Shape Granularity	User-configured shape granularity for the specified location.

Field	Description
HW Programmed Granularity	Hardware programmed shape granularity for the specified location.
LC reload (Y/N)	Specifies whether a line card reload will be required to enable the user configured shape granularity.

show policy-map interface

To display policy configuration information for all classes configured for all service policies on the specified interface, use the **show policy-map interface** command in EXEC mode.

show policy-map[accounting | **control** | **pbr** | **performance-traffic** | **qos**] [**interface** {*interface type* | **all**} *interface-path-id*] [**input** | **output** [**member** *interface type* *interface-path-id*]]**nv** [**satellite** *satellite-id*]

Syntax Description		
type accounting	Displays accounting details for a policy-map.
type control	Displays control details for a policy-map.
type pbr	Displays Policy-based routing (PBR) details for a policy-map.
type performance-traffic	Displays real time application flow monitoring details for a policy-map.
type qos	Displays qos statistics for qos policies.
interface type	Interface type. For more information, use the question mark (?) online help function.
all	Specifies all interfaces.
interface-path-id	Physical interface instance. Naming notation is *rack/slot/module/port* and a slash between values is required as part of the notation. • *rack*—Chassis number of the rack. • *slot*—Physical slot number of the line card. • *module*—Module number. A physical layer interface module (PLIM) is always 0. • *port*—Physical port number of the interface. **Note** In references to a Management Ethernet interface located on a route processor card, the physical slot number is alphanumeric (RSP0 or RSP1) and the module is CPU0. Example: interface MgmtEth0/RSP0/CPU0/0. For more information about the syntax for the router, use the question mark (?) online help function.
input	(Optional) Displays per class statistics on inbound traffic for the specified policy map and interface.
output	(Optional) Displays per class statistics on outbound traffic for the specified policy map and interface.

member	(Optional) Specifies the bundle member's interface or PWHE member interface name.
nv	Displays the statistics of the satellite access or fabric interfaces.
satellite	Displays the per class statistics on the inbound or outbound traffic for the specified satellite.
satellite-id	Displays the satellite statistics based on the specified satellite ID.

Command Default   None

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 4.0.0	The **show policy-map interface** command output was updated to show IPHC statistics.
Release 4.3.1	The **pbr** keyword was added.
Release 5.1.1	The **nv satellite** keywords and the *satellite-id* variable were added. The show outputs were updated for nv satellite details.
	The show outputs were updated for CAC and UBRL details.
	PWHE interface type **PW-Ether** and **PW-IW** were added.

Usage Guidelines   The **show policy-map interface** command displays the statistics for classes in the service policy attached to an interface.

The **show policy-map interface** command displays the statistics for shared and referred classes separately. To determine the policer action, an aggregate of the shared policer statistics should be collected.

For PWHE aggregate shaper the **show policy-map interface** command displays aggregate of all the queuing stats for subinterface policies if they co-exist.

The output of the **show policy-map interface** command is inconsistent for priority level 1, priority level 2, priority level 3 that is configured on the bundle interface, when the interface has either of these combinations:

- 3rd generation of ASR 9000 LC with SE and TR versions

- 4th generation of ASR 9000 LC with SE and 3rd generation of ASR 9000 LC with TR versions

Additionally, for priority level 3 configuration the show policy-map interface command output is inconsistent when the bundle interface has a combination of 3rd generation ASR 9000 LC with TR and 4th generation of ASR 9000 LC with TR versions.

In order to display consistent show policy-map interface, use **show policy-map interface bundle-eth** *<number>* **[input | output] member** {*interface type interface-path-id*} command.

Task ID

Task ID	Operations
qos	read

Examples

This sample output shows how to display policy statistics information for all classes on the TenGigE interface 0/6/1/0 that are in the output direction:

```
RP/0/RSP0/CPU0:router# show policy-map interface TenGigE0/1/0/0 nv

TenGigE0/1/0/0 direction input: Service Policy not installed

TenGigE0/1/0/0 Satellite: 0 output: policy_queue

Class class7
  Classification statistics          (packets/bytes)       (rate - kbps)
    Matched              :                 130/133640               35
    Transmitted          :                 130/133640               35
    Total Dropped        :                    0/0                    0
  Queueing statistics
    Queue ID                          : 1
    High watermark   (Unknown)
    Inst-queue-len   (Unknown)
    Avg-queue-len    (Unknown)
    Taildropped(packets/bytes)        : 0/0
    Queue(conform)       :                 130/133640               35
    Queue(exceed)        :                    0/0                    0
    CLP0 Taildropped(packets/bytes)   : 0/0
    CLP1 Taildropped(packets/bytes)   : 0/0
```

This example shows how to display the satellite information for a policy-map:

```
RP/0/RSP0/CPU0:router # show policy-map interface gigabitEthernet1000/0/0/0 nv

GigabitEthernet1000/0/0/0 Satellite: 0 input: policy

Class class0
  Classification statistics          (packets/bytes)       (rate - kbps)
    Matched              :    11511218114/11787487348736        363762
    Transmitted          :    11511218114/11787487348736        363762
    Total Dropped        :                    0/0                    0
Class class1
  Classification statistics          (packets/bytes)       (rate - kbps)
    Matched              :     3251595388/3329633677312          98038
    Transmitted          :     3251595388/3329633677312          98038
    Total Dropped        :                    0/0                    0
Class class2
  Classification statistics          (packets/bytes)       (rate - kbps)
    Matched              :     3003931166/3076025511936         123068
    Transmitted          :     3003931166/3076025511936         123068
    Total Dropped        :                    0/0                    0


RP/0/RSP0/CPU0:router # show policy-map interface TenGigE0/1/1/2 nv satellite 1000

TenGigE0/1/1/2 direction input: Service Policy not installed

TenGigE0/1/1/2 Satellite: 0 output: icl
```

```
         Class icl1
           Classification statistics          (packets/bytes)     (rate - kbps)
             Matched            :                    0/0                      0
             Transmitted        :                    0/0                      0
             Total Dropped      :                    0/0                      0
           Queueing statistics
             Queue ID                           : 1
             High watermark   (Unknown)
             Inst-queue-len   (Unknown)
             Avg-queue-len    (Unknown)
             Taildropped(packets/bytes)         : 0/0
             Queue(conform)     :                    0/0                      0
             Queue(exceed)      :                    0/0                      0
             CLP0 Taildropped(packets/bytes)    : 0/0
             CLP1 Taildropped(packets/bytes)    : 0/0
         Class icl2
           Classification statistics          (packets/bytes)     (rate - kbps)
             Matched            :                    0/0                      0
             Transmitted        :                    0/0                      0
             Total Dropped      :                    0/0                      0
           Queueing statistics
             Queue ID                           : 2
             High watermark   (Unknown)
             Inst-queue-len   (Unknown)
             Avg-queue-len    (Unknown)
             Taildropped(packets/bytes)         : 0/0
             Queue(conform)     :                    0/0                      0
             Queue(exceed)      :                    0/0                      0
             CLP0 Taildropped(packets/bytes)    : 0/0
             CLP1 Taildropped(packets/bytes)    : 0/0
         Class icl4
           Classification statistics          (packets/bytes)     (rate - kbps)
             Matched            :                    0/0                      0
             Transmitted        :                    0/0                      0
             Total Dropped      :                    0/0                      0
           Queueing statistics
             Queue ID                           : 4
             High watermark   (Unknown)
             Inst-queue-len   (Unknown)
             Avg-queue-len    (Unknown)
             Taildropped(packets/bytes)         : 0/0
             Queue(conform)     :                    0/0                      0
             Queue(exceed)      :                    0/0                      0
             CLP0 Taildropped(packets/bytes)    : 0/0
             CLP1 Taildropped(packets/bytes)    : 0/0
         Class icl5
           Classification statistics          (packets/bytes)     (rate - kbps)
             Matched            :                    0/0                      0
             Transmitted        :                    0/0                      0
             Total Dropped      :                    0/0                      0
           Queueing statistics
             Queue ID                           : 5
             High watermark   (Unknown)
             Inst-queue-len   (Unknown)
             Avg-queue-len    (Unknown)
             Taildropped(packets/bytes)         : 0/0
             Queue(conform)     :                    0/0                      0
             Queue(exceed)      :                    0/0                      0
             CLP0 Taildropped(packets/bytes)    : 0/0
             CLP1 Taildropped(packets/bytes)    : 0/0
         Class class-default
           Classification statistics          (packets/bytes)     (rate - kbps)
             Matched            :                    0/0                      0
```

```
      Transmitted         :                0/0                    0
      Total Dropped       :                0/0                    0
    Queueing statistics
      Queue ID                          : 0
      High watermark   (Unknown)
      Inst-queue-len   (Unknown)
      Avg-queue-len    (Unknown)
      Taildropped(packets/bytes)        : 0/0
      Queue(conform)      :                0/0                    0
      Queue(exceed)       :                0/0                    0
      CLP0 Taildropped(packets/bytes)   : 0/0
      CLP1 Taildropped(packets/bytes)   : 0/0
```

This example shows how to display the policy statistics information for ring topology on satellite 100.

```
RP/0/RSP0/CPU0:router# show policy-map interface GigabitEthernet 100/0/0/40 nv satellite
100

GigabitEthernet100/0/0/40 Satellite: 0 input: NV9kV

Class 9kv-dscp
  Classification statistics        (packets/bytes)      (rate - kbps)
    Matched          :                0/0                    0
    Transmitted      :                0/0                    0
    Total Dropped    :                0/0                    0
Policing statistics (packets/bytes) (rate - kbps)
    Policed(conform)    :                0/0                    0
    Policed(exceed)     :                0/0                    0
    Policed(violate)    :                0/0                    0
    Policed and dropped :                0/0
Class class-default
  Classification statistics        (packets/bytes)      (rate - kbps)
Matched : 1737069/111172288 29645
    Transmitted      :       1737069/111172288           29645
    Total Dropped    :                0/0                    0
```

This example shows how to display the flow related information for CAC:

```
RP/0/RSP0/CPU0:routershow policy-map interface gigabitEthernet 0/1/0/0

GigabitEthernet0/1/0/0 input: premium-services

Class prec5
  Classification statistics        (packets/bytes)      (rate - kbps)
    Matched          :                0/0                    0
    Transmitted      : N/A
    Total Dropped    :                0/0                    0
  Policing statistics              (packets/bytes)      (rate - kbps)
    Policed(conform)    :                0/0                    0
    Policed(exceed)     :                0/0                    0
    Policed(violate)    :                0/0                    0
    Policed and dropped :                0/0
Class video   (CAC_ADMIT)
  Classification statistics        (packets/bytes)      (rate - kbps)
    Matched          :                0/0                    0
    Transmitted      : N/A
    Total Dropped    : N/A
  CAC Statistics                   (packets/bytes)       (rate-kbps)
    CAC Admitted     :                0/0                   0
    CAC Drop         :                0/0                   0
Class class-default
  Classification statistics        (packets/bytes)      (rate - kbps)
```

```
     Matched              :                  0/0                    0
     Transmitted          : N/A
     Total Dropped        :                  0/0                    0
   Policing statistics                  (packets/bytes)      (rate - kbps)
     Policed(conform)     :                  0/0                    0
     Policed(exceed)      :                  0/0                    0
     Policed(violate)     :                  0/0                    0
     Policed and dropped  :                  0/0
```

This example shows how to display the flow related information for UBRL:

```
RP/0/RSP0/CPU0:routershow policy-map interface gigabitEthernet 0/1/0/0

GigabitEthernet0/1/0/0 input: voice_flow

Class voice_prec6
  Classification statistics            (packets/bytes)      (rate - kbps)
    Matched              :                  0/0                    0
    Transmitted          : N/A
    Total Dropped        :                  0/0                    0
  Policing statistics                  (packets/bytes)      (rate - kbps)
    Policed(conform)     :                  0/0                    0
    Policed(exceed)      :                  0/0                    0
    Policed(violate)     :                  0/0                    0
    Policed and dropped  :                  0/0
Class ubrl1            (UBRL_CLASS)
  Classification statistics            (packets/bytes)      (rate - kbps)
    Matched              :                  0/0                    0
    Transmitted          : N/A
    Total Dropped        :                  0/0                    0
  Policing statistics                  (packets/bytes)      (rate - kbps)
    Policed(conform)     :                  0/0                    0
    Policed(exceed)      :                  0/0                    0
    Policed(violate)     :                  0/0                    0
    Policed and dropped  :                  0/0
Class class-default
  Classification statistics            (packets/bytes)      (rate - kbps)
    Matched              :                  0/0                    0
    Transmitted          : N/A
    Total Dropped        :                  0/0                    0
  Policing statistics                  (packets/bytes)      (rate - kbps)
    Policed(conform)     :                  0/0                    0
    Policed(exceed)      :                  0/0                    0
    Policed(violate)     :                  0/0                    0
    Policed and dropped  :                  0/0
GigabitEthernet0/1/0/0 direction output: Service Policy not installed
```

Note
- The **show policy-map interface** command displays matched rate that is more than the line rate, when a:

    - kernel crash is executed on an active route switch processor (RSP) of host.

    - state of policy-map changes from standby to new active.

    - state of new active offloaded policy-map changes to an active state for ICL interface.

- The **show policy-map interface** command does not show updated conform stats for 2R3C configuration when policy rate is changed.

- In the **show policy-map interface** command output, displayed police rate and actual police rate for an interface varies.

This table describes the significant fields shown in the display.

Table 4: show policy-map interface Field Descriptions

Field	Description
Classification statistics	
Matched	Number of packets or bytes that matched this class.
Transmitted	Number of packets or bytes transmitted for this class.
Total Dropped	Number of packets or bytes dropped for this class.
Policing statistics	
Policed(conform)	Number of packets or bytes that conformed to the police rate for this class.
Policed(exceed)	Number of packets or bytes that exceeded the police rate for this class.
Policed(violate)	Number of packets or bytes that violated the police rate for this class.
Policed and dropped	Number of packets or bytes dropped by the policer of this class.
Queuing statistics	
Queue ID	Queue number of the packet in this class.
High watermark (bytes)/(ms)	Maximum length of the queue.
Inst-queue-len (bytes)/(ms)	Instantaneous length of the queue.
Avg-queue-len (bytes)/(ms)	Average length of the queue.
Taildropped (bytes)	Number of bytes taildropped for this queue.
Compression Statistics	
Sent Total	Total number of packets sent.

Field	Description
Sent Compressed	Number of compressed packets sent.
Sent full header	Number of packets sent with a full header.
Saved	Number of bytes saved.
Sent	Number of bytes sent.
Efficiency improvement factor	Ratio of the packet's original full size to the packet's compressed size.
Queue (conform)	Number of packets or bytes that conformed to the queue rate for this class.
Queue (exceed)	Number of packets or bytes that exceeded the queue rate for this class.
NV9kV	NV SAT Simple ring.
CAC Statistics	
CAC Admitted	Number of packets admitted.
CAC Drop	Number of packets dropped.

show policy-map shared-policy-instance

To display the statistics for all details of the shared policy instance, use the **show policy-map shared-policy-instance** command in EXEC mode.

show policy-map shared-policy-instance *instance-name* **member** *member-interface* [**input** | **output**] **location** *node-id*

Syntax Description		
instance-name	String of up to 32 characters to identify the shared policy instance.
member	Identifies a specific bundle member link or PWHE member.
member-interface	Identifies interface type and interface-path-id.
input	(Optional) Display the policy map attached to the input interface.
output	(Optional) Display the policy map attached to the output interface.
location *node-id*	Location of node. The node-id argument is entered in the *rack/slot/module* notation.

Command Default

If neither **input** nor **output** is selected, statistics for both are displayed.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 3.9.0	This command was updated to support shared policy instance over bundle interfaces.
Release 5.1.1	This command was updated to support SPI over PW-Ether subinterface.

Usage Guidelines

QoS statistics are only available for the shared policy instance. There are no per-member interface QoS statistics.

Task ID

Task ID	Operations
qos	read, write

Examples

The following example shows how to display statistics for all details of the shared policy instance named inst-shape:

```
RP/0/RSP0/CPU0:router# show policy-map shared-policy-instance inst-shape input location
0/RSP0/CPU0

 input: shape
Class class-default
```

```
       Classification statistics          (packets/bytes)      (rate - kbps)
         Matched        :                     0/0                     0
         Transmitted    :                     0/0                     0
         Total Dropped  :                     0/0                     0
         Policy child Class class-default
           Classification statistics        (packets/bytes)      (rate - kbps)
             Matched        :                   0/0                     0
             Transmitted    :                   0/0                     0
             Total Dropped  :                   0/0                     0
           Queueing statistics
             Queue ID                         : 268435466
             High watermark  (Unknown
             Inst-queue-len  (packets)        : 0
             Avg-queue-len   (Unknown)
             Taildropped(packets/bytes)       : 0/0
             Queue(conform)    :                 0/0                     0
             Queue(exceed)     :                 0/0                     0
             RED random drops(packets/bytes   : 0/0


RP/0/RSP0/CPU0:router:router#show policy-map shared-policy-instance spi1 location 0/1/cPU0


Shared Policy Instance spi1 input: hier_l2_ingress

Class class-default
  Classification statistics          (packets/bytes)      (rate - kbps)
    Matched        :                     0/0                     0
    Transmitted    :                     0/0                     0
    Total Dropped  :                     0/0                     0
  Policing statistics                (packets/bytes)      (rate - kbps)
    Policed(conform)   :                 0/0                     0
    Policed(exceed)    :                 0/0                     0
    Policed(violate)   :                 0/0                     0
    Policed and dropped :                0/0
    Policy child_hier_l2_ingress Class cos3
      Classification statistics        (packets/bytes)      (rate - kbps)
Matched        :                 0/0                 0
Transmitted    :                 0/0                 0
Total Dropped  :                 0/0                 0
      Policing statistics            (packets/bytes)      (rate - kbps)
Policed(conform)   :                 0/0                 0
Policed(exceed)    :                 0/0                 0
Policed(violate)   :                 0/0                 0
Policed and dropped :                0/0
Policed and dropped(parent policer)  : 0/0
    Policy child_hier_l2_ingress Class cos4
      Classification statistics        (packets/bytes)      (rate - kbps)
Matched        :                 0/0                 0
Transmitted    :                 0/0                 0
        Total Dropped     :                 0/0                     0
      Policing statistics            (packets/bytes)      (rate - kbps)
        Policed(conform)   :                 0/0                     0
        Policed(exceed)    :                 0/0                     0
        Policed(violate)   :                 0/0                     0
        Policed and dropped :                0/0
        Policed and dropped(parent policer)  : 0/0
    Policy child_hier_l2_ingress Class cos5
      Classification statistics        (packets/bytes)      (rate - kbps)
        Matched        :                   0/0                     0
        Transmitted    :                   0/0                     0
        Total Dropped  :                   0/0                     0
      Policing statistics            (packets/bytes)      (rate - kbps)
        Policed(conform)   :                 0/0                     0
        Policed(exceed)    :                 0/0                     0
```

```
        Policed(violate)    :                    0/0                        0
        Policed and dropped :                    0/0
        Policed and dropped(parent policer)  : 0/0
   Policy child_hier_l2_ingress Class class-default
     Classification statistics          (packets/bytes)     (rate - kbps)
       Matched             :                    0/0                        0
       Transmitted         :                    0/0                        0
       Total Dropped       :                    0/0                        0

Shared Policy Instance spi1 output: l2_egress

Class qos_grp1
  Classification statistics          (packets/bytes)     (rate - kbps)
    Matched             :                    0/0                        0
    Transmitted         :                    0/0                        0
    Total Dropped       :                    0/0                        0
  Queueing statistics
    Queue ID                           : 18
    High watermark                     : N/A
    Inst-queue-len  (packets)          : 0
    Avg-queue-len   (packets)          : 0
    Taildropped(packets/bytes)         : 0/0
Class class-default
  Classification statistics          (packets/bytes)     (rate - kbps)
    Matched             :                    0/0                        0
    Transmitted         :                    0/0                        0
    Total Dropped       :                    0/0                        0
  Queueing statistics
    Queue ID                           : 19
    High watermark                     : N/A
    Inst-queue-len  (packets)          : 0
    Avg-queue-len   (packets)          : 0
    Taildropped(packets/bytes)         : 0/0
```

Related Commands

Command	Description
policy-map, on page 25	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.
service-policy (interface)	Attaches a policy map to an input interface or output interface to be used as the service policy for that interface.
show policy-map interface, on page 53	Displays policy configuration information for all classes configured for all service policies on the specified interface.

show policy-map targets

To display information about the interfaces on which policy maps are applied, use the **show policy-map targets** command in EXEC mode.

show policy-map targets [**location** *node-id* | **pmap-name** *name* | **type** [**pbr** | **performance-traffic** | **redirect** | **traffic**] [**location** *node-id* | **pmap-name** *name*] | **type qos** [**location** *node-id* | **pmap-name** *name*]]

Syntax Description

location *node-id*	(Optional) Displays information about the interfaces on which policy maps are applied for the specified location. The *node-id* argument is entered in the *rack/slot/module* notation.
pmap-name *name*	(Optional) Displays information about the interfaces on which the specified policy map is applied.
type pbr	(Optional) Displays information about Policy-based routing (PBR).
type performance-traffic	(Optional) Displays information about the interfaces on which Realtime Application Flow Monitoring policy maps are applied.
type qos	(Optional) Displays information about the interfaces on which QoS policy maps are applied. This is the default type.

Command Default   The default QoS policy type is QoS.

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 4.3.1	The **pbr** keyword was added.
Release 5.1.1	The show outputs were updated for nv satellite details.

Usage Guidelines   For a short period of time while a QoS policy is being modified, there might not be any policy in effect on the interfaces in which the modified policy is used. For this reason, modify QoS policies that affect the fewest number of interfaces at a time. Use the **show policy-map targets** command to identify the number of interfaces that will be affected during policy map modification.

When an unsupported policy-map is offloaded, a warning message stating 'policy is not offloaded' is shown. But the **show policy-map targets** command shows the unsupported policy-map entry for an interface.

Task ID

Task ID	Operations
qos	read

Examples

In this example, the Gigabit Ethernet interface 0/1/0/0 has one policy map attached as a main policy. Outgoing traffic on this interface will be affected if the policy is modified:

```
RP/0/RSP0/CPU0:router# show policy-map targets

Fri Jul 16 16:38:24.789 DST
1) Policymap: policy1    Type: qos
    Targets (applied as main policy):
      GigabitEthernet0/1/0/0 output
    Total targets: 1

    Targets (applied as child policy):
    Total targets: 0
```

This example shows target of the offloaded policies that are applied for ingress and egress traffic to the LC at location 0/1/cpu0:

```
RP/0/RSP0/CPU0:router# show policy-map targets location 0/1/cpU0

1) Policymap: policy    Type: qos
    Targets (applied as main policy):
      GigabitEthernet1000/0/0/0 input
      GigabitEthernet1000/0/0/1 input
    Total targets: 2

    Targets (applied as child policy):
    Total targets: 0


2) Policymap: policy_queue    Type: qos
    Targets (applied as main policy):
      TenGigE0/1/0/0 output
    Total targets: 1

    Targets (applied as child policy):
    Total targets: 0
```

Related Commands

Command	Description
show policy-map interface, on page 53	Displays policy configuration information for all classes configured for all service policies on the specified interface.

show qos flow-aware summary location

To display the flow aware qos summary information on the specified interface, use the **show qos flow-aware summary location** command in the EXEC mode.

show qos flow-aware summary location   {*interface-path-id* | **all**}

Syntax Description	*interface-path-id*	Physical location of the Shared Interface Processor (SIP). Naming notation is *rack/slot/module;* a slash between values is required as part of the notation.
		• *rack* —Chassis number of the rack.
		• *slot* —Physical slot number of the modular services card or line card.
		• *module* —Module number. A physical layer interface module (PLIM) is always 0.
	all	Specifies all location.

Command Default   No default behavior or values

Command Modes   EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines   No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
qos	read

This sample output shows how to display the flow aware qos summary information at location 0/1/CPU0:

```
RP/0/RSP0/CPU0:router# show qos flow-aware summary location 0/1/CPU0

Flow QoS Summary Information:
======================

Number of interfaces with Flow Aware QoS Policies: 1
Number of interfaces with ingress Flow Aware QoS Policies: 1
Number of interfaces with egress Flow Aware QoS Policies: 0
Number of UBRL Classes: 1
Number of CAC Classes: 0
NP id: 0
  Max number of Flow Table Entries: 51200
  Used Flow Table Entries: 0
  Number of CAC Flow Counters In Use: 1
NP id: 1
  Max number of Flow Table Entries: 51200
  Used Flow Table Entries: 0
```

```
        Number of CAC Flow Counters In Use: 1
```

show qos inconsistency

To display inconsistency information for the QoS policy on an interface, use the **show qos inconsistency** command in EXEC mode.

show qos inconsistency {**detail** *warning-type* {**file** *filename* | **location** *node-id*} | **summary** {**file** *filename* | **location** *node-id*}}

Syntax Description

detail	Displays interface and policy name details of the inconsistency.
warning-type	Selects the warning types to display: • 0—All warning types • 1—ANCP - No shaper at top policy map • 2—ANCP - Multiple classes at top policy map • 3—ANCP - Downstream rate less than shaper rate • 4—ANCP - Downstream rate more than port speed • 5—ANCP - Policy resolution failure • 6—ANCP - Traffic manager program failure • 7—Port speed - Policy resolution failure • 8—Port speed - Traffic manager program failure • 9—Bundle member addition failure • 10—Interface state not matching system configuration
file *filename*	Specify a file name, such as disk0:tmp.log or bootflash:.
location *node-id*	Displays detailed QoS information for the designated node. The *node-id* argument is entered in the rack/slot/module notation.
summary	Displays summary counts of QoS inconsistency warnings.

Command Default   None

Command Modes   EXEC mode

Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 4.3.0	The command was supported in dynamic template configuration mode in BNG.

Usage Guidelines   To enter the dynamic template configuration mode, run **dynamic-template** command in the Global Configuration mode.

Task ID

Task ID	Operations
qos	read

Examples

This example provides detail about QoS policy inconsistency, for all warning types:

```
RP/0/RSP0/CPU0:router# show qos inconsistency detail 0 location 0/7/CPU0

Interface Lists with QoS Inconsistency Warning:
========================================================

                    Node 0/7/CPU0
------------------------------------------------------------

Interfaces with QoS Inconsistency:  ANCP - No Shaper at top policymap
==============================================================================
Interface                 Direction  Policy Name            SPI Name
------------------------------------------------------------------------------
GigabitEthernet0/7/0/1.5    output     parent-none

Interfaces with QoS Inconsistency:  ANCP - Downstream Rate less than Shaper Rate
==============================================================================
Interface                 Direction  Policy Name            SPI Name
------------------------------------------------------------------------------
GigabitEthernet0/7/0/1      output     parent                 SPI1
GigabitEthernet0/7/0/1.2    output     parent
GigabitEthernet0/7/0/1      output     normal-policy-name     normal-spi-name
```

This example displays summary counts of inconsistency warnings:

```
RP/0/RSP0/CPU0:router#
RP/0/RSP0/CPU0:router# show qos inconsistency summary location 0/7/CPU0

Summary Counts of QoS Inconsistency Warnings:
========================================================


                    Node 0/7/CPU0

   Inconsistency Warning Type                 Count
-----------------------------------------------------
ANCP - No Shaper at top policymap:            1
ANCP - Downstream Rate less than Shaper Rate:  4
```

Related Commands

Command	Description
show qos interface, on page 30	Displays QoS information for a specific interface.

show qos shared-policy-instance

To list interface details for a specific location of a specific shared policy instance, attached to either an input or output interface, use the **show qos shared-policy-instance** command in EXEC mode.

show qos shared-policy-instance *instance-name* {**input** | **output**} **location** *node-id*

Syntax Description		
	instance-name	String of up to 32 characters to identify the shared policy instance.
	input	Displays details for the shared policy instance attached to the input interface.
	output	Displays details for the shared policy instance attached to the output interface
	location *node-id*	Location of node. The node-id argument is entered in *rack/slot/module* notation.

Command Default　None

Command Modes　EXEC mode

Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 3.9.0	This command was updated to support shared policy instance over bundle interfaces.
Release 4.3.0	The command was supported in BNG.
Release 5.1.1	This command was updated to support SPI over PW-Ether subinterface.

Usage Guidelines　To enter the dynamic template configuration mode, run **dynamic-template** command in the Global Configuration mode

Task ID

Task ID	Operations
qos	read, write

Examples　This example shows the results of the command to show details of the shared policy instance attached to the input interface at location 0/RSP0/CPU0:

```
RP/0/RSP0/CPU0:router# show qos shared-policy-instance instancetwo input location 0/RSP0/CPU0

shared-policy-instance: instancetwo input Bandwidth: 10000000 kbps
Policy: shape Total number of classes: 2
-----------------------------------------------------------------
Level: 0 Policy: shape Class: class-default
QueueID: N/A
Shape Profile: 1 CIR: 16 kbps CBS: 1024 bytes PIR: 128000 kbps PBS:1605632
bytes WFQ Profile: 1 Committed Weight: 1 Excess Weight: 1
```

```
Bandwidth: 0 kbps, Parent Bandwidth: 10000000 kbps, Excess Ratio: 1
-----------------------------------------------------------------------
Level: 1 Policy: child Class: class-default Parent Policy: shape Class: class-default
QueueID: 268435466 (Priority Normal)
Queue Limit: 1572 kbytes Profile: 1 Scale Profile: 14 WFQ Profile: 2
Committed Weight: 10 Excess Weight: 1020
Bandwidth: 0 kbps, Parent Bandwidth: 0kbps, Excess Ratio: 1
-----------------------------------------------------------------------


RP/0/RSP0/CPU0:router# show qos shared-policy-instance spi5 output location 0/1/cPU0
Interface: GigabitEthernet0_1_1_5
----------------------------------------------------
shared-policy-instance: spi5 output
Bandwidth configured: 1000000 kbps Bandwidth programed: 1000000 kbps
ANCP user configured: 0 kbps ANCP programed in HW: 0 kbps
Port Shaper programed in HW: 0 kbps
Policy: parent Total number of classes: 3
-----------------------------------------------------------------------
Level: 0 Policy: parent Class: class-default
QueueID: N/A
Shape CIR : NONE
Shape PIR Profile : 2/4(S) Scale: 488 PIR: 499712 kbps PBS: 6246400 bytes
WFQ Profile: 2/9 Committed Weight: 10 Excess Weight: 10
Bandwidth: 0 kbps, BW sum for Level 0: 0 kbps, Excess Ratio: 1
-----------------------------------------------------------------------
Level: 1 Policy: child Class: prec1
Parent Policy: parent Class: class-default
QueueID: 131112 (Priority 1)
Queue Limit: 318 kbytes Abs-Index: 46 Template: 0 Curve: 6
Shape CIR Profile: INVALID
Policer Profile: 56 (Single)
Conform: 25000 kbps (5 percent) Burst: 312500 bytes (0 Default)
Child Policer Conform: TX
Child Policer Exceed: DROP
Child Policer Violate: DROP
-----------------------------------------------------------------------
Level: 1 Policy: child Class: class-default
Parent Policy: parent Class: class-default
QueueID: 131114 (Priority Normal)
Queue Limit: 5888 kbytes Abs-Index: 109 Template: 0 Curve: 0
Shape CIR Profile: INVALID
WFQ Profile: 2/9 Committed Weight: 10 Excess Weight: 10
Bandwidth: 0 kbps, BW sum for Level 1: 0 kbps, Excess Ratio: 1
-----------------------------------------------------------------------
```

qos account

To enable QoS Layer 2 overhead accounting, use the **qos account** command in dynamic template configuration mode. To disable this qos account, use the **no** form of this command.

qos account [**AAL5** | **user-defined** *offset* **atm**] [**mux-1483 routed** | **mux-dot1q-rbe** | **mux-pppoa** | **mux-rbe** | **snap-1483routed** | **snap-dot1q-rbe** | **snap-pppoa** | **snap-rbe**]

Syntax Description

AAL5	Specifies AAL5 for qos.
user-defined	Specifies the user-defined keyword.
offset	Specifies the user-defined offset size.
atm	Adds ATM cell tax to the L2 overhead.
mux-1483 routed	Specifies the mux-1483 routed.
mux-dot1q-rbe	Specifies the mux-dot1q-rbe.
mux-pppoa	Specifies the mux-pppoa.
mux-rbe	Specifies the mux-rbe.
snap-1483routed	Specifies the snap-1483routed.
snap-dot1q-rbe	Specifies the snap-dot1q-rbe.
snap-pppoa	Specifies the snap-pppoa
snap-rbe	Specifies the snap-rbe.

Command Default None

Command Modes Dynamic template configuration

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines This command is available only in the dynamic template type ppp submode.

Task ID

Task ID	Operation
qos	read, write

This is an example of configuring the **qos account** command in dynamic template configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# dynamic-template type ppp p1
RP/0/RSP0/CPU0:router(config-dynamic-template-type)# qos account AAL5 snap-rbe
```

Related Commands

Command	Description
#unique_93	Sets the minimum guaranteed output bandwidth for a subscriber.

violate-action

To configure the action to take on packets that violate the rate limit, use the **violate-action** command in policy map police configuration mode. To remove a conform action from the policy-map, use the **no** form of this command.

violate-action   {**drop** | **set** *options* | **transmit**}
no violate-action   {**drop** | **set** *options* | **transmit**}

Syntax Description		
drop	Drops the packet.	
	• **qos-group***value*—Sets QoS group value. Range is 0 to 63.	
transmit	Transmits the packets.	

Command Default   No default behavior or values

Command Modes   Policy map police configuration

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines   For more information regarding the traffic policing feature refer to the police rate, on page 16 command.

The **violate-action** command can set the DSCP, the precedence, or the discard class for IP packets, and experimental and discard-class values for MPLS packets.

Task ID

Task ID	Operations
qos	read, write

Examples   In this example for MPLS, traffic policing is configured to drop packets that violate the rate limit:

```
RP/0/RSP0/CPU0:router(config)# class-map class1
RP/0/RSP0/CPU0:router(config-cmap)# match mpls experimental topmost 0
RP/0/RSP0/CPU0:router(config-cmap)# exit
RP/0/RSP0/CPU0:router(config)# policy-map policy1
RP/0/RSP0/CPU0:router(config-pmap)# class class1
RP/0/RSP0/CPU0:router(config-pmap-c)# police rate 250 kbps burst 50
RP/0/RSP0/CPU0:router(config-pmap-c-police)# violate-action drop
RP/0/RSP0/CPU0:router(config-pmap-c-police)# exit
RP/0/RSP0/CPU0:router(config-pmap-c)# exit
RP/0/RSP0/CPU0:router(config-pmap)# exit
RP/0/RSP0/CPU0:router(config)# interface gigabitethernet 0/1/0/9
RP/0/RSP0/CPU0:router(config-if) service-policy input policy1
```

Related Commands	**Command**	**Description**
	conform-action	Configures the action to take on packets that conform to the rate limit.
	exceed-action	Configures the action to take on packets that exceed the rate limit.
	police rate, on page 16	Configures traffic policing and enters policy map police configuration mode.
	policy-map, on page 25	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.
	show policy-map interface, on page 53	Displays policy configuration information for all classes configured for all service policies on the specified interface.

violate-action